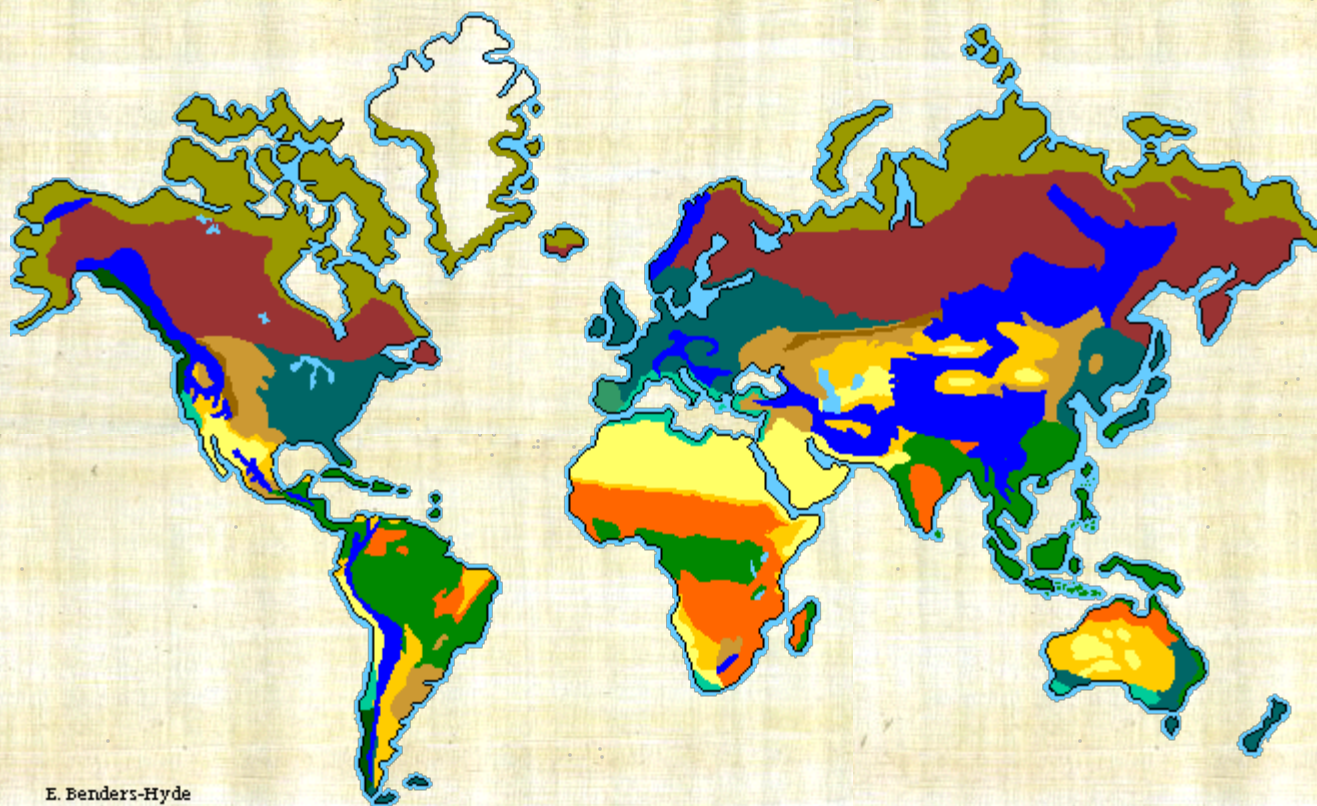


World Biomes



E. Benders-Hyde

- | | | |
|-------------------|-------------------------|-------------------|
| Tundra | Deciduous Forest | Savanna |
| Taiga | Chaparral | Rainforest |
| Grasslands | Desert | Alpine |
| | Desert-scrub | |

What is a Biome?

A biome is a large geographical area of distinctive plant and animal

groups, which are adapted to that particular environment. The climate and geography of a region determines what type of biome can exist in that region. Major biomes include deserts, forests, grasslands, tundra, and several types of aquatic environments. Each biome consists of many ecosystems whose communities have adapted to the small differences in climate and the environment inside the biome.

All living things are closely related to their environment. Any change in one part of an environment, like an increase or decrease of a species of animal or plant, causes a ripple effect of change in through other parts of the environment.

The earth includes a huge variety of living things, from complex plants and animals to very simple, one-celled organisms. But large or small, simple or complex, no organism lives alone. Each depends in some way on other living and nonliving things in its surroundings.

To understand a world biome, you need to know:

- What the climate of the region is like.
- Where each biome is found and what its geography is like.
- The special adaptations of the vegetation.
- The types of animals found in the biome and their physical and behavioral adaptations to their environment.

Ecological Relationships of Biomes

The survival and well being of a biome and its organisms depends on ecological relationships throughout the world. Even changes in distant parts of the world and its atmosphere affect our environment and us. The eruption of a volcano in Mexico, or Southeast Asia can bring the temperature of the whole world down a few degrees for several years.

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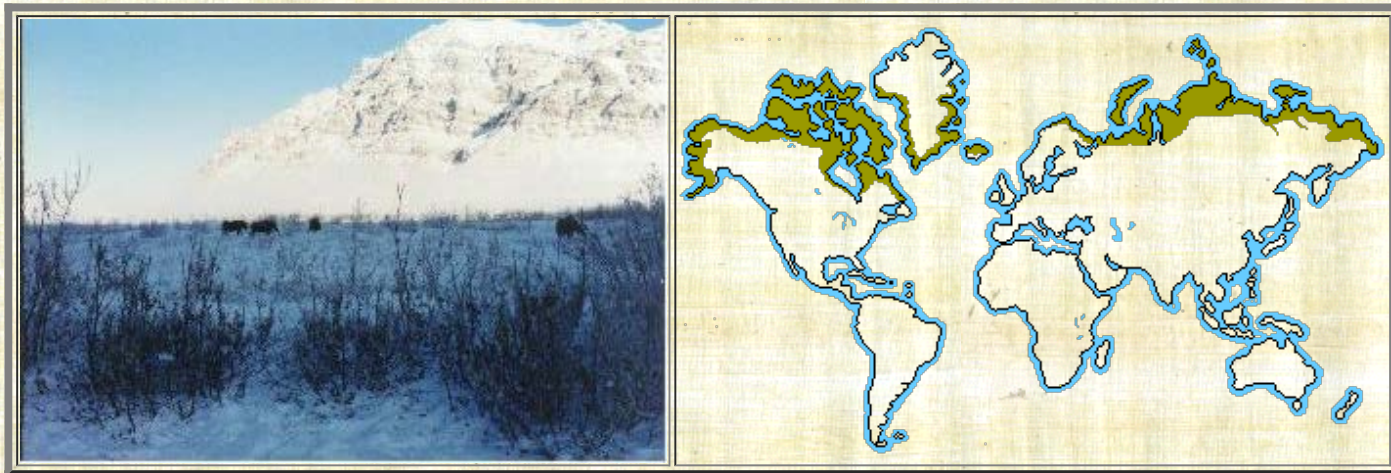
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Tundra



Anaktuvuk Pass, Alaska

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Did you know that the Arctic Tundra is the world's youngest biome? It was formed 10,000 years ago. Located at latitudes 55° to 70° North, the tundra is a vast and treeless land which covers about 20% of the Earth's surface, circumnavigating the North pole. It is usually very cold, and the land is pretty stark. Almost all tundras are located in the Northern Hemisphere. Small tundra-like areas do exist in Antarctica in the Southern Hemisphere, but because it is much colder than the Arctic, the ground is always covered with snow and ice. Conditions are not right for a true tundra to form. Average annual temperatures are -70°F (-56°C).

Tundra comes from the Finnish word "tunturia", which means a barren land. The ground is permanently frozen 10 inches to 3 feet (25 to 100 cm) down so that trees can't grow there. The bare and sometimes rocky ground can only support low growing plants like mosses, heaths, and lichen. In the winter it is cold and dark and in the summer, when the snow and the top layer of permafrost melt, it is very soggy and the tundra is covered with marshes, lakes, bogs and streams that breed thousands of insects and attract many migrating birds.

The main seasons are winter and summer. Spring and fall are only short periods between winter and summer. The tundra is the world's coldest and driest biomes. The average annual temperature is -18° F (-28° C). Nights can last for weeks when the sun barely rises during some months in the winter, and the temperature can drop to -94° F (-70° C). During the summer the sun shines almost 24 hours a day, which is why the Arctic is also called the Land of the Midnight Sun. Summer are usually warm. Temperatures can get up to 54° F (12° C), but it can get as cold as 37° F (3° C). Average summer temperatures range from 37° to 60°F (3° to 16°C).

The Arctic tundra is also a windy place and winds can blow between 30 to 60 miles (48 to 97 kilometers) per hour. Of the North American, Scandinavian and Russian tundras, the Scandinavian tundra is the warmest, with winter temperatures averaging 18°F (-8°C)

The tundra is basically like a desert when it comes to precipitation. Only about 6 - 10 inches of precipitation (mostly snow) fall each year. Below the soil is the tundra's permafrost, a permanently frozen layer of earth. During the short summers the top layer of soil may thaw just long enough to let plants grow and reproduce. Since it can't sink into the ground, water from melting permafrost and snow forms lakes and marshes each summer.

There is barely any vegetation in the tundra, only about 1,700 different species, which isn't very much. These are mostly shrubs, sedges, mosses, lichens and grasses. There are about 400 varieties of flowers. The growing season is only about 50 to 60 days long. There are no trees, except for some birches in the lower latitudes. The ground is always frozen beneath the top layer of soil, so trees can't send their roots down. [Willows](#) do grow on some parts of the tundra but only as low carpets about 3 inches (8 cm) high. Most plants grow in a dense mat of roots which has developed over thousands of years. The soil is very low in nutrients and minerals, except where animal droppings fertilize the soil.

Surprisingly there are animals in the tundra. Although there isn't a lot of biodiversity, only 48 species of land mammals are found on the tundra, there are a lot of each species. These consist of slightly modified shrews, hares, rodents, wolves, foxes, bears and deer. There are huge herds of [caribou](#) in North America (known as reindeer in Eurasia) which feed on lichens and plants. There are also smaller herds of [musk-oxen](#). Wolves, [wolverines](#), arctic foxes, and [polar bears](#) are the predators of the tundra. Smaller mammals are [snowshoe rabbits](#) and lemmings. There aren't many different species of insects in the tundra, but black flies, deer flies, mosquitoes and "no-see-ums" (tiny biting midges) can make the tundra a miserable place to be in the summer. Mosquitoes can keep themselves from freezing by replacing the water in their bodies with a chemical called glycerol. It works like an antifreeze and allows them to survive under the snow during the winter. The marshy tundra is a great place for migratory birds like the [harlequin duck](#), sandpipers and plovers.

The tundra is one of Earth's three major carbon dioxide sinks. A carbon dioxide sink is a [biomass](#) which takes in more carbon dioxide than it releases. Carbon dioxide is a greenhouse gas that contributes to global warming. During the short summer tundra's plants take in carbon dioxide, sunlight and water in the process of photosynthesis. Plants normally give off carbon dioxide after they die and decompose. But because of the short, cool summer and freezing winter temperatures, plants can't decompose. Remains of plants thousands of years old have been found in the tundra permafrost. In this way the tundra traps the carbon dioxide and removes it from the atmosphere. Today global warming is melting the permafrost of the tundra and every year several feet of tundra are lost. As the tundra melts, the plant mass decomposes and returns carbon dioxide to the atmosphere.

The tundra is a very fragile environment. The extremely cold temperatures makes it a difficult environment to survive in during the winter, and plants and animals have a hard time coping with any extra stresses and disturbances. More

people moving to the tundra to work in the mines and oil rigs have created towns and more roads. Some animal's movements to traditional feeding and denning grounds have been disrupted by these obstacles. When they try to pass through a town they are often scared away or shot. With their feeding patterns disrupted, many polar bears have starved. The Alaskan oil pipeline was built across a caribou migration route. In some places the pipeline has been raised above the ground so the caribou can pass under it. Pesticides have been used to control the hordes of insects. Thousands of migrating birds come to the tundra because of the abundant insects. Through the food chain the pesticides reach many of the animals that live on the tundra.

Pollution from mining and drilling for oil has polluted the air, lakes and rivers. The land around some nickel mines in Russia has become so polluted that the plants in the surrounding area have died. Footprints and tire tracks can be visible for many years after they were made. When the sun hits the ruts it causes the permafrost to melt. This causes erosion and the ruts get bigger, and eventually the ruts turn into gullies. Tracks made during WW II have grown so large that some of them are now lakes.

The tundra is not a cold and useless wasteland. It is a very fragile environment and the plants and animals that have made their home on the tundra biome have made some incredible adaptations to the long, cold winters and the short but abundant summers. They live on a precarious edge and the smallest stresses can bring about their destruction.

by Whitney S. 2002

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*Check out this website for great info on life on the tundra and the people who live there!

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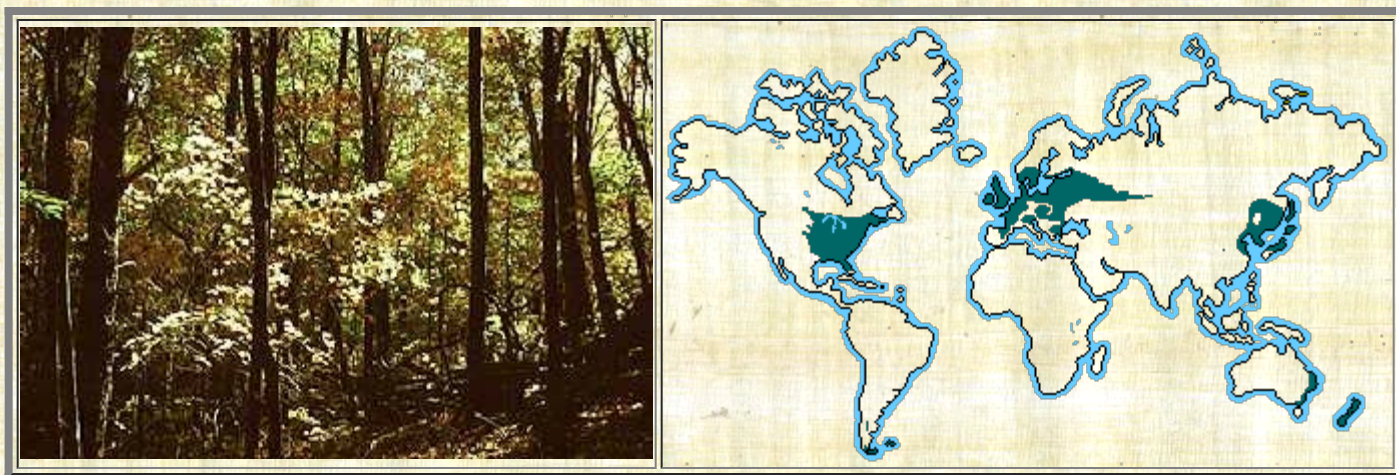
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Deciduous Forest



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Northeast Asian Deciduous Forest

Deciduous forests can be found in the eastern half of North America, and the middle of Europe. There are many deciduous forests in Asia. Some of the major areas that they are in are southwest Russia, Japan, and eastern China. South America has two big areas of deciduous forests in southern Chile and Middle East coast of Paraguay. There are deciduous forests located in New Zealand, and southeastern Australia also.

The average annual temperature in a deciduous forest is 50° F. The average rainfall is 30 to 60 inches a year.

In deciduous forests there are five different zones. The first zone is the Tree Stratum zone. The Tree Stratum zone contains such trees as oak, beech, maple, chestnut hickory, elm, basswood, linden, walnut, and sweet gum trees. This zone has height ranges between 60 feet and 100 feet.

The small tree and sapling zone is the second zone. This zone has young, and short trees. The third zone is called the shrub zone. Some of the shrubs in this zone are rhododendrons, azaleas, mountain laurel, and huckleberries. The Herb zone is the fourth

zone. It contains short plants such as herbal plants. The final zone is the Ground zone. It contains lichen, club mosses, and true mosses.

The deciduous forest has four distinct seasons, spring, summer, autumn, and winter. In the autumn the leaves change color. During the winter months the trees lose their leaves.

The animals adapt to the climate by hibernating in the winter and living off the land in the other three seasons. The animals have adapted to the land by trying the plants in the forest to see if they are good to eat for a good supply of food. Also the trees provide shelter for them. Animal use the trees for food and a water sources. Most of the animals are camouflaged to look like the ground.

The plants have adapted to the forests by leaning toward the sun. Soaking up the nutrients in the ground is also a way of adaptation.

A lot of deciduous forests have lost land to farms and towns. Although people are trying to protect the forests some poachers are trying to kill the animals in the forests. The animals are losing their homes because of people building their homes.

by Connie T. 2001

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The word "Deciduous" means "falling off or out at a certain season". That explains why deciduous forest means a forest in which the leaves fall off the trees when the winter comes.

The deciduous forests are located in the temperate zone above the tropical forests and below the coniferous forests. Most of Europe, the eastern half of North America, parts of Japan and Asia were once covered with large deciduous forests. Most of the deciduous forests have now disappeared but many of the trees still grow in deciduous forest biome. The types of trees you can find in these three regions are broad leaved deciduous trees and some of the evergreen species. The trees are more commonly known as ash, oak, lime, [beech](#), birch and northern arrowwood. Also found in this biome are wild flowers such as oxlip, bluebells, painted trillium and primrose. As well as things such as carpet moss, tawny milk-cap mushrooms and lady fern.

The soil is very fertile. In fact, some of the great agricultural regions are found in this biome. That is one of the reasons there aren't a lot of original deciduous forests left in the world. Almost all of the forests in North America are second growth forests but it still has the biggest variety of original plant species. In Europe there are only a few species of original trees left. Most of the forests have been cleared for agriculture. China has been clearing the natural trees for at least 4,000 years and most of the forests are man-made.

There are many types of animals in the deciduous forest ranging from mammals like deer to bugs like mosquitoes. Many of the animals are either nut and acorn feeders, or omnivores. Many of the animals have adapted to forest life. Some of them hibernate during the winter months.

A few common animals found in the deciduous forest are, deer, gray squirrels, mice raccoons, salamanders, snakes, robins, frogs and many types of insects. Some animals migrate south when winter comes.

Most deciduous forests are found in Eastern North America somewhere around 35-48° N, and Europe and Asia around 45-60° N. There are some deciduous regions in the southern hemisphere but their plants and animals are different from those of the northern deciduous forests.

The average temperature is around 50° F (about 10° C). The average rainfall is 30-60 inches (75-150 cm) per year. You can find all four seasons: winter (cold and frosty), summer (hot and humid), fall (cool and breezy), and spring (warm and breezy). There is about a 6 month growing season.

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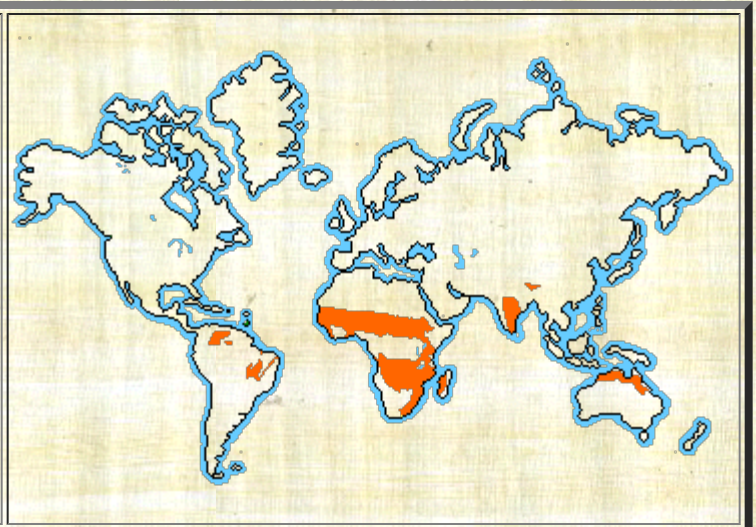
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Savanna



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Australian Tropical Savanna

African Savanna

A savanna is a rolling grassland scattered with shrubs and isolated trees, which can be found between a tropical rainforest and desert biome. Not enough rain falls on a savanna to support forests. Savannas are also known as tropical grasslands. They are found in a wide band on either side of the equator on the edges of tropical rainforests.

Savannas have warm temperature year round. There are actually two very different seasons in a savanna; a very long dry season (winter), and a very wet season (summer). In the dry season only an average of about 4 inches of rain falls. Between December and February no rain will fall at all. Oddly enough, it is actually a little cooler during this dry season. But don't expect sweater weather; it is still around 70° F.

In the summer there is lots of rain. In Africa the monsoon rains begin in May. An average of 15 to 25 inches of rain falls during this time. It gets hot and very humid during the rainy season. Every day the hot, humid air rises off the ground and collides with cooler air above and turns into rain. In the afternoons on the summer savanna the rains pour down for hours. African savannas have large herds of grazing and browsing hoofed animals. Each animal has a specialized eating habit that reduces competition for food.

There are several different types of savannas around the world. The savannas we are most familiar with are the East African savannas covered with acacia trees. The Serengeti Plains of Tanzania are some of the most well known. Here animals like lions, zebras, elephants, and giraffes and many types of ungulates (animals with hooves) graze and hunt. Many large grass-eating mammals (herbivores) can survive here

because they can move around and eat the plentiful grasses. There are also lots of carnivores (meat eaters) who eat them in turn.

South America also has savannas, but there are very few species that exist only on this savanna. In Brazil, Colombia, and Venezuela, savannas occupy some 2.5 million square kilometers, an area about one-quarter the size of Canada. Animals from the neighboring biomes kind of spill into this savanna. The Llanos of the Orinoco basin of Venezuela and Columbia is flooded annually by the Orinoco River. Plants have adapted to growing for long periods in standing water. The capybara and marsh deer have adapted themselves to a semi-aquatic life.

Brazil's cerrado is an open woodland of short twisted trees. The diversity of animals is very great here, with several plants and animals that don't exist anywhere else on earth.

There is also a savanna in northern Australia. Eucalyptus trees take the place of acacias in the Australian savanna. There are many species of kangaroos in this savanna but not too much diversity of different animals

Plants of the savannas are highly specialized to grow in this environment of long periods of drought. They have long tap roots that can reach the deep water table, thick bark to resist annual fires, trunks that can store water, and leaves that drop off during the winter to conserve water. The grasses have adaptations that discourage animals from grazing on them; some grasses are too sharp or bitter tasting for some animals, but not others, to eat. The side benefit of this is that every species of animal has something to eat. Different species will also eat different parts of the grass. Many grasses grow from the bottom up, so that the growth tissue doesn't get damaged by grazers. Many plants of the savanna also have storage organs like bulbs and corms for making it through the dry season.

Most of the animals on the savanna have long legs or wings to be able to go on long migrations. Many burrow under ground to avoid the heat or raise their young. The savanna is a perfect place for birds of prey like hawks and buzzards. The wide, open plain provides them with a clear view of their prey, hot air updrafts keep them soaring, and there is the occasional tree to rest on or nest in. Animals don't sweat to lose body heat, so they lose it through panting or through large areas of exposed skin, or ears, like those of the elephant.

The savanna has a large range of highly specialized plants and animals. They all depend on each other to keep the environment in balance. There are over 40 different species of hoofed mammals that live on the savannas of Africa. Up to 16 different species of browsers (those who eat leaves of trees) and grazers can coexist in one area. They do this by having their own food preferences, browsing/grazing at different heights, time of day or year to use a given area, and different places to go during the dry season.

These different herbivores provide a wide range of food for carnivores, like lions, leopards, cheetahs, jackals and hyenas. Each species has its own preference, making it possible to live side by side and not be in competition for food.

In many parts of the savannas of Africa people have started using it to graze their cattle and goats. They don't move around and soon the grasses are completely eaten up. With no vegetation, the savanna turns into a desert. Huge areas of savanna are lost to the Sahara desert every year because of overgrazing and farming.

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Taiga



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Siberian Taiga

A biome is the type of habitat in certain places, like mountain tops, deserts, and tropical forests, and is determined by the climate of the place. The taiga is the biome of the needleleaf forest. Living in the taiga is cold and lonely. Coldness and food shortages make things very difficult, mostly in the winter. Some of the animals in the taiga hibernate in the winter, some fly south if they can, while some just cooperate with the environment, which is very difficult. (Dillon Bartkus)

Taiga is the Russian word for forest and is the largest biome in the world. It stretches over Eurasia and North America. The taiga is located near the top of the world, just below the tundra biome. The winters in the taiga are very cold with only snowfall. The summers are warm, rainy, and humid. A lot of coniferous trees grow in the taiga. The taiga is also known as the boreal forest. Did you know that Boreal was the Greek goddess of the North Wind?

The taiga doesn't have as many plant and animal species as the tropical or the deciduous forest biomes. It does have millions of insects in the summertime. Birds migrate there every year to nest and feed.

Here is some information about the temperatures and weather in the taiga. The average temperature is below freezing for six months out of the year. The winter temperature range is -54 to -1°C (-65 to 30°F). The winters, as you can see, are really cold, with lots of snow.

Temperature range in the summer gets as low as -7°C (20°F). The high in summer can be 21°C (70°F). The summers are mostly warm, rainy and humid.

They are also very short with about 50 to 100 frost free days. The total precipitation in a year is 30 - 85 cm (12 - 33 in) . The forms the precipitation comes in are rain, snow and dew. Most of the precipitation in the taiga falls as rain in the summer.

The main seasons in the taiga are winter and summer. The spring and autumn are so short, you hardly know they exist. It is either hot and humid or very cold in the taiga.

There are not a lot of species of plants in the taiga because of the harsh conditions. Not many plants can survive the extreme cold of the taiga winter. There are some lichens and mosses, but most plants are coniferous trees like pine, white spruce, hemlock and douglas fir.

Coniferous trees are also known as evergreens. They have long, thin waxy needles. The wax gives them some protection from freezing temperatures and from drying out. Evergreens don't lose their leaves in the winter like deciduous trees. They keep their needles all year long. This is so they can start photosynthesis as soon as the weather gets warm. The dark color of evergreen needles allows them to absorb heat from the sun and also helps them start photosynthesis early.

Evergreens in the taiga tend to be thin and grow close together. This gives them protection from the cold and wind. Evergreens also are usually shaped like an upside down cone to protect the branches from breaking under the weight of all that snow. The snow slides right off the slanted branches.

The taiga is susceptible to many wildfires. Trees have adapted by growing thick bark. The fires will burn away the upper canopy of the trees and let sunlight reach the ground. New plants will grow and provide food for animals that once could not live there because there were only evergreen trees.

Animals of the taiga tend to be predators like the lynx and members of the weasel family like wolverines, bobcat, minks and ermine. They hunt herbivores like snowshoe rabbits, red squirrels and voles. Red deer, elk, and moose can be found in regions of the taiga where more deciduous trees grow.

Many insect eating birds come to the taiga to breed. They leave when the breeding season is over. Seed eaters like finches and sparrows, and omnivorous birds like crows stay all year long.

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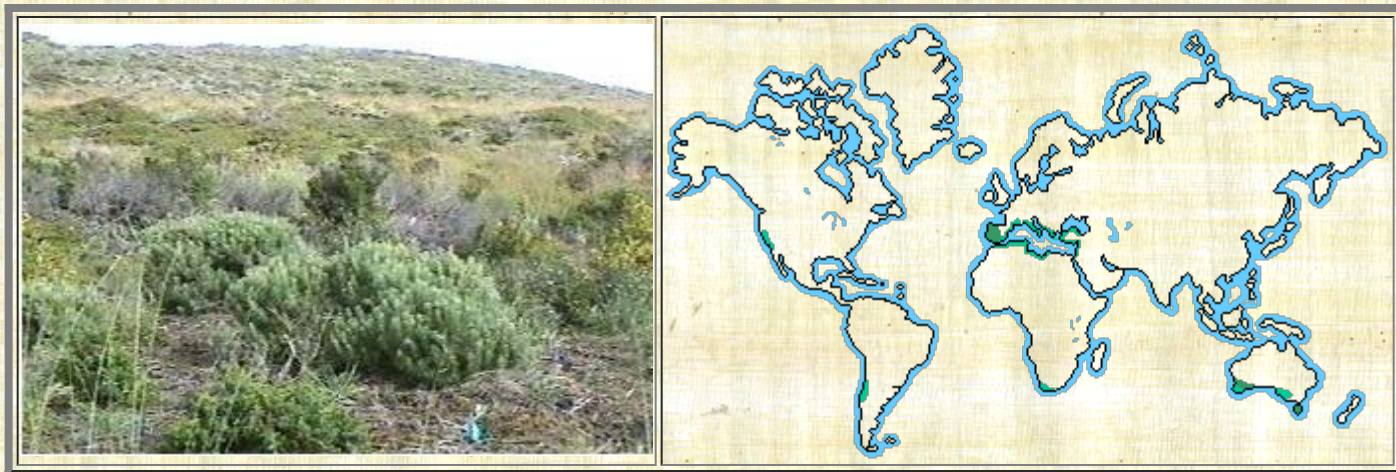
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Chaparral



Plants

The chaparral biome is found in a little bit of most of the continents - the west coast of the United States, the west coast of South America, the Cape Town area of South Africa, the western tip of Australia and the coastal areas of the Mediterranean.

Animals

Climate

Lay of the land: The chaparral biome has many different types of terrain. Some examples are flat plains, rocky hills and mountain slopes. It is sometimes used in movies for the "Wild West".

Mediterranean

Chaparral

Chaparral is characterized as being very hot and dry. As for the temperature, the winter is very mild and is usually about 10 °C. Then there is the summer. It is so hot and dry at 40 °C that fires and droughts are very common.

California Chaparral

Fynbos

Fortunately, the plants and animals are adapted to these conditions. Most of the plants have small, hard leaves which hold moisture. Some of these plants are poison oak, scrub oak, Yucca Wiple and other shrubs, trees and cacti.

The animals are all mainly grassland and desert types adapted to hot, dry weather. A few examples: coyotes, jack rabbits, mule deer, alligator lizards, horned toads, praying mantis, honey bee and ladybugs.

So, if you ever go somewhere that is like chaparral, make sure to bring some sunscreen and lots of water!

by Lucy M. 2000

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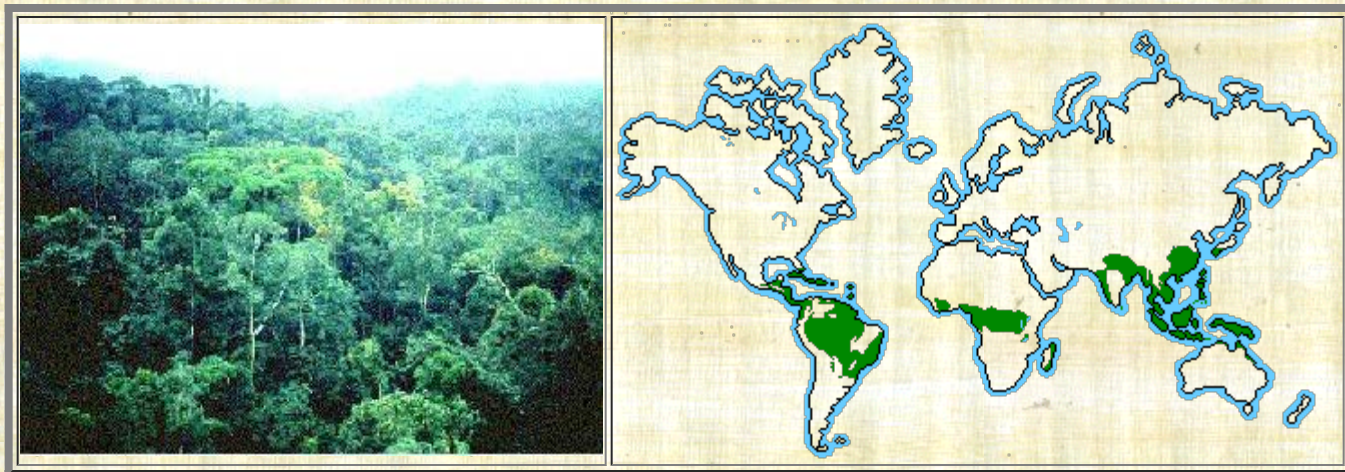
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Tropical Rainforest



T. Sibona. F.A.O

Plants

The tropical rain forest is a forest of tall trees in a region of year-round warmth. An average of 50 to 260 inches (125 to 660 cm.) of rain falls yearly.

Animals

Climate

Rain forests belong to the tropical wet climate group. The temperature in a rain forest rarely gets higher than 93 °F (34 °C) or drops below 68 °F (20 °C); average humidity is between 77 and 88%; rainfall is often more than 100 inches a year. There is usually a brief season of less rain. In monsoonal areas, there is a real dry season. Almost all rain forests lie near the equator.

Southeast Asian Rainforests

Rainforests now cover less than 6% of Earth's land surface. Scientists estimate that more than half of all the world's plant and animal species live in tropical rain forests. Tropical rainforests produce 40% of Earth's oxygen.

A tropical rain forest has more kinds of trees than any other area in the world. Scientists have counted about 100 to 300 species in one 2 1/2-acre (1-hectare) area in South America. Seventy percent of the plants in the rainforest are trees.

About 1/4 of all the medicines we use come from rainforest plants. **Curare** comes from a tropical vine, and is used as an anesthetic and to relax muscles during surgery. Quinine, from the cinchona tree, is used to treat malaria. A person with lymphocytic leukemia has a 99% chance that the disease will go into remission because of the rosy periwinkle. More than 1,400 varieties of tropical plants are thought to be potential cures for cancer.

All tropical rain forests resemble one another in some ways. Many of the trees have straight trunks that don't branch out for 100 feet or more. There is no sense in growing branches below the canopy where there is little light. The majority of the trees have smooth, thin bark because there is no need to protect them from water loss and freezing temperatures. It also makes it difficult for **epiphytes** and plant parasites to get a hold on the trunks. The bark of different species is so similar that it is difficult to identify a tree by its bark. Many trees can only be identified by their flowers.

Despite these differences, each of the three largest rainforests--the American, the African, and the Asian--has a different group of animal and plant species. Each rain forest has many species of monkeys, all of which differ from the species of the other two rain forests. In addition, different areas of the same rain forest may have different species. Many kinds of trees that grow in the mountains of the Amazon rain forest do not grow in the lowlands of that same forest.

Layers of the Rainforest

There are four very distinct layers of trees in a tropical rain forest. These layers have been identified as the emergent, upper canopy, understory, and forest floor.

- **Emergent** trees are spaced wide apart, and are 100 to 240 feet tall with umbrella-shaped canopies that grow above the forest. Because emergent trees are exposed to drying winds, they tend to have small, pointed leaves. Some species lose their leaves during the brief dry season in monsoon rainforests. These giant trees have straight, smooth trunks with few branches. Their root system is very shallow, and to support their size they grow buttresses that can spread out to a distance of 30 feet.
- The upper canopy of 60 to 130 foot trees allows light to be easily available at the top of this layer, but greatly reduced any light below it. Most of the rainforest's animals live in the upper canopy. There is so much food available at this level that some animals never go down to the forest floor. The leaves have "drip spouts" that allows rain to run off. This keeps them dry and prevents mold and mildew from forming in the humid environment.
- The understory, or lower canopy, consists of 60 foot trees. This layer

is made up of the trunks of canopy trees, shrubs, plants and small trees. There is little air movement. As a result the humidity is constantly high. This level is in constant shade.

- The forest floor is usually completely shaded, except where a canopy tree has fallen and created an opening. Most areas of the forest floor receive so little light that few bushes or herbs can grow there. As a result, a person can easily walk through most parts of a tropical rain forest. Less than 1 % of the light that strikes the top of the forest penetrates to the forest floor. The top soil is very thin and of poor quality. A lot of litter falls to the ground where it is quickly broken down by decomposers like termites, earthworms and fungi. The heat and humidity further help to break down the litter. This organic matter is then just as quickly absorbed by the trees' shallow roots.

Plant Life

Besides these four layers, a shrub/sapling layer receives about 3 % of the light that filters in through the canopies. These stunted trees are capable of a sudden growth surge when a gap in the canopy opens above them.

The air beneath the lower canopy is almost always humid. The trees themselves give off water through the pores (stomata) of their leaves. This process, called transpiration, can account for as much as half of the precipitation in the rain forest.

Rainforest plants have made many adaptations to their environment. With over 80 inches of rain per year, plants have made adaptations that helps them shed water off their leaves quickly so the branches don't get weighed down and break. Many plants have drip tips and grooved leaves, and some leaves have oily coatings to shed water. To absorb as much sunlight as possible on the dark understory, leaves are very large. Some trees have leaf stalks that turn with the movement of the sun so they always absorb the maximum amount of light. Leaves in the upper canopy are dark green, small and leathery to reduce water loss in the strong sunlight. Some trees will grow large leaves at the lower canopy level and small leaves in the upper canopy. Other plants grow in the upper canopy on larger trees to get sunlight. These are the epiphytes such as orchids and bromeliads. Many trees have buttress and stilt roots for extra support in the shallow, wet soil of the rainforests.

Over 2,500 species of vines grow in the rainforest. Lianas start off as small shrubs that grow on the forest floor. To reach the sunlight in the upper canopy it sends out tendrils to grab sapling trees. The liana and the tree grow towards the canopy together. The vines grow from one tree to another and make up 40% of the canopy leaves. The rattan vine has spikes on the underside of its leaves that point backwards to grab onto sapling trees. Other "strangler" vines will use trees as support and grow thicker and thicker as they reach the canopy, strangling its host tree. They look

like trees whose centers have been hollowed out.

Dominant species do not exist in tropical rainforests. Lowland dipterocarp forest can consist of many different species of Dipterocarpaceae, but not all of the same species. Trees of the same species are very seldom found growing close together. This bio diversity and separation of the species prevents mass contamination and die-off from disease or insect infestation. Bio diversity also insures that there will be enough pollinators to take care of each species' needs. Animals depend on the staggered blooming and fruiting of rainforest plants to supply them with a year-round source of food.

Animal Life

Many species of animal life can be found in the rain forest. Common characteristics found among mammals and birds (and reptiles and amphibians, too) include adaptations to a life in the trees, such as the prehensile tails of New World monkeys. Other characteristics are bright colors and sharp patterns, loud vocalizations, and diets heavy on fruits.

Insects make up the largest single group of animals that live in tropical forests. They include brightly colored butterflies, mosquitoes, camouflaged stick insects, and huge colonies of ants.

The Amazon river basin rainforest contains a wider variety of plant and animal life than any other biome in the world. The second largest population of plant and animal life can be found in scattered locations and islands of Southeast Asia. The lowest variety can be found in Africa. There may be 40 to 100 different species in 2.5 acres (1 hectare) of a tropical rain forest.

When early explorers first discovered the rainforests of Africa, Southeast Asia and South America, they They were amazed by the dense growth, trees with giant buttresses, vines and epiphytes . The tropical vegetation grew so dense that it was difficult to cut one's way through it. It was thought at the time that the soil of a rainforest must be very fertile, filled with nutrients, enabling it to support the immense trees and other vegetation they found.

Today we know that the soil of the tropical rainforests is shallow, very poor in nutrients and almost without soluble minerals. Thousands of years of heavy rains have washed away the nutrients in the soil obtained from weathered rocks. The rainforest has a very short nutrient cycle. Nutrients generally stay in an ecosystem by being recycled and in a rainforest are mainly found in the living plants and the layers of decomposing leaf litter.

Various species of decomposers like insects, bacteria, and fungi make quick work of turning dead plant and animal matter into nutrients. Plants take up these nutrients the moment they are released.

A study in the Amazon rainforest found that 99% of nutrients are held in root mats. When a rainforest is burned or cut down the nutrients are removed from the ecosystem. The soil can only be used for a very short time before it becomes completely depleted of all nutrients.

Where the Rainforests Are Found

The tropical rain forest can be found in three major geographical areas around the world.

- Central America in the Amazon river basin.
- Africa - Zaire basin, with a small area in West Africa; also eastern Madagascar.
- Indo-Malaysia - west coast of India, Assam, Southeast Asia, New Guinea and Queensland, Australia.

Rainforests

by Michael G. 2001

In an average year the climate in a tropical rain forest is very humid because of all the rainfall. A tropical rainforest gets about 150 cm of rain per year. It gets lots of rain because it is very hot and wet in rain forests. The hotter the air, the more water vapor it can hold. It rains usually about 1/8 of an inch per day.

This climate is found near the equator. That means that there is more direct sunlight hitting the land and sea there than anywhere else. The sun warms the land and sea and the water evaporates into the air. The warm air can hold a lot of water vapor. As the air rises, it cools. That means it can hold less water vapor. Then as warm meets cold, condensation takes place and the vapor forms droplets and clouds form. The clouds then produce rain. It rains more than ninety days a year and the strong sun usually shines between the storms. The water cycle repeats often along the equator.

The main plants in this biome are trees. This is important because in the rain forest, some rain never gets past the trees and to the smaller plants and ground below. Trees in this climate reach a height of more than 164 feet. They form a canopy. The forest floor is called understory. The canopy also keeps sunlight from reaching the plants in the understory. Between the canopy and understory is a lower canopy made up of smaller trees. These plants do receive some filtered sunlight.

The tropical rain forest is classified under the Köppen Classification system as **Af**, meaning tropical forest. The **A** is given to tropical climates that are moist for all months and which have average temperatures above 18 degrees Celsius. The **f** stands for sufficient precipitation for all months. The latitude range for my climate is 15° to 25° North and South of the equator.

The annual precipitation of a rain forest is greater than 150 cm. In a rain forest there is a short dry season. In only a month the rainforest receives 4 inches of rain. The rain forest climate is different from a lot of other climates. In other climates, the evaporation is carried away to fall as rain in far off areas, but in the rain forests, 50 percent of the precipitation comes from its own evaporation. A lot of the rain that falls on the rain forest never reaches the ground, instead it stays on the trees because the leaves act as a shield.

The average temperature of a rain forest is about 77° Fahrenheit. The rain forest is about the same temperature year round. The temperature never drops below 64° Fahrenheit. Rain forests are so hot because they are found near the equator. The closer to the equator you are, the more solar radiation there is. The more solar radiation there is, the hotter it is. Rain forest are never found in climates which have temperatures 32° Fahrenheit and below because the plant life will not be able to live in the frost. All the plants will die out if the rain forest is cooler.

The plants that make up the understory of a rain forest have adapted to the small amount of sunlight that they receive. Ferns and mosses do well, along with epiphytes. These are plants that grow on other plants. They can be found growing on branches of tall trees. There are many different plant species found in the rain forest.

by Michael G. 2001

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Grasslands



Animal

Grassland biomes are large, rolling terrains of grasses, flowers and herbs. Latitude, soil and local climates for the most part determine what kinds of plants grow in a particular grassland. A grassland is a region where the average annual precipitation is great enough to support grasses, and in some areas a few trees. The precipitation is so erratic that drought and fire prevent large forests from growing. Grasses can survive fires because they grow from the bottom instead of the top. Their stems can grow again after being burned off. The soil of most grasslands is also too thin and dry for trees to survive.

Plant

Climate

Steppes of Eurasia

When the settlers of the United States moved westward, they found that the grasslands, or prairies as they called them, were more than just dry, flat areas. The prairies contained more than 80 species of animals and 300 species of birds, and hundreds of species of plants.

North American Prairie

There are two different types of grasslands; tall-grass, which are humid and very wet, and short-grass, which are dry, with hotter summers and colder winters than the tall-grass prairie. The settlers found both on their journey west. When they crossed the Mississippi River they came into some very tall grass, some as high as 11 feet. Here it rained quite often and it was very humid. As they traveled further west and approached the Rocky Mountains, the grass became shorter. There was less rain in the summer and the winters got colder. These were the short-grass prairies.

The Pampas

Grassland biomes can be found in the middle latitudes, in the interiors of continents. They can have either moist continental climates or dry subtropical climates. In Argentina, South America, the grasslands are known as pampas. The climate there is humid and moist. Grasslands in the southern hemisphere tend to get more precipitation than those in the

northern hemisphere, and the grass tends to be the tall-grass variety.

There is a large area of grassland that stretch from the Ukraine of Russia all the way to Siberia. This is a very cold and dry climate because there is no nearby ocean to get moisture from. Winds from the arctic aren't blocked by any mountains either. These are known as the Russian and Asian steppes.

In the winter, grassland temperatures can be as low as -40° F, and in the summer it can be as high 70° F. There are two real seasons: a growing season and a dormant season. The growing season is when there is no frost and plants can grow (which lasts from 100 to 175 days). During the dormant (not growing) season nothing can grow because its too cold.

In tropical and subtropical grasslands the length of the growing season is determined by how long the rainy season lasts. But in the temperate grasslands the length of the growing season is determined by temperature. Plants usually start growing when the daily temperature reached about 50° F.

In temperate grasslands the average rainfall per year ranges from 10-30 inches. In tropical and sub-tropical grasslands the average rainfall per year ranges from 25-60 inches per year. The amount of rainfall is very important in determining which areas are grasslands because it's hard for trees to compete with grasses in places where the uppers layers of soil are moist during part of the year but where deeper layer of soil are always dry.

The most common types of plant life on the North American prairie are Buffalo Grass, Sunflower, Crazy Weed, Asters, Blazing Stars, Coneflowers, Goldenrods, Clover, and Wild Indigos.

Some common animals in the grasslands are Coyotes, Eagles, Bobcats, the Gray Wolf, Wild Turkey, Fly Catcher, Canadian Geese, Crickets, Dung Beetle, Bison, and Prairie Chicken.

by Sam M. 2000

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Desert



Dry desert



Plants

In this report you will learn about Hot and Dry Deserts and Cold Deserts. I hope you enjoy!

Animals

A Hot and Dry Desert is, as you can tell from the name, hot and dry. Most Hot and Dry Deserts don't have very many plants. They do have some low down plants though. The only animals they have that can survive have the ability to burrow under ground. This is because they would not be able to live in the hot sun and heat. They only come out in the night when it is a little cooler.

Climate

Mojave Desert

A cold desert is a desert that has snow in the winter instead of just dropping a few degrees in temperature like they would in a Hot and Dry Desert. It never gets warm enough for plants to grow. Just maybe a few grasses and mosses. The animals in Cold Deserts also have to burrow but in this case to keep warm, not cool. That is why you might find some of the same animals here as you would in the Hot and Dry Deserts.

Sonoran Desert

Deserts cover about one fifth of the Earth's land surface. Most Hot and Dry Deserts are near the Tropic of Cancer or the Tropic of Capricorn. Cold Deserts are near the Arctic part of the world.

Hot and Dry Deserts temperature ranges from 20 to 25° C. The extreme maximum temperature for Hot Desert ranges from 43.5 to 49° C. Cold Deserts temperature in winter ranges from -2 to 4° C and in the summer 21 to 26° C a year

The precipitation in Hot and Dry Deserts and the precipitation in Cold Deserts is different. Hot and Dry Deserts usually have very little rainfall and/or concentrated rainfall in short periods between long rainless periods.

This averages out to under 15 cm a year. Cold Deserts usually have lots of snow. They also have rain around spring. This averages out to 15 - 26 cm a year.

Hot and Dry Deserts are warm throughout the fall and spring seasons and very hot during the summer. the winters usually have very little if any rainfall. Cold Deserts have quite a bit of snow during winter. The summer and the beginning of the spring are barely warm enough for a few lichens, grasses and mosses to grow.

Hot and Dry Deserts vegetation is very rare. Plants are almost all ground-hugging shrubs and short woody trees. All of the leaves are replete (packed with nutrients). Some examples of these kinds of plant are Turpentine Bush, Prickly Pears, and Brittle Bush. For all of these plants to survive they have to have adaptations. Some of the adaptations in this case are the ability to store water for long periods of time and the ability to stand the hot weather.

Cold Desert's plants are scattered. In areas with little shade, about 10 percent of the ground is covered with plants. In some areas of sagebrush it reaches 85 percent. The height of scrub varies from 15 cm to 122 cm. All plants are either deciduous and more or less contain spiny leaves.

Hot and Dry Deserts animals include small nocturnal (only active at night) carnivores. There are also insects, arachnids, reptiles, and birds. Some examples of these animals are Borrowers, Mourning Wheatears, and Horned Vipers. Cold Deserts have animals like Antelope, Ground Squirrels, Jack Rabbits, and Kangaroo Rats.

Stetson N. 2000

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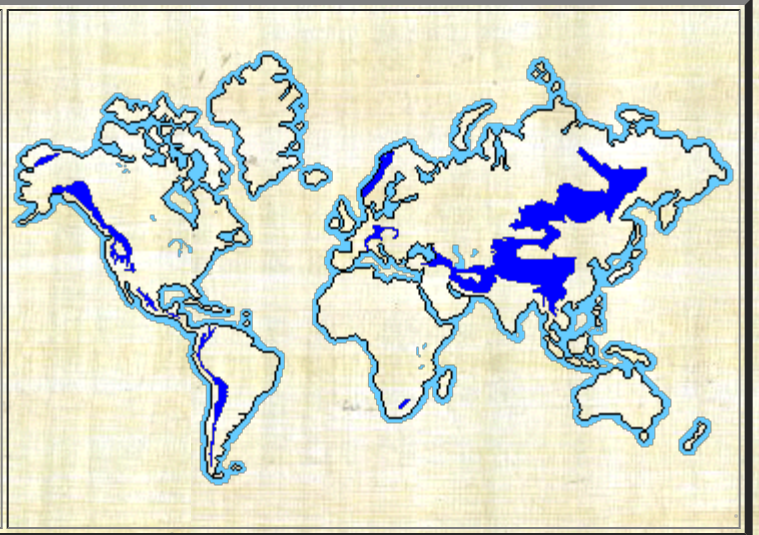
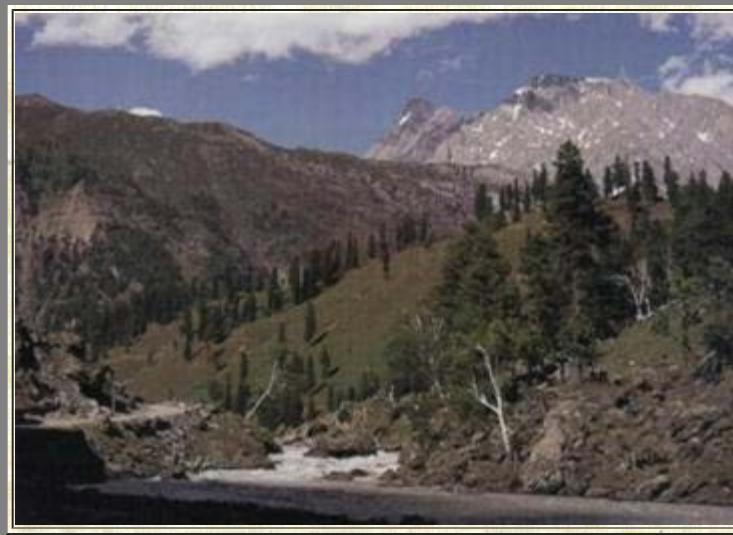
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Alpine



Plants

Cold, snowy, windy. When you hear those words they make you think of mountains. The Alpine biome is like winter is to people in New England; snow, high winds, ice, all the typical winter things. In Latin the word for 'high mountain' is 'alpes'. That is where today's word alpine comes from.

Animals

Climate

Alpine biomes are found in the mountain regions all around the world. They are usually at an altitude of about 10,000 feet or more. The Alpine biome lies just below the snow line of a mountain. As you go up a mountain, you will travel through many biomes. In the North American Rocky Mountains you begin in a desert biome. As you climb you go through a deciduous forest biome, grassland biome, steppe biome, and taiga biome before you reach the cold Alpine biome.

Himalayan Mountains

In the summer average temperatures range from 10 to 15° C . In the winter the temperatures are below freezing. The winter season can last from October to May. The summer season may last from June to September. The temperatures in the Alpine biome can also change from warm to freezing in one day.

Andes Mountains

Rocky Mountains

Because the severe climate of the Alpine biome, plants and animals have developed adaptations to those conditions. There are only about 200 species of Alpine plants. At high altitudes there is very little CO₂, which plants need to carry on photosynthesis. Because of the cold and wind, most plants are small perennial groundcover plants which grow and reproduce slowly. They protect themselves from the cold and wind by hugging the ground. Taller plants or trees would soon get blown over and freeze. When plants die they don't decompose very quickly because of the cold. This makes for poor soil conditions. Most Alpine plants can grow in sandy and rocky soil. Plants have also adapted to the dry conditions of the Alpine biome. Plant books and catalogs warn you about over watering Alpine plants.

Alpine animals have to deal with two types of problems: the cold and too much high UV wavelengths. This is because there is less atmosphere to filter UV rays from the sun. There are only warm blooded animals in the Alpine biome, although there are insects. Alpine animals adapt to the cold by hibernating, migrating to lower, warmer areas, or insulating their bodies with layers of fat. Animals will also tend to have shorter

legs, tails, and ears, in order to reduce heat loss. Alpine animals also have larger lungs, more blood cells and hemoglobin because of the increase of pressure and lack of oxygen at higher altitudes. This is also true for people who have lived on mountains for a long time, like the Indians of the Andes Mountains in South America and the Sherpas of the Himalayas in Asia.

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Some Facts About Our Planet



Earth Facts

Earth is the third planet, and 93,000,000 miles (150,000,000 km.) from the sun. It is estimated to be over 4.5 billion years old.

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The planet rotates once every 23 hours, 56 minutes, and 4.09 seconds. It makes one full revolution around the sun every 365 days, 6 hours, 9 minutes, and 9.45 seconds. Earth's axis is tilted at a 23.5° angle.

Earth has a total surface area of 196,800,000 square miles. Approximately 57,300,000 square miles, or 29% of the total surface area is land. Water covers approximately 139,500,000 square miles, or 71% of the total surface area.

The highest temperatures on Earth have reached 136° F (58° C) at Al Asisiyah, Libya. Temperatures of - 128° F (- 89° C) have been recorded at Vostok station in Antarctica.

The atmosphere is a thin, gaseous layer of air that

envelops the planet. Its inner layer is called the troposphere and reaches only 11 miles above sea level. It contains most of the planet's air, which consists of nitrogen (78%) and oxygen (21%). The stratosphere, or outer layer, stretches 11-30 miles above sea level and contains ozone (O₃). Ozone filters out most of the sun's harmful ultraviolet radiation.

More than 99% of earth's atmosphere is less than 50 miles (80 km.) high. However, particles of the atmosphere are found 1,000 miles (1,600 km.) in space above the planet's surface.

Our Sun

Our sun is the source of energy for life. Solar energy drives the climate and weather systems of our planet. The sun is a huge ball of hydrogen (72%) and helium (28%) gases. Tremendous pressure and temperatures in its inner core fuses the hydrogen nuclei and forms helium, releasing enormous amounts of energy.

This energy travels at the speed of light and reaches Earth in slightly more than 8 minutes. Earth receives only about one-billionth of the sun's energy. About 34% of the solar energy reaching the troposphere is reflected back into space by clouds, dust, chemicals. Most of the energy reaches the troposphere as visible light, infrared radiation, and a small amount of ultraviolet radiation that wasn't absorbed by the stratosphere.

This unreflected solar radiation is turned into infrared radiation, or heat. Heat-trapping gasses like water vapor, carbon dioxide, methane, nitrous oxide, and ozone affect the speed at which this radiation is returned to space. Without these gasses, known as the natural greenhouse effect, heat would immediately return to space, making it almost as cold as Mars.

Forming Life on Earth

Scientists have studied fossils and made chemical analysis of rocks to find out how life on Earth evolved to its present system. Several theories have been suggested. It is theorized by some scientists that life

developed in two phases over billions of years.

In the first phase explosions of dying stars shattered through our galaxy and created swirling clouds of dust particles and hot gases. These extended trillions of miles across space. As the cloud cooled, bits of matter began to cling to each other. Over 4 billion years ago the cloud had formed into a flattened, slowly rotating disk. Our sun was born in the center of this disk. Farther out on the disk, Earth and the other planets formed as bits of matter were drawn together. Earth started out as a molten mass that did not cool for millions of years. As it cooled it formed a thin, hard crust with no atmosphere or oceans.

Molten rock frequently erupted through the crust. Water vapor was released from the breakdown of rocks during volcanic eruptions. Eventually the crust cooled enough for this vapor to condense and come down as rain to form the oceans that covered most of Earth.

In the second phase scientists have recently hypothesized that bubbles floating on the ancient ocean trapped carbon-containing molecules and the other chemicals necessary for life. These bubbles may have popped and released these chemicals into the atmosphere. Organic compounds formed and dissolved in the early atmosphere, collecting in the shallow waters of the earth. Although no one knows how, the first living cells developed between 3.6 and 3.8 billion years ago. Over time these protocells developed into cells having the properties we describe as life.

These single-celled bacteria multiplied in the warm, shallow waters for billions of years. Here they mutated and developed into a variety of protists, fungi and, about 600 million years ago, plants and animals.

Life could not develop on land since there was no ozone layer to shield early life from damaging ultraviolet radiation. Then about 2.3-2.5 billion years ago photosynthetic bacteria emerged. These cells could remove carbon dioxide (CO₂) from the atmosphere and, using sunlight, combine it with water to make carbohydrates. In the process they created oxygen (O₂) and released it into the ocean. Some of the oxygen escaped into the atmosphere.

Our atmosphere was created over a span of 2 billion years. Some of the oxygen was converted into ozone (O₃), which formed in the lower stratosphere and protected life forms from UV radiation. This allowed

green plants to live closer to the surface of the ocean, making it easier for oxygen to escape into the atmosphere. About 400-500 million years ago the first plants began to exist on land. Over the following millions of years a variety of land plants and animals evolved.

Living Earth

Earth is truly a remarkable planet. It is the only planet in our solar system that has the components necessary to support life as we recognize it. The planet is only a tiny part of the universe, but it is the home of human beings and many other organisms. Animals and plants live almost everywhere on the surface of Earth.

These organisms can live on Earth because it has an atmosphere. The atmosphere moderates daytime and nighttime temperature swings. The atmosphere filters radiant energy during the day, preventing the surface from overheating. At night the atmosphere prevents most of the radiant heat from escaping back into space, keeping the surface warm.

Most organisms - both plants and animals - must also have water to live. Earth has plenty. Seventy-one percent of its surface is covered by water.

Living things also need nitrogen, oxygen, and carbon dioxide. Earth's thin layer of atmosphere provides all of these elements.

The atmosphere also screens out lethal levels of the sun's ultraviolet radiation. The atmosphere, however, could not exist if Earth were not at the exact distance it is from the sun.

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Plants



Illustrations from Kohler's "Medizinal Pflanzen"

The Importance of Plants

Close to 2.5 billion years ago, the earth's surface and atmosphere were stable enough to support primitive life. Single-cell organisms began to develop in the seas that covered the planet. A simple organism known as blue-green algae appeared and spread across the seas. Blue-green algae used sunlight and water to make food, and in the process, created oxygen. As the blue-green algae grew in the earth's seas, they began to fill the atmosphere with oxygen. The oxygen that blue-green algae produced made it possible for other types of organisms to develop.

Plants play the most important part in the cycle of nature. Without plants, there could be no life on Earth. They are the primary producers that sustain all other life forms. This is so because plants are the only organisms that can make their own food. Animals, incapable of making their own food, depend directly or indirectly on plants for their supply of food. All animals and the foods they eat can be traced back to plants.

The oxygen we breathe comes from plants. Through

- **Tundra**
- **Taiga**
- **Steppe**
- **Grasslands**
- **Deciduous Forest**
- **Chaparral**
- **Desert**
- **Savanna**
- **Rainforest**

photosynthesis, plants take energy from the sun, carbon dioxide from the air, and water and minerals from the soil. They then give off water and oxygen. Animals and other non-producers take part in this cycle through respiration. Respiration is the process where oxygen is used by organisms to release energy from food, and carbon dioxide is given off. The cycles of photosynthesis and respiration help maintain the earth's natural balance of oxygen, carbon dioxide, and water.

Leaves are the main food-making part of most plants. They capture energy from sunlight, and turn water and carbon dioxide into sugar and starch. This sugar and starch becomes the food that provides plants with energy to grow, to produce flowers and seeds, and carry on their other life processes.

Plant Facts

Scientists believe there are over 260,000 species of plants. Some plants are so small they can barely be seen. Others are taller than people or animals. One of the largest living plants on the earth are the sequoia trees of California. Some stand over 290 feet (88 meters) high and measure over 30 feet (9 meters) wide.

Certain characteristics of plants set them apart from other living things. Both plants and animals are complex organisms that are made up of many types of cells, but plant cells have thick, rigid walls that consist of a material called cellulose. Animal cells do not have this material. The cellulose enables plants to stand upright without the aid of an internal or external skeleton.

Plants and Their Environment

Plants require a reasonable level of heat to grow. The most favorable temperature at which photosynthesis takes place ranges from near freezing to 20 to 25° C (70 to 80° F). The rates of photosynthesis and respiration increase with rising temperatures. Any temperatures above or below these levels limit plant growth. The climate of a region determines what types of plants can survive in that region.

A plant's environment is made up of many factors. One of the most important is the weather--sunlight, temperature, and precipitation (rain, melted snow, and other moisture).



Alpine

Plant Index



Soil and other plants and animals that live in the same area are also included in the environment of a plant. All these factors form what is called a natural community.

No two natural communities are exactly alike, but many resemble one another more than they differ. Botanists divide the world into biomes--natural communities of plants, animals, and other organisms.

Medicine

Plants provide many useful drugs. Some of these plants have been used as medicines for hundreds of years. The bark of the cinchona tree was used 400 years ago to reduce fever. It is still used to make quinine, a drug used to treat malaria and other diseases. Another drug, called digitalis, is used in treating heart disease. It is made from the dried leaves of the purple foxglove plant. The roots of the Mexican yam are used in producing cortisone, a drug useful in treating arthritis and a number of other diseases.

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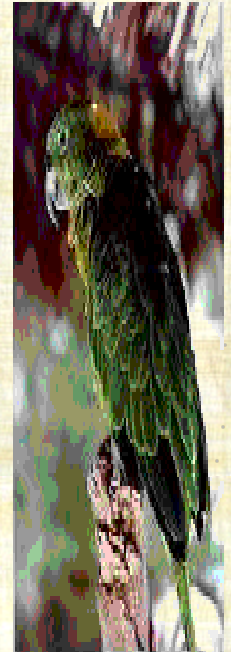
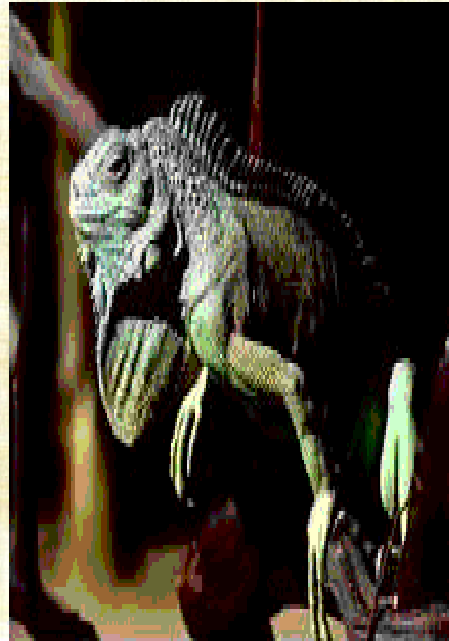
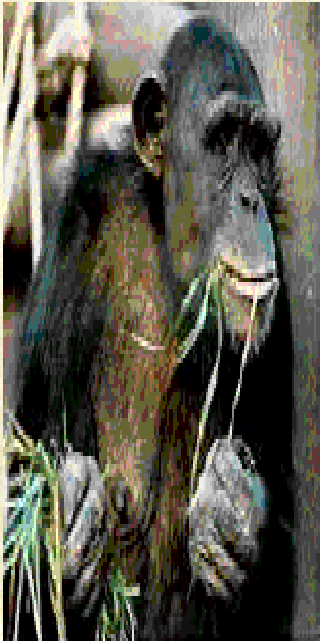
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Animals



Images courtesy of the Oakland Zoo

The First Organisms

Close to 2.5 billion years ago, the earth's surface and atmosphere were stable enough to support primitive life. Single-cell organisms began to develop in the seas that covered the planet. Most of them were very simple single-cell bacteria that fed on chemicals in the ocean's waters.

A simple organism known as blue-green algae appeared and spread across the seas. Blue-green algae are still alive today. It was very important to the future of the planet because blue-green algae used sunlight and water to make food, and in the process, created oxygen. As the blue-green algae grew in the earth's seas, they began to fill the atmosphere with oxygen.

The oxygen blue-green algae produced made

- **Tundra**
- **Taiga**
- **Steppe**
- **Deciduous Forest**
- **Chaparral**
- **Desert**

it possible for other types of organisms to develop. These organisms needed oxygen to carry out their life processes of growth, feeding, responding and reproducing. Unlike the blue-green algae, these organisms could not produce their own food. They needed oxygen to perform their life processes of growth, feeding, responding, and reproducing. In return, they produced CO₂, which the algae needed to perform its life processes. A precise balance between plants and animals was established.

 **Savanna**

 **Rainforest**

 **Alpine**

 **Grasslands**

Classification

In order to study nature, scientists have classified the life forms in nature, or put them into groups. Organisms are classified according to how closely they are related. Large groups are broken down into smaller and smaller groups. A kingdom is the largest unit of classification. There are five kingdoms in nature. One of those kingdoms is Animalia, or the animal kingdom.

There are two main groups of animals: vertebrates and invertebrates. Vertebrates are a subgroup of the Phylum Cordata, or animals that have a spinal chord. These include fish, amphibians, reptiles, birds and mammals. You might not think it, but invertebrates, or animals without a spinal chord, make up most of the animal kingdom. These include sponges, jellyfish, worms, arthropods (insects, shrimp, spiders), mollusks (snails, clams, octopuses), and echinoderms (sea urchins, sea stars).

Organisms in the animal kingdom consist of many different species. Some animals most familiar to us are mammals, birds, fish and insects.

Animal cells don't have the rigid cell walls that plant cells have. Most animal bodies are made up of organized cells that are specialized to perform a specific task. Other cells are organized into even more specialized organs. Most animals are capable of moving relatively fast, unlike plants. Most animals reproduce sexually.

All told, around 9 or 10 million species of the kingdom Animalia inhabit the earth; the exact

number isn't known. Most of them are in the Arthropod phylum, or animals with jointed legs, like insects and crustaceans. In fact, some scientists believe that if we were to identify all species in the tropical rain forests, the ranks of Arthropoda would be over 10 million!

Animal Ecology

A habitat is any place where a particular animal or plant species lives. Examples of a habitat include a lake, a desert, or forest, or even a drop of water.

All habitats on Earth are part of the biosphere. Since the Earth is always changing, habitats are continually changing as well.

Descriptions of environments using temperature and rainfall are used to group habitats together. Habitats of similar climate and vegetation are called biomes. In different parts of the world, the same biome may contain different species, but will contain similar life forms. For example, trees are the dominant forms of the rain forest, no matter where the rainforest is located.

Animals, which live within a same-species group, and occupy an area at the same time, are part of a population. All members of the same population have certain traits in common. Populations of different plants and animals interact with each other, and together, these populations form communities. Plants and animals in a particular ecological community, or biome, must be adapted to the same living conditions so they can all survive in the same biome.

Many populations can live in the same area because each species fills a specific role in the community. This role is called a niche. What an animal eats, and where it eats are also part of its niche. Giraffes can live in the same area as gazelles because they eat different plants and don't compete with each other. Dung beetles bury the feces of these animals and lay their eggs in it. The hatching grubs feed on the feces. The buried feces also fertilize plants, which in turn feeds the gazelle and giraffe. Each plant and animal has its own niche in the ecological community, and is important in some way to the survival of the other.

Living organisms are usually classified as

consumers (animals), producers (plants), or decomposers (fungi), depending on how they get their food. Consumers are, either herbivores, carnivores, or omnivores. Herbivores are called primary consumers because they feed directly on producers. Carnivores feed on other consumers. Omnivores eat both plants and animals. However, animals are seldom completely carnivorous or herbivorous. Some carnivores, such as bears, foxes, and the family cat or dog, will at times eat plants. Herbivores will sometimes eat small insects or grubs as well.

Limiting factors

There are several limiting factors in an environment which determine whether an organism can live in a particular environment. Limiting factors on land include temperature, water, light, competition, and soil. Every organism needs certain requirements for its survival.

Most organisms can survive if the temperature is within a certain range. The freezing condition of the tundra has resulted in animals with thick fur, lots of body fat, and small ears. Animals in a desert will have large ears, like the elephant, to disperse body heat.

The amounts of sunlight and rainfall are also limiting factors for both plants and animals. Both affect plant growth. Which plants grow in a biome determines which animals inhabit that biome. For example, grey squirrels, which feed on nuts, are found in woodlands, but not in deserts where nuts aren't found.

Competition results when two different species try to fill the same niche. This usually results in one species displacing another species, or the extinction of one of the species.

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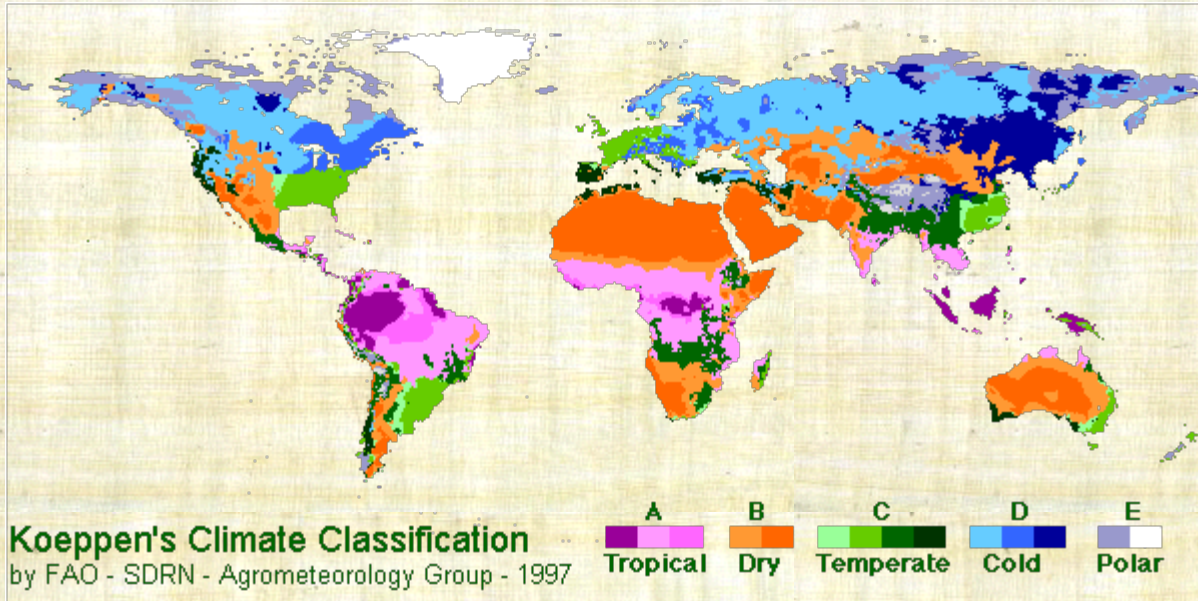
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World Climates



World Climate Zones

Have you ever wondered why one area of the world is a desert, another a grassland, and another a rainforest? Why are there different forests and deserts, and why are there different types of life in each area? The answer is climate.

Climate is the characteristic condition of the atmosphere near the earth's surface at a certain place on earth. It is the long-term weather of that area (at least 30 years). This includes the region's general pattern of weather conditions, seasons and weather extremes like hurricanes, droughts, or rainy periods. Two of the most important factors determining an area's climate are air temperature and precipitation.

World biomes are controlled by climate. The climate of a region will determine what plants will grow there, and what animals will inhabit it. All three components, climate, plants and animals are interwoven to create the fabric of a biome.

Some facts about climate

The sun's rays hit the equator at a direct angle between 23° N and 23° S latitude. Radiation that reaches the atmosphere here is at its most intense.

In all other cases, the rays arrive at an angle to the surface and are less intense. The closer a place is to the poles, the smaller the angle and therefore the less intense the radiation.

Our climate system is based on the location of these hot and cold air-mass regions and the atmospheric circulation created by trade winds and westerlies.

Trade winds north of the equator blow from the northeast. South of the equator, they blow from the southeast. The trade winds of the two hemispheres meet near the equator, causing the air to rise. As the rising air cools, clouds and rain develop. The resulting bands of cloudy and rainy weather near the equator create tropical conditions.

Westerlies blow from the southwest on the Northern Hemisphere and from the northwest in the Southern Hemisphere. Westerlies steer storms from west to east across middle latitudes.

Both westerlies and trade winds blow away from the 30° latitude belt. Over large areas centered at 30° latitude, surface winds are light. Air slowly descends to replace the air that blows away. Any moisture the air contains evaporates in the intense heat. The tropical deserts, such as the Sahara of Africa and the Sonoran of Mexico, exist under these regions.

Seasons

The Earth rotates about its axis, which is tilted at 23.5 degrees. This tilt and the sun's radiation result in the Earth's seasons. The sun emits rays that hit the earth's surface at different angles. These rays transmit the highest level of energy when they strike the earth at a right angle (90°). Temperatures in these areas tend to be the hottest places on earth. Other locations, where the sun's rays hit at lesser angles, tend to be cooler.

As the Earth rotates on its tilted axis around the sun, different parts of the Earth receive higher and lower levels of radiant energy. This creates the seasons.

Köppen Climate Classification System

The Köppen Climate Classification System is the most widely used for classifying the world's climates. Most classification systems used today are based on the one introduced in 1900 by the Russian-German climatologist Wladimir Köppen. Köppen divided the Earth's surface into climatic regions that generally coincided with world patterns of vegetation and soils.

The Köppen system recognizes five major climate types based on the annual and monthly averages of temperature and precipitation. Each type is designated by a capital letter.

A - Moist Tropical Climates are known for their high temperatures year round and for their large amount of year round rain.

B - Dry Climates are characterized by little rain and a huge daily temperature range. Two subgroups, **S** - semiarid or steppe, and **W** - arid or desert, are used with the **B** climates.

C - In Humid Middle Latitude Climates land/water differences play a large part. These climates have warm, dry summers and cool, wet winters.

D - Continental Climates can be found in the interior regions of large land masses. Total precipitation is not very high and seasonal temperatures vary widely.

E - Cold Climates describe this climate type perfectly. These climates are part of areas where permanent ice and tundra are always present. Only about four months of the year have above freezing temperatures.

Further subgroups are designated by a second, lower case letter which distinguish specific seasonal characteristics of temperature and precipitation.

f - Moist with adequate precipitation in all months and no dry season. This letter usually accompanies the **A**, **C**, and **D** climates.

m - Rainforest climate in spite of short, dry season in monsoon type cycle. This letter only applies to **A** climates.

s - There is a dry season in the summer of the respective hemisphere (high-sun season).

w - There is a dry season in the winter of the respective hemisphere (low-sun season).

To further denote variations in climate, a third letter was added to the code.

a - Hot summers where the warmest month is over 22°C (72°F). These can be found in **C** and **D** climates.

b - Warm summer with the warmest month below 22°C (72°F). These can also be found in **C** and **D** climates.

c - Cool, short summers with less than four months over 10°C (50°F) in the **C** and **D** climates.

d - Very cold winters with the coldest month below -38°C (-36°F) in the **D** climate only.

h - Dry-hot with a mean annual temperature over 18°C (64°F) in **B** climates only.

k - Dry-cold with a mean annual temperature under 18°C (64°F) in **B** climates only.

Three basic climate groups.

Three major climate groups show the dominance of special combinations of air-mass source regions.

Group I

Low-latitude Climates: These climates are controlled by equatorial a tropical air masses.

- **Tropical Moist Climates (Af) rainforest**



Rainfall is heavy in all months. The total annual rainfall is often more than 250 cm. (100 in.). There are seasonal differences in monthly rainfall but temperatures of 27°C (80°F) mostly stay the same. Humidity is between 77 and 88%.

High surface heat and humidity cause cumulus clouds

to form early in the afternoons almost every day.

The climate on eastern sides of continents are influenced by maritime tropical air masses. These air masses flow out from the moist western sides of oceanic high-pressure cells, and bring lots of summer rainfall. The summers are warm and very humid. It also rains a lot in the winter

- Average temperature: 18 °C (°F)
- Annual Precipitation: 262 cm. (103 in.)
- Latitude Range: 10° S to 25 ° N
- Global Position: Amazon Basin; Congo Basin of equatorial Africa; East Indies, from Sumatra to New Guinea.

- **Wet-Dry Tropical Climates (Aw) savanna**

A seasonal change occurs between wet tropical air masses and dry tropical air masses. As a result, there is a very wet season and a very dry season. Trade winds dominate during the dry season. It gets a little cooler during this dry season but will become very hot just before the wet season.



- Temperature Range: 16 °C
- Annual Precipitation: 0.25 cm. (0.1 in.). All months less than 0.25 cm. (0.1 in.)
- Latitude Range: 15 ° to 25 ° N and S
- Global Range: India, Indochina, West Africa, southern Africa, South America and the north coast of Australia

- **Dry Tropical Climate (BW) desert biome**

These desert climates are found in low-latitude deserts approximately between 18° to 28° in both hemispheres. these latitude belts are centered on the tropics of Cancer and Capricorn, which lie just north and south of the equator. They coincide with the edge of the equatorial subtropical high pressure belt and trade winds. Winds are light, which allows for the evaporation of moisture in the intense heat. They generally flow downward so the area is seldom penetrated by air masses that produce rain. This makes for a very dry heat. The dry arid desert is a true desert climate, and covers 12 % of the Earth's land surface.



- Temperature Range: 16° C
- Annual Precipitation: 0.25 cm (0.1 in). All months less than 0.25 cm (0.1 in).
- Latitude Range: 15° - 25° N and S.
- Global Range: southwestern United States and northern Mexico; Argentina; north Africa; south Africa; central part of Australia.

Group II

- **Mid-latitude Climates:** Climates in this zone are affected by two different air-masses. The tropical air-masses are moving towards the poles and the polar air-masses are moving towards the equator. These two air masses are in constant conflict. Either air mass may dominate the area, but neither has exclusive control.

- **Dry Midlatitude Climates (BS) steppe**

Characterized by grasslands, this is a semiarid climate. It can be found between the desert climate (BW) and more humid climates of the A, C, and D groups. If it received less rain, the steppe would be classified as an arid desert. With more rain, it would be classified as a tallgrass prairie.

This dry climate exists in the interior regions of the North American and Eurasian continents. Moist ocean air masses are blocked by mountain ranges to the west and south. These mountain ranges also trap polar air in winter, making winters very cold. Summers are warm to hot.



- Temperature Range: 24° C (43° F).
- Annual Precipitation: less than 10 cm (4 in) in the driest regions to 50 cm (20 in) in the moister steppes.
- Latitude Range: 35° - 55° N.
- Global Range: Western North America (Great Basin, Columbia Plateau, Great Plains); Eurasian interior, from steppes of eastern Europe to the Gobi Desert and North China.

- **Mediterranean Climate (Cs) chaparral biome**

This is a wet-winter, dry-summer climate. Extremely dry summers are caused by the sinking air of the subtropical highs and may last for up to five months.

Plants have adapted to the extreme difference in rainfall and temperature between winter and summer seasons. Sclerophyll plants range in formations from forests, to woodland, and scrub. Eucalyptus forests cover most of the chaparral biome in Australia.

Fires occur frequently in Mediterranean climate zones.

- Temperature Range: 7 °C (12 °F)
- Annual Precipitation: 42 cm (17 in).
- Latitude Range: 30° - 50° N and S
- Global Position: central and southern California; coastal zones bordering the Mediterranean Sea; coastal Western Australia and South Australia; Chilean coast; Cape Town region of South Africa.



- **Dry Midlatitude Climates (Bs) grasslands biome**

These dry climates are limited to the interiors of North America and Eurasia.

Ocean air masses are blocked by mountain ranges to the west and south. This allows polar air masses to dominate in winter months. In the summer, a local continental air mass is dominant. A small amount of rain falls during this season.

Annual temperatures range widely. Summers are warm to hot, but winters are cold.

- Temperature Range: 31 °C (56°F).
- Annual Precipitation: 81 cm. (32 in.).
- Latitude Range: 30° - 55° N and S
- Global Position: western North America (Great Basin, Columbia Plateau, Great



Plains); Eurasian interior.

- **Moist Continental Climate (Cf) Deciduous Forest biome**

This climate is in the polar front zone - the battleground of polar and tropical air masses. Seasonal changes between summer and winter are very large. Daily temperatures also change often. Abundant precipitation falls throughout the year. It is increased in the summer season by invading tropical air masses. Cold winters are caused by polar and arctic masses moving south.



- Temperature Range: 31 °C (56 ° F)
- Average Annual Precipitation: 81 cm (32 in).
- Latitude Range: 30° - 55° N and S (Europe: 45° - 60° N).
- Global Position: eastern parts of the United States and southern Canada; northern China; Korea; Japan; central and eastern Europe.

Group III

- **High-latitude climates:** Polar and arctic air masses dominate these regions. Canada and Siberia are two air-mass sources which fall into this group. A southern hemisphere counterpart to these continental centers does not exist. Air masses of arctic origin meet polar continental air masses along the 60th and 70th parallels.

- **Boreal forest Climate (Dfc) taiga biome**

This is a continental climate with long, very cold winters, and short, cool summers. This climate is found in the polar air mass region. Very cold air masses from the arctic often move in. The temperature range is larger than any other climate. Precipitation increases during summer months, although annual precipitation is still small.



Much of the boreal forest climate is considered humid. However, large areas in western Canada and Siberia receive very little precipitation and fall into the subhumid or semiarid climate type.

- Temperature Range: 41 °C (74 °F), lows; -25 °C (-14 °F), highs; 16 °C (60 °F).
- Average Annual Precipitation: 31 cm (12 in).
- Latitude Range: 50° - 70° N and S.
- Global Position: central and western Alaska; Canada, from the Yukon Territory to Labrador; Eurasia, from northern Europe across all of Siberia to the Pacific Ocean.

• Tundra Climate (E) tundra biome



The tundra climate is found along arctic coastal areas. Polar and arctic air masses dominate the tundra climate. The winter season is long and severe. A short, mild season exists, but not a true summer season. Moderating ocean winds keep the temperatures from being as severe as interior regions.

- Temperature Range: -22 °C to 6 °C (-10 °F to 41 °F).
- Average Annual Precipitation: 20 cm (8 in).
- Latitude Range: 60° - 75° N.
- Global Position: arctic zone of North America; Hudson Bay region; Greenland coast; northern Siberia bordering the Arctic Ocean.

• Highland Climate (H) Alpine Biome



Highland climates are cool to cold, found in mountains and high plateaus. Climates change rapidly on mountains, becoming colder the higher the altitude gets. The climate of a highland area is closely related to the climate of the surrounding biome. The highlands have the same seasons and wet and dry periods as the biome they are in.

Mountain climates are very important to midlatitude biomes. They work as water storage areas. Snow is kept back until spring and summer when it is released slowly as water through melting.

- Temperature Range: -18 °C to 10 °C (-2 °F to 50°F)
- Average Annual Precipitation: 23 cm (9 in.)
- Latitude Range: found all over the world

- Global Position: Rocky Mountain Range in North America, the Andean mountain range in South America, the Alps in Europe, Mt. Kilimanjaro in Africa, the Himalayans in Tibet, Mt. Fuji in Japan.

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Blue Planet Biomes

An Introduction

In our site you will discover facts about our planet, its complex patterns of biomes, plants, and animals, and how climates ultimately determine the biomes of our Earth.

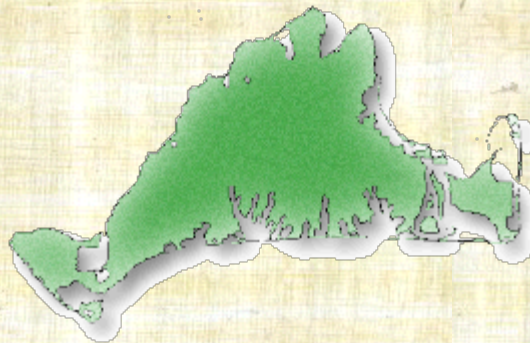
This site was created to teach students the power of the Internet as a tool for both communication and learning, and how to use this tool while at the same time express their scientific/environmental knowledge in a fun way.

Students have individually researched different attributes of major climate regions (biomes). Topics covered include the various animals and plants of these regions, the climates, and other specific biome characteristics. Our hope is that this site will be up-dated, changed and improved by each succeeding 6th grade class for many years.

The West Tisbury School is a K-8 school located on Martha's Vineyard, an island approximately 6 miles off the south coast of Massachusetts. It is part of the Up-Island Regional School District that is presently composed of the towns of Aquinnah, Chilmark & West Tisbury.

This site was created and developed by Elisabeth Benders-Hyde. It evolved from a biome project created by Ann and Karl Nelson, two fabulous 6th grade math and science teachers.

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<http://www.wtisburyschool.org/>, or take a look at all our island schools at:
<http://www.mv.k12.ma.us/>

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bschaffner@islanderis.net**

Tundra Plants

Arctic Moss

Genus: Calliergon

Species: giganteum

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Return to Tundra



The Calliergon giganteum grows in the arctic tundra which is a harsh cold environment in the Northern Hemisphere within the arctic circle. There are strong winds, up to 100 miles per hour. In the tundra it is very cold: the average winter temperature is -25°C , and in the summer it is rarely over 10°C . The summertime only lasts six to eight weeks. In the winter it is dark most of the time, and even in the summer it is usually cloudy and

overcast; therefore plants get little sunlight. The tundra is also unusually dry; it gets an average of just 30 cm of rainfall per year. The growing season is very short. There is also a major lack of nutrients.

A cool fact about the tundra is that nearly 75 % of it is covered in permafrost. There are many cracks on the surface because of the earth freezing and thawing. This frozen soil prevents water from sinking into the ground, causing many lakes, streams, bogs, and fens (wetlands with a constant high water level) during the summer. Probably the most unique thing about the arctic moss Calliergon giganteum is that it grows in freshwater arctic lakes and in fens.

The Calliergon giganteum is an aquatic plant found growing on the bottom of tundra lake beds and in and around bogs and fens. It is a member of the Siberian tundra biome. Like all mosses, Calliergon giganteum is a bryophyte. They have rhizoids (tiny rootlets) instead of roots. They never have wood stems. They have tiny leaves, usually only one cell thick. There are lots of leaves on the stem. They do not have flowers. They can either reproduce by growing shoots or by sending out spores, which need to be wet to survive. They have two life stages; gametophyte and sporeophyte. There are some ways Calliergon giganteum is unique. It is very slow growing. It grows as slow as one centimeter per year. It also lives a very long time; the shoots live seven to nine years, the leaves live for four. It is brown in color. Its branches are crowded. It is one of the few plants on the tundra. It is "the slowest growing longest living freshwater macrophyte ever recorded" (Amazing Arctic Moss.)

The Calliergon giganteum has adapted well to its cold climate. When it is not growing, it stores nutrients so new leaves can be made quickly next spring. The more leaves the more they can photosynthesize. It is adapted to the incredibly strong winds because it grows near to the ground. Because it can grow under water it is protected from the drying winds and cold, dry air of the frozen tundra. Its long life and slow growth are probably adaptations to the short growing season and the cold.

There are few uses for the Calliergon giganteum. In the arctic, moss covers the ground and warms it up allowing other plants to grow. It is eaten by migrating animals such as birds. Some type of arctic moss was frozen for thousands of years and is helping scientists learn about life on our planet.

The Calliergon giganteum is fairly common. It is one of about 2000 plant species on the tundra, most of which are mosses and lichens.

by Micah T. 2002

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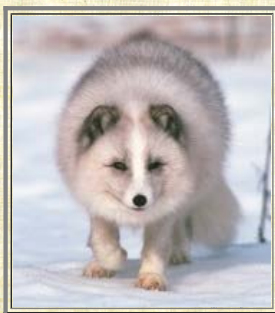
Return to Tundra

Arctic Fox

Common Names: Polar Fox, White Fox

Genus: Lagopus

Species: alopex



The North American tundra is located at latitudes 60° to 85° North and longitudes 55° to 160° West which includes northern parts of Canada and the state of Alaska. The tundra is a cold barren wasteland that includes snow, rocks and very little variety in vegetation. It is in this place where the Arctic fox is found.

The Arctic fox (*Alopex lagopus*) makes its home in small burrows in frost-free ground, often in low mounds, or in rock piles. Because the Arctic fox is a scavenger it can usually find food to eat. Sometimes the fox will follow Polar bears or other predators and feed off the remains they leave behind.

The Arctic fox is about 10 -16 inches long and weighs about 6-12 pounds. It is about the size of an ordinary domesticated house cat. It has short legs a long bushy tail that it uses as insulation by wrapping it around itself when sleeping. Its long hair is white in the winter, and "blue" or gray in the summer. Its head has a stubby muzzle, small ears, and large eyes. Its feet are lined with fur, which helps it conserve heat. The Arctic fox has adapted a stealthy movement due to its predatory nature.

Both male and female mature sexually at one year of age. The mating season is May-February and the gestation period for a pregnant female is 52 days. The number of pups born can range between 6-19, and the newborns weigh approximately 2 ounces. Whelps are helpless and blind when first born. They nurse until they can eat solid food. Both parents care for the pups. The mother raises the young while the father hunts for lemmings and other food. They start to eat solids after 6 weeks and leave the den after 14-15 weeks. The whelp is usually dependent on its parent from summer to fall. Mortality rates for young foxes is very high. An average life span for the arctic fox is around three years.

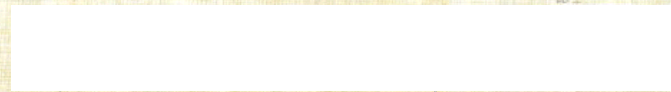
The Arctic fox is a solitary animal. Arctic foxes usually live to 15 years of age. It is an omnivore (one who eats both plants and animals). A typical diet of this fox consists of birds, eggs, small mammals and fish. It will also eat berries, seaweed, insects and larvae, when other prey is scarce. The Arctic fox is a predator to lemmings (one of it's favorite foods) and voles, among other creatures. The population cycles of lemmings and voles are

largely dependent on the arctic fox. The fox is prey to wolves, polar bears and golden eagles. Because it is a scavenger, it keeps the environment clean by eating dead animals and keeping the rodent population down. The Arctic fox is a diurnal creature.

The Arctic fox has adapted to its environment by growing long fur that changes color with the season for camouflage. It tends to eat whatever is available. Its movements are stealthy due to lack of cover on the tundra. Its legs, ears, and muzzle are short to conserve heat, and uses its tail like a muffler when cold.

The Arctic fox is not endangered world wide and it is estimated that there are several thousand arctic foxes left in the wild. Two arctic fox populations are endangered, however. One in Russia has been reduced to around 90 animals because of a mange caused by ear ticks introduced by dogs. The second in Fennoscandia (Norway, Sweden, Finland, and Kola Peninsula) was caused by over hunting around the turn of the century. The total number of breeding pairs there is about 140.

By Tye S. 2003



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Tundra Climate

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Return to Tundra

Tundra Climate (E)

The tundra is a bleak and treeless place. It is cold through all months of the year. Summer is a brief period of milder climates when the sun shines almost 24 hours a day. It has been called "the land of the midnight sun". But even the sun can't warm the tundra much. The short summer lasts only 6 to 10 weeks. It never gets any warmer than 45 or 50° F. The warmer weather causes a layer of permafrost, ice that never goes away in the ground, to melt, creating bogs and shallow lakes that don't drain. They breed stinging insects, which make life even in the summer miserable for the inhabitants of the tundra. The wind blows constantly, whipping around the small plants.

During the long winter months the sun barely rises and it is dark for most of the day. Bitter cold winds scud across the barren snowscape, exposing high plateaus to barren ground.

Winter temperatures don't reach above 20° F and average -20° to -30°F. Endless hours darkness settle in and the winds blow even harder. The snow that falls is blown off the high plateaus and collects in the valleys. Animals hunker down, able to find only enough food to keep warm.

The tundra is an unusually cold and dry climate. Precipitation totals 6-10 inches of rain a year, which includes melted snow. This is almost as little as the world's driest deserts. Coupled with strong and drying winds, the tundra is an extreme weather biome. The tundra seems like a wet and soggy place because the precipitation that falls evaporates slowly, and because of the poor drainage caused by the permafrost.

You can find the tundra climate in Köppen's E climate category. The E stands for ice climates. The average temperature of the warmest month is below 50° F.

The tundra climate spans from most of Greenland to parts of Alaska, northern Canada, and northern Russia. The latitudinal range is 75° N to 60° N. Tundra climates can be found on the coastal areas of the arctic. The ocean water keeps the climate from falling to the extreme temperatures found in the interior of the continents.

by Sam A.2000

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Tundra Climate (E)

The tundra is freezing for almost all of the year with no traditional seasons, only a very long winter. Winter conditions in the tundra exist most of the year, with the exception of a very short mild season which passes for summer.

The type of vegetation that grows on the tundra are; grass, shrubs of willow, sedges, and lichens. The vegetation grows very slowly because of the hard winter.

The animals in the tundra put on heavy coats to adapt to the harsh climate. Examples of this adaptation would be the coats on the caribou, reindeer, musk ox, arctic hare and the arctic fox.

The Köppen system of classification would be Dfc. D In Köppen climate classification stands up for snow climate, f stands up for sufficient precipitation in all months and c stands up for fewer than four month with average temperatures over 50° F (1°C).

The average temperature per year is 16 degrees°F. The highest temperature can get to 45° F and the coldest temperature can get to 10° F below 0. That makes it one of the coldest regions on earth. This biome feels freezing most of the year.

The average precipitation per year is more than 18 inches, and most of it falls as the snow. Average precipitation per season is 4.5 inches. The type of precipitation that falls in this climate is mostly snow in the winter, and in the summer it is rain, with occasional snow.

The latitude range for the tundra is from the arctic circle to 60° to 70° latitude North. Parts of Alaska and northern Canada contains tundra biome and climates. Tundra climate can also be found in northern Europe and Russia.

by Ilekea S. 2001.

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Willow

Common Name: Diamond-leaf Willow, Sura

Genus: Salix

Species: pulcha

Parts Used: the leaves



The twigs on a willow are soft, slender, and they bend easily. A willow has thin branches. The leaves are narrow and grow alternately on the branch. Some leaves have serrated edges.

There are many different species of willows in the world. They can grow to be 30 feet in height or just a few inches. On the [tundra](#) this willow only grows a

few inches tall and creeps along the ground in a thick carpet. Willows have clusters of flowers that look like white, fuzzy caterpillars and are about 1 inch in length. When the willow blooms on the tundra it looks like a bumpy, fuzzy carpet covering the ground

On the tundra the diamond-leaf willow is known by the Inupiat name Sura. Sura grows near creeks, marshes or other wet areas. Young leaves are picked in the spring, before they become bitter and hard. They can be used in seal oil to add vitamins. Seal oil is also used to preserve the leaves. Willow leaves can also be dried and used in tea and in soup as flavoring.

Amazingly enough, Sura is 10 times richer in vitamin C than oranges. It is also rich in vitamin A and calcium. Willow leaves are a good source of nutrients for animals and people of the tundra.

The twigs of the willow are made into baskets because they bend easily. The wood of some willows produce charcoal which they used to make gunpowder with. Wood from the willow is good to use to start a fire, since it burns easily.

The diamond leaf willow provides much needed food for grazing animal of the tundra, like [musk oxen](#), and [caribou](#) or [reindeer](#).

These plants are found in most parts of the world, usually in the northern hemisphere. The white willow (*Salix alba*) is known as Nature's Aspirin. The chemical salicin is found in the bark of the white willow. It reduces fever and relieves pain and inflammation. Chinese physicians have been using willow bark to relieve pain for 2,000 years.

Eliot T. 2000.

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Caribou

Common Names: Caribou, Reindeer

Genus: Rangifer

Species: tarandus



The caribou lives in the arctic tundra, mountain tundra, and northern forests of North America, Greenland, Scandinavia, and Russia. It is estimated that there are about 5 million caribou in the world. They were first domesticated in Norway and northern Asia and known as reindeer. People used them to pull their sleds, provide milk, meat and skins to build their tents. When it was seen how valuable they were, they were brought to Alaska in 1887. Later they were brought to parts of Canada. These North American

reindeer became known as caribou. Although they are called by different names, they are both considered to be a single species.

The caribou is actually a large members of the deer family. Unlike deer, both the male and female have antlers. The antlers of the male are long, branched and massive, and they are a little flattened at the ends. The antlers of the female are much shorter, simpler and more slender and irregular. Sometimes they are completely missing.

The caribou is a sturdy animal with short legs. Its coat is brown and becomes darker in the summer and lighter in the winter. It has a ruff of long hairs under the neck, and the fur above the hooves and around the tail are almost white. The Alaskan caribou is clove-brown with a white neck and hindquarters.

Adult bulls average 350-400 pounds, but can weigh as much as 700 pounds. Mature females average 175-225 pounds They can range

anywhere from 34 to 55 in height at the shoulder.

They are well adapted to living on the tundra. Their large, spreading hooves support the animal in snow in the winter and marshy tundra in the summer. Caribou are also great swimmers and use their feet as paddles. They can also lower their metabolic rate and go into a semi-hibernation when conditions get very harsh.

When it looks like there is nothing to eat on the winter tundra, caribou will scrape the snow away with their wide feet or antlers and eat lichens, dried sedges and small shrubs. In the summer they will eat leaves of willows, sedges, flowering tundra plants, and mushrooms.

Caribou are social animals and live in huge herds. Males are often loners, until its time to mate, which begins in late September and October. The herds will often have several thousand animals in it. They will migrate more than 400-500 miles to reach winter or summer feeding grounds, and can travel up to 50 miles a day. The caribou's leg tendons make crackling sounds when it walks, which would make a migrating herd an noisy bunch indeed.

Pregnant females will lead the migration to the calving grounds in May, where they will give birth to a single calf. Most females don't breed until they are 28 months old, and will give birth every year. They weigh an average of 13 pounds and grow very quickly, doubling their weight in 10-15 days. Their hair is a reddish-brown. Newborns can walk within an hour and in a few days can run with the herd. Still, wolves, grizzly bears, and golden eagles kill a large number of newborn calves.

Although some people are moving into the caribou's habitat, they seem to have adapted. Only one herd lost its calving grounds when the Alaskan oil pipeline was built, but they seem to have migrated elsewhere. The caribou is not endangered, thanks to its ability to tolerate climates people would rather not deal with.



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Musk Ox

Common Name: Oomingmak

Genus: Ovibos

Species: moschatus



The musk ox live in the frozen **tundra** of northern, Alaska, Canada, Ellesmere Island, Greenland, Norway, Sweden and Siberia. No other hoofed animal lives as far north as the musk ox.

The musk ox can live in the harsh conditions of the arctic tundra because its 24" long hair and woolly undercoat ward off frost and provide insulation. It has a sturdy build. It looks like a huge dust mop on hooves, their long hair

reaching almost to the ground. Its muzzle is usually white. It can weigh from 396-880 pounds, and reach a length of 7 feet. The musk ox gets its name from the odor produced by glands beneath the bull's eyes. The male has thick horns that almost meet on top of its head in what is called a "boss". The horns curve down besides its face and out at the ends. The female has smaller horns, without a boss. Instead the top of her head is covered with whitish hair.

In the summer the musk ox herd has about 10 members. They will use the almost constant daylight to stuff themselves on plants. They need to put on enough fat to get them through the long winter. In winter the herd can have about 15 to 20 members. They will head out to higher ground where the fierce Arctic winds blow the snow off the ground. Here they will feed on crowberry, **bearberry**, and **willow**. The herd only travels about 50 miles between its summer and winter feeding areas.

Breeding season starts in July and goes on until the end of August. Each herd has a dominant male, or bull, who will try to keep other bulls from mating with the females. The female will give birth to one calf the following April through June. The calf can graze in about a week but keeps suckling for another year.

The lifespan of a musk ox is about 24 years.

Muskoxen coexisted with the mastodons and mammoths and have survived early hunters and climate changes that caused the extinction of other species. The musk ox doesn't have many predators. Polar bears can sometimes kill weak or injured oxen. The Arctic wolf is the only serious predator.

Musk ox form a defensive formation when threatened. They will first run to a higher location, then turn and stand shoulder-to-shoulder in a circle. With their heads lowered, they form an impenetrable wall. The young are protected in the center of the circle. Musk oxen stampede easily and sometimes young calves become separated from the herd and are lost.

The musk ox's defense is useless against bullets, and they became easy targets for humans. They were almost hunted to extinction for their fur and their meat. By the early 20th century the population had become depleted. In 1917 the Canadian government gave them protection and now there are about 90,000 musk ox in that country.

More ominous as far as the decline of the musk ox is concerned are the effects global warming has had on their breeding. In the past few years, as a result of warmer climates, the coastal plains used as calving grounds have had more snow, and as a result, a later thaw. Musk oxen have moved to the foothills to find forage and often give birth there, making them and their calves more vulnerable to grizzly bears.

The Inupiaq speaking Eskimos of the Northern Slope of Alaska call the musk ox "Oomingmak", which means "animal with skin like a beard".

2000

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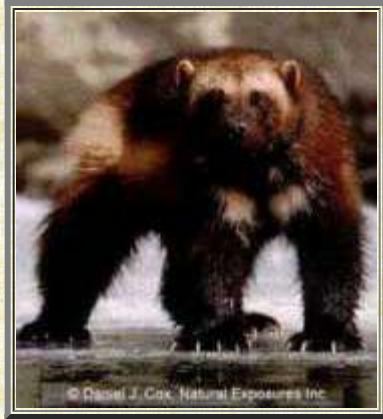
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Wolverine

Genus: Gulo

Species: luscus



The Taiga Biome is populated with special animals that all have techniques of keeping warm and dry or away from the harsh coldness of the Taiga. One animal of the Taiga is the wolverine.

The wolverine is a meat eating animal, or carnivore. It's body length can get up to 87 centimeters as an adult and weigh about 45 lbs. It looks sort of like a bear, with short legs, but it is the largest member of the weasel family. The wolverine is powerfully built and is well adapted to living in the cold. It has very strong jaws that can bite through frozen meat and bone. Its head is wide and kind of rounded, with small eyes and small

round ears. Its paws are very large with long claws. The wolverine's fur is thick and a glossy dark brown.

It is known for its physical strength and sharp, accurate hunting skills. It ranges from western United States, through Canada, up to Alaska. Wolverines have a very keen sense of smell that helps it locate food. It feeds mostly on rodents, fish, reptiles, birds, carrion, and sometimes berries. Its habitat is in the boreal forests of the northern North American continent.

During breeding season the males usually stay close to the female, but they prefer to travel alone. The females give birth to about 2 to 3 kits in March. The kits are born furry and their eyes are closed. They are weaned in about 9 to 10 months. They reach adult size by early winter but may stay with their mother until they are old enough to reproduce.

The wolverines need a large home territory of about 200 square miles. They need lots of shelters in rock crevices and among boulders to hole up during bad weather or to escape predators. Its huge, flat feet and long claws make the wolverine an excellent climber. Their feet also act as snowshoes and keep them from sinking into deep snow.

The wolverine is a shy animal that tries to avoid contact with humans. Human settlements and low birth rates have decreased the wolverine populations in North America. Wolverines are considered a rare and vulnerable species.

by Dillon B. 2000.



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Polar Bear

Common Names: Sea Bear

Genus: Ursus

Species: maritimus



Polar bears can be found all through the polar regions of the Northern hemisphere. They are the largest carnivore on land.

They have a black nose and eyes. They have two layers of fur which is so warm that adult bears can easily overheat when they run. The polar bear's fur is really clear, not white. Some light reflects off the fur and makes it look white. Most of the sun's rays reach their black skin, which

absorbs the heat and keeps the polar bear warm. The adult's fur looks darker than the cub's fur.

Their teeth and claws are very sharp so they can catch their prey easily (seal). Their shoulder height can be five feet or more and when they are standing up, their height can be 8-11 feet. Females weigh 660-770 lbs and males weighs 880-990 lbs. Polar bears spend most of their time on drifting packs of ice, eating, and resting.

The bears reach sexual maturity 3 to 5 years after birth. They usually mate in March and have their cubs 7 to 8 months later. Each year pregnant polar bears dig a den in the snow of southern facing slopes, where they give birth. The females gives birth to one or two cubs. Cubs are usually born in December or January. They are naked, blind and deaf. They stay in their den with their mother until March or early April. Then they emerge from the dens. After a few days of getting used to the outside environment, they take little trips to strengthen the cubs. The families then move back to the sea ice and hunt for seals and other prey. The cubs learn how to hunt with their mothers for about two and a half years. They live for 15 to 20 years. Polar bears live alone,

except for mothers who live with their cubs.

Polar bears adapt very well to the cold. Ursus Maritimus means "sea bear". The polar bear has a thick layer of blubber around 4.5 inches thick. That and the hollow shafts of their hair provides them with excellent insulation. This allows them to handle temperature of -34°F. Their ears and tail are very short so they don't lose any heat through them. They have a very good sense of smell. Their necks are longer than other bears to keep their head above the water when they swim. They have strong legs and partially webbed front feet to help them swim. Their feet can be up to twelve inches in diameter.

They hunt and eat seals and other sea life. The polar bear is a predator. It hunts and eats meat. The polar bear mostly eats ringed seals, which are very abundant. Adult ringed seal can grow to 4.1 feet in length and weigh 150 pounds. The bears also eat whale and walrus carcasses. In the summer they will also eat lemmings, arctic foxes and ducks. Like all bears they will also eat some plants.

The polar bear is listed as an endangered species. At one time there were only 5,000 polar bears left. In the past people hunted polar bears for their fur. All countries where the polar bears exists have conservation projects and restrict hunting. Today there are about 40,000 bears.

The polar bears aren't safe yet because chemicals are polluting their food stock. The ice packs in the North Pole are melting sooner in the spring, and cutting their time to hunt seals. The major cause of death for young polar bears is starvation.

by Emma T. 2001

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Snowshoe Rabbit

Common Names: Varying Hare

Genus: Lepus

Species: americanus



photograph by Susan Teel

The snow shoe rabbit lives in forest areas where the ground is covered with undergrowth in the higher parts of North America. It migrates throughout the mid west United States as well. It is larger than other rabbits and it weighs around three to four pounds as an adult and can be fifteen to twenty inches. It has large rear feet and the toes can spread out to act like snowshoes. Their feet also have fur on the bottom, which protects them from the cold and gives them traction in the snow. In the

summer its fur is rusty, grayish brown but is turns pure white in the winter, except for its eyelids and the tips of their ears. This helps it to hide from predators.

They have three to four litters a year with one to eight in each litter.

The Snowshoe Rabbit can run up to 27 mph and jump 10 feet in one hop. It is an expert at escaping predators like the wolf, bobcat, or lynx. When a predator chases it, the rabbit will quickly change direction. They are also good swimmers and will jump in the water to make an escape.

The Snowshoe Hare is a herbivore that likes to eat grass, clover and other greens in the summer, and bark, twigs and buds in the winter. Since they are herbivores they are mainly prey. The Snowshoe Hare is not considered endangered but their populations have been

studied since the 1800's.

by Jai B. 2000.



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Harlequin duck

Genus: *Histrionicus*

Species: *histrionicus*



The harlequin duck gets its name from the decorated appearance of the male harlequin, because it resembles the colorful costumes worn by "harlequins", who were people dressed as clowns. The male duck has dark, blue plumage, highlighted in black-outlined white striping and spots of white. Its wing-tips are brownish black and its flanks are chestnut-red. The female duck is not as colorful as the male duck. It is uniformly brown and it's marked by three pale patches on its face. The

harlequin ducks have a buoyant, compact body, with strong webbed feet, which give the duck the power to swim through torrent waters. They are expert swimmers. When they fly, their wings beat rapidly. The harlequin duck weighs 1 to 1.5 pounds and is about 1 to 1.5 feet long. Its wing span is 2 to 2.3 feet in width.

The harlequin duck reaches sexual maturity at two years old. It breeds during May-August. The female duck lays anywhere from 5 to 7 yellowish colored eggs. She sits on the eggs for 27 to 29 days and covers the eggs with down, when she's away from the nest. The chicks hatch within a few hours of one another and are able to swim and feed soon after they are hatched. The ducks like to nests by fast flowing rivers, by the edge of the water. Their nests are well hidden and are made from a hollow lined with grass and down. Young chicks fledge (get their feathers) after 35-42 days. The male duck stays with the female until she is finished incubating.

They live in flocks of up to 50 in the Atlantic and in larger groups in the Pacific, except when breeding. They are sociable birds. They don't often mix with ducks of other species.

Feathers keep the ducks warm and allows them to fly. Feathers are not living so they don't need blood vessels, nerves and other living tissue. They are made of a tough, flexible material and called keratin. There are six different kinds of feathers, such as contour, down, afterfeathers, filoplumes and bristle. The harlequin duck does not have feathers on its beak or feet. The ducks have an oil gland near base of their tail. They use their beak or tail to spread this oil through their feathers to make them waterproof and shiny. When feathers get hurt they do not heal. Ducks molt (lose old feathers and grow new) about 3 times a years. Molting can take up to two months. Harlequin ducks lose all their feathers at once. During breeding, the female duck loses most of her feathers on the lower breast, exposing the skin where it touches the eggs during incubation. The heat from her body helps keep the eggs warm. Feathers help the birds to fly and they also give the wing a shape.

A harlequin ducks diet consists of mussels, shellfish, aquatic insects, crustaceans and some small fish. They feed in tight-packed flocks and dive into water 3 or 4 meters deep and within 15 to 25 seconds of diving they have their prey. During the summer months they feed on insect larvae found in shallower waters.

The harlequin duck is a prey to the arctic fox and to the gray wolf. Harlequin ducks are not an endangered species. Their lifespan is unknown.

by Travis T. 2001

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Glossary

aril	an extra, pulp-like covering of certain seeds, like apples or peaches.
biodiversity	
biomass	any organic matter which is available on a renewable basis through natural processes, like forests, grasslands, crop lands, or oceans.
chlorophyll	the green matter in plants necessary to produce carbohydrates through photosynthesis
compound leaf	a leaf composed of several leaflets on a common stalk. These leaflets can in themselves be compound.
cauliflorous cauliflory	where flowers and fruits grow directly from the trunk or branches of a tree instead of at the tips of branches. This is a unique feature of tropical plants.
drought deciduous	a plant's ability to drop its leaves during dry or hot periods to avoid water loss through transpiration.
emergent	rising above the surrounding trees
epiphyte	a plant that grows on another in a non-parasitic relationship and gets its nutrients from water, dust particles, and the air.
forb	flowering annual which is not a grass or grass-like.
nurse plant	a plant that contributes to the survival of seedlings of other species by providing shade and nutrients.
nutrient cycle	when vegetable and animal matter decomposes and nutrients are released back to the soil to be taken up by again by plants.
pinnate	having leaflets arranged on each side of a common stalk

- photosynthesis** the ability of plants to produce their own food by converting energy from the sun, carbon dioxide, water and inorganic salts to produce carbohydrates with the aid of chlorophyll.
- prehensile** adapted for seizing or grabbing hold of something. Monkeys with prehensile tails can use them to hold on to branches for balance.
- ruminant** A mammal with a stomach which is divided into four compartments. It is able to extract the maximum amount of nutrients and moisture from the foods it eats by chewing a cud which consists of regurgitated, partially digested foods. Ruminants have cloven hooves and usually horns.
- stolon** a horizontal stem at or just below the surface of the ground, which produces new plants from buds at its tips or nodes. Usually found in grasses.
- stoma** a small opening in the epidermis of leaves through which the plant takes in carbon dioxide, and gives off water and oxygen
- transpiration** when a plant takes in carbon dioxide, and gives off water and oxygen through the stoma on the underside of its leaves

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American Beech

Common Names: beech, carolina beech, gray beech, red beech, ridge beech, stone beech, white beech, winter beech.

Genus: Fagus

Species: grandifolia



The American Beech tree grows in the southern and eastern parts of the United States. It grows in deciduous forests all over Maine and northern Massachusetts. It grows best in deep, rich, moist, well-drained soils.

The American beech is a tall and wide tree. The mature tree size is anywhere from 90 to 100 feet tall, and spreads 50 to 70 feet. The bark that grows on the tree is very smooth, pale and gray.

The growth buds have a yellow tinge, looking a little like a bullet. The leaves are bright green and are about three inches in length. They start wide, and then get smaller and smaller, until they come to a point. The leaves have distinct, strong veins and toothed edges.

The American Beech tree does not like city living, probably because of the carbon monoxide. The American Beech tree has a shallow root system and likes bottom land, and upland soil. There are two reasons why it is hard to grow anything beneath the tree. The first is because the leaves that grow on the tree block the sunlight and keep the ground constantly in shade. The second reason is because much of the root system grows all over the ground's surface, and uses any moisture that may reach the ground.

There are many different uses for the American Beech tree. This is a list of some of the things this tree is used for: furniture such as cabinets, benches, stools and tables.

The American Beech tree produces a lot of paper. The animals that feed on the nuts that grow on this tree are: the opossum, black bears, white-tailed deer, rabbits, ruffed grouse, red and gray squirrels, flying foxes, porcupines and others.

The American Beech tree helps people because the nuts that fall off the tree can be harvested and sold for food. The American Beech's population is healthy throughout its range.

Davey C. 2001

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American Bald Eagle

Genus: Haliaeetus

Species: leucocephalus



The Bald Eagle is a large fierce looking bird. It's name in Latin means "the sea eagle with a white head". It is the national symbol of the United States of America. Benjamin Franklin had suggested that the national symbol be the Wild Turkey, because the Bald Eagle was "a bird of bad moral character", but he was outvoted. Today it is seen on many things in the United States, such as money, seals, and other patriotic symbols.

The Bald Eagle generally lives forty-five to fifty years in captivity and twenty-five years in the wild. It is one of the largest flying birds seen in the United States. It stands between 30.4 and 36.4 inches tall, or about as high as an average office desk. It has a five and a half to eight foot wing span. That's about as long as a big dining room table. The head of the bird is white, the body of the bird is black, and the tail is

white. The feet are a dull orange and its beak is yellow.

Like many raptors it has an unusual trait that is called "reversed sexual dimorphism". This means that the female Bald Eagle is generally bigger than the male. In most species, the male is larger than the female.

This raptor is covered in large coarse feathers. The name "Bald Eagle" doesn't mean the bird is really bald. From a distance, it appears bald because of the contrast of the light and dark feathers. To the early settlers in the United States, the word bald meant white, not hairless. Because of its appearance, its name came to be the Bald Eagle. It doesn't get its amazing colors until four to five years of age. Before that, the immature Bald Eagle appears to have a brown head and tail with a yellow beak. The Bald Eagle has a body that is midway between sleek and bulky.

What is fascinating about the bald eagle to me is that the Bald Eagle's wing span can reach eight feet. I find this fascinating because that is taller than most people.

The Bald Eagle reaches maturity between four and six years of

age. It chooses one mate for its whole life. The climate it lives in affects its reproduction. The Bald Eagle tends to breed during the winter in the south, and during the spring in the north. It raises its family in large nests that are usually built near water. It may nest by itself or in an area where many other Bald Eagles live also. This bird of prey usually nests in tall live pine trees that are higher than the things that surround them. Occasionally the Bald Eagle may build its nest on the ground if there is nothing nearby to endanger them. The female eagle usually builds most of the nests. They are obsessed with working on their nests. The nests are made of natural materials such as sticks, mud and pieces of grass and can weigh up to one ton. The nests are sometimes larger than six feet in width. There was one eagle nest found in Ohio that was 9 _ feet wide, 20 feet deep, and weighed more than two tons. Unfortunately, the nest was destroyed when the tree it was built in fell to the ground in 1925. Nests are often used year after year. Some nests are built so well that they last for ten to twenty years even though they are unprotected from the weather.

Bald Eagles breed between the months of April and August depending on their location, reproducing every year on average. They usually have a clutch of two eggs. These eggs are laid several days apart so that it is not so hard to feed the eaglets. The parents feed the first eaglet for a couple of days before the next eaglet hatches. Because of this time gap, the older eaglet is bigger and stronger than the next bird to hatch. If there happened to be a food shortage, and the parents did not have enough food for them both, the older eaglet would take all the food and eventually the younger one would die of starvation. This promises that there is at least one healthy eaglet in the nest. Both the male and the female share the responsibility of the incubation of their clutch. Both parents also share the responsibility of nourishing and raising their eaglets. After the baby eaglets hatch, one of their parents is always with them for the first two weeks. After hatching in the nest, the young live with their parents for nine to fourteen weeks. After that time the parents may help them for another four weeks. Bald Eagles will tend to stay in their nesting area year round if there is food available and the weather permits. If this is not possible, they will migrate to an area with a more suitable climate.

The Bald Eagle has five noticeable characteristics that make it very good at the jobs it needs to do in order to survive; these are called special adaptations. The first adaptation of the Bald Eagle is that it can see four to eight times better and further than humans. The second special adaptation is a bony overhang above their eyes. This overhang protects the eyes from the sun and potential injury, and helps while flying and searching for food. It shades the bird's eyes from any glare and enables it to see into the water more easily while searching for fish. The third adaptations are the little bumps on the bottom of their feet called spicules. These protruding bumps, along with razor sharp talons, help the eagle hold fish during flight. The final obvious adaptation of the Bald Eagle is their very curved beak. This is used to help tear fish apart while eating.

The Bald Eagle is a raptor and that means it is a bird of prey. They like to sit on a high perch near water to make it easier to spot their prey. Their diet is made up of mainly fish, but also includes small sea birds, mammals, and reptiles (mostly turtles). When Bald Eagles catch a large animal, they rip pieces off of it and eat it bite by bite. When they catch a small animal they swallow it whole. After they swallow it they make themselves throw up all the bones, feathers, and hair that they cannot digest. Surprisingly enough, in cold winter months, dead animals become part of this predator's diet when there is not enough prey. They often steal food from other raptors, particularly Osprey, while in flight. They grab the prey right out of the other birds talons and fly away with it. Although a great predator from the air, this specific bird has been seen wading into streams in northern states and provinces, to reach a struggling fish when

the rapids are running too fast for the bird to see in.

The Bald Eagle is an amazing predator. Because of this, it is an environment helper. It helps the environment by eating a variety of fish and other animals. This is good for the environment because it eats from a variety of different animals. Like the Osprey, the Bald Eagle returns each year to its nest. It would be unable to do this if it were to over hunt the prey in its area.

For many years the Bald Eagle was close to extinction. This close call was caused by a chemical that has now been declared illegal by the U.S. government. This chemical is called DDT and got into the eagle's body when they ate contaminated fish. The chemical caused them and many other raptors to come close to extinction. It affected the eggs that they produced. They all had really thin shells that would break during the incubation period. Because of this, there would be few baby eaglets, causing a big decline in the eagle population. There was also a bounty put out on eagles. People thought they were killing farm animals and reducing the amount of fish available for fishermen.

Other things that have endangered the eagles are a result of our everyday lives. As more stores, buildings, homes and malls are built, eagles and other animals are losing their homes. Trees they live in are cut down and food they eat is poisoned.

As more and more people are listening to conservationists, more of these beautiful animals are being saved from extinction. The Bald Eagle is not an endangered species now, but it is still threatened by poachers. Across the United States, laws have been enacted that make it illegal to kill a Bald Eagle. All of these efforts are helping the Bald Eagle become a more commonly seen sight in the United States, which is especially nice because it is our national symbol.

by Jeffrey S. 2001

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Moist Continental Climate (Cf)

Deciduous forests are in Köppen's C climate category. The corresponding biome is the Deciduous Forest, or Temperate Forest biome. Such forests occur between approximately 25 ° and 50 ° latitude in both hemispheres.

One thing that is interesting about this biome and its climate is that it has four distinct seasons; spring, summer, autumn, and winter. Most deciduous forests have mild summers averaging about 70 °F. Summer months usually begin in early June and end in late August. Winter months don't begin until December. Winter temperatures are fairly cool with an average temperature of a little below freezing. Almost all of the world's deciduous forest is located by an ocean. The ocean and the wind are two big factors of why the temperature and climate change so much in this biome.

Climate is a mix of temperature and precipitation. Deciduous forests have almost 14 inches of rain in the winter months and more than 18 inches of rain in the summer.

I hope you enjoyed my report on the climate of a deciduous forest and that you learned a few things from it. Just remember that next time you look out your window you could be looking at a deciduous forest.

Perry D. 2000

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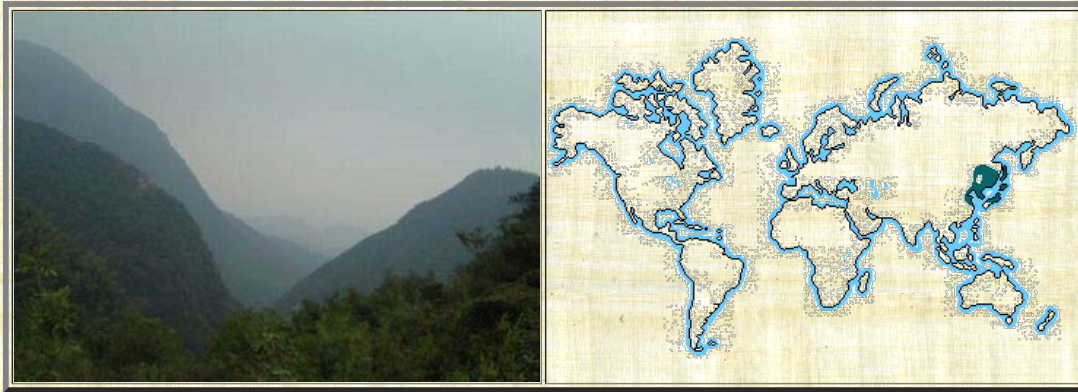
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Northeast Asian Deciduous Forest



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Deciduous Forest Biomes

The northeast Asian deciduous forest biome is located on the continent of Asia at about 30° to 45° North latitude, and about 130° to 145° East longitude. The biome covers parts of Korea, China, Russia, and Japan. In one part of China it is known as the Northeast China Plain deciduous forest, and in another part of China near the plain it is known as the Manchurian mixed forest. The part located in Korea is also known as the Central Korean deciduous forest.

The forest experiences all four seasons, and has long cold winters, and warm, humid summers. The temperature changes within the seasons. Annually about 20-40 inches of rain falls, mostly in the summer and fall. The Central Korean deciduous forest covers about 40,400 square miles, and is about the size of Ohio. The Manchurian mixed forest covers about 194,600 square miles, which is about twice the size of Wyoming, and the Northeast China Plain deciduous forest covers 89,800 square miles, about twice the size of Pennsylvania. The biome is highly elevated in some places and the home to more than one mountain range.

Walking through this biome, the trees one would see would be similar to trees in the United States. Pine trees, spruce, oak, and ash trees grow in this biome as well as Manchurian elm, Manchurian walnut, Mongolian oak, and Daurian birch. Below these trees a valuable medicinal plant called the Asian ginseng grows, as well as the shrubs bush clover, hazel, Daurian buckthorn, hawthorn, and the thorny Daurian rose. The Mongolian oak, and the Daurian birch tend to grow in drier spaces. Many areas like where the Mongolian oak, and Daurian birch stand are very dry, but other areas are prone to seasonal flooding. Forests there probably include woodland, grassland, and swamp components with closed canopy forest staying in the well drained but wetter sights. The bamboo plant, which grows in the area, has adapted to growing in the cleared areas of the forest, rather than the shady ground floor.

Though some trees in the Northeast Asian deciduous forest are the same as those in the United States, if one got a glance at the animals they could tell they were not in the USA. The endangered red-crowned crane, and red panda are two of these animals. Others that now have first class protection are the sable, Sika deer, leopard, and Siberian tiger. Otters hang out in freshwater streams in this forest biome, while Asiatic black bears look for insects. Leopards and Siberian tigers hunt in search of their prey, which include musk deer, red deer, Sika deer, and goat-like animals called gorals. Lynx and sable prowl for smaller prey, which include rodents and small birds. Pandas in the area adapt to the area by growing thick winter coats.

In recent decades heavy logging has extensively changed much of the forest. Timber harvesting, over-harvesting, and fires have also dramatically reduced the amount of Asian ginseng, which is rare, or extinct in most of eastern Asia. The Northeast China Plain is

intensively farmed for wheat mainly, so very little traces of the original forest remain. Patches of forest can still be seen in some places where it has been protected for religious reasons, or where the land is steep and inaccessible. At the mouth of the Liao River where wetlands, reed beds, sand, and mudflat areas still exist, there is a breeding shelter to protect endangered red-crowned cranes and Saunders gulls lies, called the Shuangtai Itekou Nature Reserve.

Though the Northeast Asian deciduous forest conservation status is critical and endangered, hopefully in this millennium more reserves will be established, and maybe the countries' government will do something about the extensive farming in the Northeast China Plain. Hopefully the deciduous forest will never fully disappear.

Mariah H. 2003

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American Beech

Common Names: beech, carolina beech, gray beech, red beech, ridge beech, stone beech, white beech, winter beech.

Genus: Fagus

Species: grandifolia



The American Beech tree grows in the southern and eastern parts of the United States. It grows in deciduous forests all over Maine and northern Massachusetts. It grows best in deep, rich, moist, well-drained soils.

The American beech is a tall and wide tree. The mature tree size is anywhere from 90 to 100 feet tall, and spreads 50 to 70 feet. The bark that grows on the tree is very smooth, pale and gray.

The growth buds have a

yellow tinge, looking a little like a bullet. The leaves are bright green and are about three inches in length. They start wide, and then get smaller and smaller, until they come to a point. The leaves have distinct, strong veins and toothed edges.

The American Beech tree does not like city living, probably because of the carbon monoxide. The American Beech tree has a shallow root system and likes bottom land, and upland soil. There are two reasons why it is hard to grow anything beneath the tree. The first is because the leaves that grow on the tree block the sunlight and keep the ground constantly in shade. The second reason is because much of the root system grows all over the ground's surface, and uses any moisture that may reach the ground.

There are many different uses for the American Beech tree. This is a list of some of the things this tree is used for: furniture such as cabinets, benches, stools and tables.

The American Beech tree produces a lot of paper. The animals that feed on the nuts that grow on this tree are: the opossum, black bears, white-tailed deer, rabbits, ruffed grouse, red and gray squirrels, flying foxes, porcupines and others.

The American Beech tree helps people because the nuts that fall off the tree can be harvested and sold for food. The American Beech's population is healthy throughout its range.

Davey C. 2001

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African Elephant

Common Name: Savanna Elephant

Genus: *Loxodonta*

Species: *africana*



African elephants, also known as the savanna elephants, are the largest land mammal in the world. They weigh up to 10,000 pounds and grow to 12 feet tall. They have a long trunk that is very flexible and has nostrils on the end. It is used to pick up food and water and carry it to its mouth. On the sides of its mouth there are two long teeth that extend out from inside its mouth. These are called tusks, and are made of ivory. They have thick, gray skin on their bodies that protects them from deadly predator bites.

African elephants live on the savannas of Africa. There are two species of elephants in Africa; the savanna elephant and the forest elephant, (*Loxodonta cyclotis*). The savanna elephant's habitat is usually savannas or grasslands. They are herbivores, and feed on grasses, fruits, tree leaves, bark, shrubs, and vines.

African elephants live for about seventy years, and die when their molars wear down; they can't eat so they starve. There are usually 10-15 related elephants in a group. Related family members stay in close range of each other. The leader is always a female. They communicate with sounds lower than human hearing.

An elephant's gestation period is 20 to 22 months. When born, a calf weighs around 200 pounds, and is about three feet tall. A mother is usually helped by another cow during birthing. The calves nurse until they are in their third year and are very dependent on their mothers for 8 to 10 years. When they are mature, male elephants leave the herd to join bachelor herds. Females stay with the herd they were born into.

Elephants are very social animals, and learn about what to eat, where to find water and how to behave from their mothers and older bulls. Recently some orphaned bull elephants were killing rare rhinos in South Africa's Hluhluwe-Umfolozi Reserve. In a conservation effort several decades ago, orphaned elephants were moved from Kruger National Park to Hluhluwe-Umfolozi Reserve where there were no elephants. They grew up without the influence of their mothers or older bulls. It is thought that without role models they didn't know how to behave and were taking out their aggressions inappropriately on the rhinos. Older bulls were brought in to teach them how to behave themselves.

The African elephant's size makes them hard for predators to eat, such as leopards, lions, or jaguars. At night, the adults form a circle around the calves to protect them from danger. But in the day, an unlucky calf might wander away from the herd and be some predator's lunch. But adults have thick skin, making it hard to bite.

These animals have a special job in savannas. They keep the savannas clear by eating shrubs and trees which helps the grass grow. This allows the many grazers on the savanna to survive.

Today there are about 150,000 elephants in the world. They are endangered because poachers and hunters kill them for their ivory tusks to sell. In October 1989, the African elephant was moved from Appendix II, which requires permits to hunt or trade, to Appendix I, which is the highest level of protection and doesn't allow international trade.

Allison F. 2000.



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Wet-Dry Tropical Climates (Aw)

Savanna Climate

The Savanna biome has a wet/dry climate. Its Köppen climate group is **Aw**. The **A** stands for a tropical climate, and the **w** for a dry season in the winter.

In the savanna climate there is a distinct dry season, which is in the winter. Savannas get all their rain in the summer months. During the distinct dry season of a savanna, most of the plants shrivel up and die. Some rivers and streams dry up. Most of the animals migrate to find food.

In the wet season all of the plants are lush and the rivers flow freely. The animals migrate back to graze. In West Africa the rainy season begins in May.

It is usually cooler during the dry season by a few degrees. Because it is in the tropical latitudes that is still hot enough. The savanna climate has a temperature range of 68° to 86° F (20° - 30° C). In the winter, it is usually about 68° to 78° F (20° - 25° C). In the summer the temperature ranges from 78° to 86° F (25° - 30° C). In a Savanna the temperature does not change a lot. When it does, its very gradual and not drastic.

There is an annual precipitation of 10 to 30 inches (100 to 150 cm) of rain. From December to February hardly any rain falls at all.

by Alex P. 2000

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Australian Tropical Savanna



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A home to many animals, the Australian tropical savanna is one of the world's largest tropical savannas. The world's other savannas cover two fifths of Africa and large amounts of India and South America. The Australian tropical savanna is an area of dense grass and scattered trees that stretches across northern Australia from Broome to Townsville.

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A savanna is usually very flat and with few trees and shrubs, this is because the fires destroy most of the trees and shrubs which usually aren't fire resistant. This happens frequently during the summer. This is also because savannas across the world have a limited water supply and bigger vegetation such as trees are the first to die out. Most savannas are near the equator, but the Australian savanna is south of the equator, which causes this region to have summer while we are having fall. Savannas usually occur only in a climate that has both a rainy and dry season. Each of these different seasons is very extreme.

African Savanna

The dry seasons, or "the dry", of the Australian savanna can last up to five months, from May to October. With each dry season come forest fires. These forest fires occur often, and geographers believe that fire keeps the savanna healthy. The tropical rain forest trees, that would have otherwise grown in that climate, don't grow because they are destroyed by the fires. Though the fires don't destroy all of the underground grasses, the fires limit the growth of any vegetation that isn't fire resistant. Usually the temperatures are cooler, with clear skies and low humidity.

During this time, water is key. The rainy season, or "the wet", can be pretty bad too. Some savannas around the world get ten inches of rain, and some ten full feet. Some pools, ponds, lakes, rivers, and streams flood. Much of the Australian savanna rain falls in heavy bursts of thunderstorms and monsoons. During the wet, which lasts from December to March, it is hot and humid. Temperatures can get as high as 50°C but usually stays around 30s (°C).

Marsupials dominate among the animals in this area of Australia. Marsupial's are mammals whose young are born undeveloped. The premature marsupial baby spends most of its growing up attached to the mother's nipple in a pouch. Marsupials are different from other mammals because they give birth to such undeveloped offspring while other mammal's young are much more

mature. The animals include the Echidna, Eastern Gray Kangaroo, the Koala Agile and Whiptale Wallabies, Walaroos, Possums, Gliders, the Northern Quoll, and the Golden Bandicoot. These animals live in or near the few trees in this area for shade, food, and water. In the other parts of the tropical savanna, the reptiles dominate. The saltwater Crocodile, which is found here, is the world's largest reptile. It can grow to be from 7 to 8 meters long.

The vegetation in Australia differs from that of other Savannas. The acacia, part of the 1,200 members of the pea family, is the most common tree in other savannas. The acacia tree does grow in Australia but only in tropical and subtropical areas so, it's not the most common. Acacia's produce a gum called gum arabic, this is used in drugs, foods and others. The acacia's flowers are yellow or white and they grow in bundles.

The most common tree in Australia is the eucalyptus. They are famous for their oil, gum, and timber. The eucalyptus grows in warm climates and they are the most important tree for timber in Australia. The bark of some of these trees furnishes tannin, which is used in medicine.

There are many threats to this biome. The foreign pests and weeds that have been brought to this biome, such as the wetland weed Mimosa, threaten the survival of the region's ecosystems and native species. The Australian government has sponsored programs to clear away brush for agricultural reasons. When some of the farmers took over land, they brought with them new systems that caused some species to become endangered. The Aboriginal people have been stripped of their homes so that the government can make more room for agriculture. The World Wildlife Fund (WWF) in Australia is reacting to this destruction by working with the communities to stop the clearing programs.

This savanna is unique in many ways, including its climate, its animals, its vegetation, and its beauty. It's not quite like the other savannas of the world. It provides a home for the animals we don't have anywhere else in the world. Its vegetation is unique too. The area of the world it is in makes its climate extremely different from the others around the world. The entire planet would suffer greatly if we destroyed this biome.

Thanks to the WWF, this ecosystem may survive. Without such intervention, this world's savannas won't stand a chance.

by Alix C. 2001.

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The African Savanna biome is a tropical grassland in Africa between latitude 15° North and 30 degrees S and longitude 15 degrees W and 40° West. It covers Guinea, Sierra Leone, Liberia, Cote D'ivore, Ghana, Togo, Benin, Nigeria, Cameroon, Central African Republic, Chad, Sudan, Ethiopia, Somalia, and the Democratic Republic of the Congo, Angola, Uganda, Rwanda, Burundi, Kenya, Tanzania, Malawi, Zambia, Zimbabwe, Mozambique, Botswana, and South Africa.

Annual rainfall in the African Savanna is about the same as that of Wisconsin. During the rainy season, beginning in May and ending in November, they get fifteen to twenty-five inches of rain a month. In the dry season they only get about four inches of rain. The dry season occurs more than seven months of the year, from October to March in the southern hemisphere and April to September in the northern hemisphere. The dry season comes in the low sun period and the wet season comes in the high sun period. They have a wet-dry tropical climate.

A rolling grassland dotted with trees is one way to define the African Savanna. The African Savanna is a thornbush savanna, which has many different kinds of plants such as acacia Senegal, candelabra tree, jackalberry tree, umbrella thorn acacia, whistling thorn, Bermuda grass, baobabs, and elephant grass. The Serengeti Plains are a grass savanna that has very dry but nutrient-rich volcanic sand. Around 2 million large plant-eating mammals live in the savanna. There are 45 species of mammals,

almost 500 species of birds, and 55 species of acacia in the Serengeti Plains. There are animals such as lions, African wildcats, klipspringer, steenbok, Burchell's zebra, African Savanna monitor, and puff adders. They have the largest diversity of hoofed animals in the world including antelopes, wildebeest, buffalos, zebras, and rhinoceros.

Both plants and animals have adapted very well to living where they live. Some animals are grazers, some are browsers, and some do a little of both. One herd of browsers nibbles at the trunk of a tree, another looks a little higher for food, a third eats even higher than the ones below them, and another herd browses at the very top. Many plants have developed long taproots to reach down to water. Some kinds of trees have thick fire resistant bark and trunks that can store water. Some animals migrate when it gets too hot or too cold for them, and others burrow in the ground. Some animals have tough cheek teeth so they can stand their diets, many animals cannot eat tough grasses like the animals of the African Savanna. Some animals have developed speed for hunting such as cheetahs others such as giraffes have developed long legs to become too high for a cheetah or other predators to get to. Naked mole rats feed on large underground tubers produced by plants, the secretary bird feeds on snakes so it has evolved to have long legs to walk through the grasses, and ostriches can run as fast as 31 miles per hour to escape predators. They can also have very thick skin to make it so predators cannot bite through their skin.

This biome has been helped, hurt, and changed by humans in many ways. For example people use the land for cattle grazing, which kills the grass and turns the savanna into a desert, they cause many fires that destroy the land, use of wood for fuel also causes problems to the environment, and people also poach (hunt the animals illegally) very often causing animals to become extinct. To repair damage people are creating controlled burning programs to keep worse fires from developing, they are creating nature preserves to keep the savanna natural, and they set up a biosphere reserve in South Africa to help protect the environment. The Serengeti and the Ngorongoro Conservation Area together have been named a World Heritage site. The Serengeti is one of the most famous national parks in the world. It has the most grazing animals and their predators in Africa. Some of the greatest wildlife scenes ever seen take place there. The African Savanna takes up almost half of the continent, about 5 million square miles. If it weren't for the efforts that people made to preserve the savanna they may not have all the animals, plants, and other wonderful things they have now.

by Maya S. 2003

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Photo credit:

<http://mercury.bio.uaf.edu/courses/biol105/Lectures/Section1/photos/50-25bx-Savanna.jpg>

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Return to Taiga

Balsam Fir

Common Name(s): Eastern Fir, Canadian Balsam, Blister Fir

Genus: Abies

Species: balsamea



You can find the Balsam Fir in northeastern North America, from Virginia to Newfoundland and northwest towards Yukon and Labrador. The balsam Fir can be found in many biomes including the Taiga biome.

The Balsam Fir is a small to medium sized native evergreen tree. It can grow to be 40 to 80 feet tall. The Balsam fir has a wide base and a narrow top that ends in a slender, spirelike top. The branches grow from the trunk at right angles, with the lower branches spreading and drooping to the ground when the tree grows in the open. In a dense stands, many of the lower branches are dead. It can grow to be a maximum of 200 years old.

The Balsam Fir's needles are 1 1/2 inches long. They are flat, rounded at the tip, and normally have a strong curve. They are dark green above and whitened below. The balsam fir's bark is smooth thin and have a grayish color. Blisters of resin appear on the bark of old trees, from which it gets one of its common names. Balsam fir has a shallow root system that rarely grows deeper than 30 inches.

The cones stand upright on the 1st year growth of the upper branches. The tree produces its first seeds when it is 20 years old, or 15 feet tall. The seeds are winged and are mostly dispersed by the wind, traveling from 20 to 525 feet from the parent tree.

The Balsam fir is a late successional, or climax growth tree. This means that they grow in old, undisturbed forests. The Balsam fir is the least fire resistant of evergreen in North America, and its seeds are destroyed by fire. Balsam firs first appear 30 to 50 years after a fire.

Balsam fir is one of the major food supplies for moose in the winter. Caribou and white tailed deer leave it alone. Red squirrels will eat the male flower buds. Deer, caribou and moose use Balsam fir stands as cover in the winter because the snow is not as deep under them as in hardwood stands.

The wood of the Balsam Fir is sometimes used as lumber. It is lightweight, low in bending and low in resistance to shock as well. The tree is often used as a Christmas tree, pulpwood, or cabin logs.

Samantha S. 2000.



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Climate

Return to Taiga

American Black Bear

Genus: Ursus

Species: americanus



The American Black Bear, like most bears, lack the distinctive shoulder hump that the Grizzly Bear has. This bear can run up to 25 miles per hour, which is very quick for its 220-594 pound body. Their feet relate to humans, because they touch the ground in a "heel, toe, heel, toe, etc." pattern. They have rounded ears, a short stubby tail, and short claws that are useful in climbing trees. The American Black Bear is usually black but can have phases of brown,

cinnamon, beige and even a bluish- white. The length of this bear's body is usually 5-6 feet from nose to tail and 32-38 inches from paw to the top of its shoulder. They live in most of North America.

The female black bear reaches sexual maturity 4-5 years after birth, while the male reaches maturity 5-6 years after birth, they usually have 2 or 3 young. Their mating season is in the summer and they will give birth to their young in January or February. The cubs are blind at birth and weigh 8_ ounces to 11_ ounces. The males do not help raise the cubs, but leave to mate again like most other bear species. The Mother bear can be quite territorial if it involves her cubs. For example, if any animal gets between she and her cubs, she will relentlessly attack it until it is dead. The average black bear lives up 25 years.

The black bear's coat is well adapted to the cold weather of winter because of its many layers of shaggy fur. Its claws are also very adapted to its environment, this is because they are just the right length to climb the many trees that surround its forest home. This bear also hibernates to avoid having to find food in the winter.

Like most animals the Black Bear looks for food with the highest nutritional value. They will eat virtually anything, but 75% of its diet is made up plants and other vegetation, while the other 25% is made up of, carcasses, honey, small mammals and insects.

The black bear, like all bears, is a predator, and an omnivore. The black bear helps the environment by killing off the elderly, and weaklings of over populated prey. The black bear is not endangered and is widely distributed throughout most of North America.

Max S. 2001

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Return to Taiga

Boreal forest Climate (Dfc)

Taiga is in Köppen's Dfc climate category. The *Dis* is a snow climate, while the *f* means there is enough precipitation in all months. The *c* means that fewer than 4 months have an average temperature over 50° F (10° C).

The taiga climate is for the most part dominated by cold arctic air. Exceptionally cold winds bring bitterly cold air from the Arctic Circle: the temperatures fall even more on clear nights when there is no cloud cover. Because of earth's tilt, the taiga is turned away from the sun in the winter. Less of the sun's radiation reaches the ground to warm it up.

Winter, with it's freezing cold temperatures, lasts for six to seven months. Summer is a rainy, hot and short season in the taiga. Fall is the shortest season for taiga. Spring brings flowers, the frozen ponds melt, and the animals come out from hibernation.

The lowest and highest temperatures that occur for taiga are the following:

- Winter's LOWEST temperature in taiga is -65°F.
- Winter's HIGHEST temperature is 30° F.
- Summer's LOWEST temperature is 30° F.
- Summer's HIGHEST temperature is 70° F.

The temperature range, as you can see, is -65° F to 70° F (-54 to 21° C). For half of the year, the average temperature is below freezing. In the winter the average air temperature is warmer than it is for tundra, which lies north of the taiga.

The taiga climate has an average annual rainfall of 12 - 33 inches (30 - 84 cm). Most of it falls in the summer as rain.

The corresponding biome would be the Taiga biome. The global range for taiga goes all around the world from Alaska, to Canada, Scandinavia, Russia and China. Taiga climate is only found in the northern hemisphere, because there isn't enough land mass in the southern hemisphere to create a taiga climate there.

2000

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Taiga Climate (Dfc and Dfb)

The taiga is a moist subarctic forest that begins where the Tundra ends. The winters are long, dark and cold with lots of snow, and the summers are warm and short when the daylight can be up to 20 hours long. The average climate for the taiga each year falls below -32°F (0°C). The taiga can be as low as -76°F (60°C). In the summer the temperature can reach as high as 104°F (40°C). The major type of vegetation in the taiga biome are coniferous evergreens. Needles on evergreen trees of the taiga are thin, wax-covered and they do not fall off in the fall. The conifers of the taiga keep their leaves all year around. Needles are the leaves in the taiga biome. Conifers are adapted to the taiga environment because they lose less water and shed snow more easily because of their conical shape. Some types of adaptations in the animals are migration, heavier coats of fur, and some change color, such as the snow-shoe rabbit. Mice and moles live in tunnels under the snow. Some animals that live in the taiga are bears, badger, beavers, reindeer, foxes, wolverine and squirrels. Many birds migrate to the taiga during the spring because there are so many insects to feed on after the snow melts. The latitude range is approximately between 50°-60° North latitude.

The taiga climate under Köppen's classification system are Dfb and Dfc. The letters of the climate codes mean the following; D = snow climates, f = sufficient precipitation in all months, b = warmest month average under 71.6°F (22°C) at least 4 months have an average of over 50°F (10°C), and c = Fewer than 4 months with average temperatures over 50°F (10°C).

The average temperature per year is 32°F (0°C) The average temperature for the summer can be over 50°F (10°C). The average winter temperature is under 26.6°F (-3°C). The highest temperature for the taiga biome has been 104°F (-60°C). I guess it would be an uncomfortable place for humans to live in. However, millions of people live there.

The average precipitation per year is about 40 inches. The average precipitation for the summer is between 10-20 inches. The average precipitation for the winter is between 20-40 inches. The type of precipitation that falls in the taiga climate are rain in summer and mostly snow in winter.

Something I find interesting about the climate of this biome is that the temperature can change from one extreme to another. I didn't think that a place farther north from us could have higher temperatures than we do.

By Harold Pilskan, 2001

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Caribou Moss

Common Name: Caribou Moss, Reindeer Lichen

Genus: Cladonia

Species: rangiferina

Parts Used: entire organism



Caribou moss grows in arctic and northern regions around the world. It grows on the ground and on rocks. It looks like a foamy, gray-green spongy mass, and grows to be 1 to 4 inches high. The stems, or stocks, are hollow, and branch out many times. Although it is called caribou moss, it is actually a lichen.

Lichens are two separate organisms. They are made up of fungi and algae, which live and grow together. The spongy threads of lichens support and protects the algae. The algae has

chlorophyll which can make food. Each has something the other needs. This is called a symbiotic relationship. Lichen can make food when the temperature gets very low and there is little light. The tissues of lichens aren't easily damaged by frost. This makes it a great plant for the tundra.

Lichen can survive for long periods of time without water. They just dry out and go dormant when there is little water or light. They can begin to grow again even after very long periods of dormancy.

Animals such as Reindeer and Caribou feed on lichen during the coldest periods of the season. They do this because it is one of the only things that they have for food when the weather is cold and there is little other vegetation left. It has lots of carbohydrates that give the caribou energy to make body heat. Caribou have special microorganisms in their stomachs which let them digest lichen. Very few other animals eat lichens. Some scientists think that the caribou evolved to fill the tundra's food niche that other

animals couldn't fill.

People are afraid that the reindeer and the caribou are dying from eating lichens. Lichens absorb moisture and nutrients through their surface cells. Pollutants and deadly radiation can pass easily into their cells. The caribou eat the radiation rich lichen and pass it on to people who can get the radiation from caribou meat.

Lichens are commercially grown in Scandinavia to make a powder that thickens soups and desserts. It is very rich in vitamins A and B. The Dena'ina, Native Americans of the area, boil it until its soft. They use it in all kinds of their foods. They also make a tea out of it as a medicine for diarrhea.

It is also used to tan caribou hides so if you don't boil out the harsh acids, it will give you a very bad stomach ache.

2000

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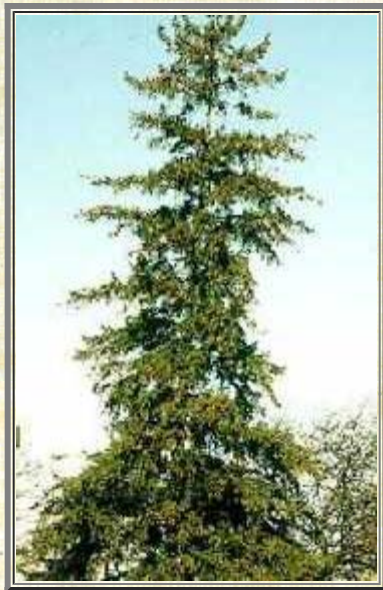
White Spruce

Common Names: Canada Spruce, Cat Spruce, Single Spruce

Genus: Picea

Species: glauca

Parts Used: landscape trees



Most spruce needles are four-sided, stiff, and less than one inch long, 2.5 centimeters to be exact. Woody, peglike projections help join the needles to the twigs. Spruce trees grow tall and most are shaped like pyramids. Some grow as tall as one hundred and fifty feet, specifically the white spruce. The spruce tree is an evergreen color but specific types of spruces, the black spruce for example, are named for the color of their bark and foliage.

The needle-like leaves attached to the common spruce trees are used to hold in moisture. The blue spruce is widely planted in yards because of its beautiful silver-blue foliage.

Some spruce trees grow beyond the Arctic Circle, whereas others can grow as far south as the Pyrenees Mountains.

Approximately forty different types of spruce trees are native to the Northern Hemisphere. In North America, spruce trees grow as far south as North Carolina and Arizona. The Sitka spruce grows on the Pacific Coast from northern California to Alaska.

by Leah E. 2000

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Douglas-fir

Common Names: bigcone Douglas-fir, Rocky Mountain Douglas-fir

Genus: Pseudotsuga

Species: menziesii

Parts Used: The trunk is used for lumber and the leaves can be steeped for tea.



Douglas-firs are very big. They can grow from 40 to 60 feet tall and 15 to 25 feet wide. Because of this they are one of the most important lumber trees in the world. The wood is used as lumber, timbers, and plywood. The dense wood is very hard, stiff and durable.

Animals forage off the Douglas-fir in the winter or early spring when their other food supplies are covered in snow or haven't come up yet. Mule deer like it more than elk, but it is not an important food for both. Bears often scrape off the bark on young trees and eat the sap layer beneath.

The common name of the Douglas-fir is hyphenated because it isn't a true fir. It was named after David Douglas, the Scottish botanist.

Like most of its family it has a fine texture and is pyramid shaped. The trunk on older trees are free of branches. They have a short cylindrical crown with a flattened top. Needles are flat with a pointed tip. The top of the needles are bright yellowish-green with a single groove down the center; the bottom of the needles are paler. The needles appear to stand out around the twig. The cones are 1-3 inches long, turning from green to grey as they mature. Small bracts with three prongs grow between each scale. They curls up when the cone gets older, making the cone look very bristled. The bark of the Douglas-fir becomes very thick and grooved, with dark brown ridges as the tree grows older.

Native Americans had many uses for Douglas-fir. They used the wood and the branches as fuel for cooking. They also used it for fishing hooks and for handles. Douglas-fir branches were used for covering the floors of lodges and sweat lodges.

The Douglas fir is vulnerable to clay because it is a wet substance and it can rot the roots. Also the needles can get infected with fungi and this causes them to fall out .

Mason F. 2000.

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Northern Lynx

Genus: Lynx

Species: canadensis



A not so common animal is the Canadian lynx. The lynx is almost identical to a regular house cat, but larger. It has a powerful body on short, furry legs attached to hefty feet, and a bobbed, black-tipped tail. Its fur is spotted and yellowish-brown to grey. It has a collar of fur around its face, giving a triangular shape. It also has long black ear tufts.

It is quick and sly, and can strike an animal at any moment. The lynx

mainly hunts snowshoe hares, but also eats meadow voles, small deer, caribou and sheep.

It has eyes that provide excellent vision for the night, and its feet have fur covered pads and are silent in the snow so it can sneak up on small prey. It isn't very fast so it has to ambush an animal instead of chasing it down.

The lynx can grow up to 2 -4 feet as an adult, and is about 2 feet high in the shoulders. It weighs about 11 - 45 pounds.

The male has a hunting range of about 20 square miles and females have about half that size. It likes to travel alone, and searches up to twelve miles during the night in search of food. In the spring the female will have a litter of four kittens under a log or bush. The kittens are born blind and helpless, and grow slowly. They are weaned at two months but stay with their mother for about a year.

The lynx lives deep in the coniferous forest and mountains of Canada and the northern United States. It can be found scattered through Europe, across northern Asia and Siberia.

There aren't as many lynxes because their habitats are being destroyed. They are also hunted for their fur and meat. In Europe

the lynx has almost been wiped out because farmers think it is a pest and that it kills sheep, goats and other livestock. It is waiting to be put on the endangered list in the United States. With strong laws to protect it the lynx is making a slow comeback.

by Dillon B. 200o.



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Bobcat

Genus: Felis

Species: rufus



The large coniferous forest found in Canada is called the Taiga. There are many swamps, mountains and forests in the Taiga that are home to the Bobcat. Throughout much of the United States the bobcat lives in forests, but can also be found in deserts and chaparral.

A bobcat's body is about two feet long, and its tail is approximately four to eight inches long. The bobcat gets its name from its stubby tail. A bobcat's weight range is between thirteen and twenty three pounds. It stands twenty to twenty four inches tall. A bobcat's paw print is a little over an inch wide.

The bobcat has two color changes per year. The fur of the bobcat is striped, blotchy, and dense; tawny gray for the winter and reddish brown for the summer. The baby bobcat has spotted fur that disappears when they get older.

The bobcat's head is small and its ears are large. The face of the bobcat looks a lot like a house cat, but the body is taller and slimmer.

The teeth of this cat are sharp. The canine teeth are long and are used to stab the prey. The back teeth are scissor-like so they can cut through the meat and hide. The bobcat's claws are designed to help it climb and catch its prey. These claws are very sharp and can be pulled inside their toes.

The bobcat can run very fast, up to 30 miles per hour, but it prefers to walk. The bobcat has a special technique for running fast to catch its prey. It puts its back feet into the front feet's spot. If the bobcat is walking on leaves and twigs that would make noise this technique also prevents it from making any sound, and makes it a very quiet hunter.

Bobcats are loners, and they keep separate territories. The male's territory can be as big as forty square miles. A male can have two or three females living in his territory. The male mates with all the females. He will father all the litters and he is responsible for feeding the mother and the kittens. Mating season is in the spring and females have two or three kittens each year. The kittens stay with their mother until the fall. They are born with their eyes closed and open them when they are ten days old. The young kitten drinks its mother's milk until about two months old. When they are five months old, the kittens learn to hunt with their mother. The kittens will stay with their mother for six to nine months.

Two adaptations of the bobcat are sharp claws and teeth. Both of these help it hunt. Its fur changes color with the seasons, and helps it blend in with the colors of the season. The bobcat is common in North America, but it is rarely seen due to its camouflage. The bobcat's ears help it hear the quietest sound of its prey by swiveling front to back. Bobcats have little tufts of fur on top of their ears and this may improve their hearing the same way cupping our hand to our ear catches more sound.

The bobcat is a carnivore. It eats mice, squirrels, rabbits, and game birds that live on the ground, like grouse. The scissor like teeth help it rip up the meat and eat it. The bobcat sneaks up on its prey, close enough to catch it in one pounce. Jack rabbits are too quick to be caught, so the bobcat eats mostly snowshoe rabbits and hares.

A bobcat is mostly a predator, rarely a prey. It keeps the population of mice, squirrels, rabbits, and game birds down. The bobcat feeds on animals most people think of as vermin.

The bobcat is not endangered, it is on the Least Concern list. About one million live in North America. There are so many because they are so adaptable to different habitats and prey - they can live in forests, swamps, mountains, and deserts.

Justin A. 2001

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Blue Oak

Common Name: Californis Blue Oak, Iron Oak, Mountain White Oak, Mountain Oak

Genus: Quercus

Species: douglasii



The blue oak is native to the state of California on the western coast of North America. In its natural habitat it grows in the valleys and lower slopes of the Coast Ranges, the lower western foothills of the Sierra Nevada, and the north slope of the San Gabriel Mountains. Blue oak covers about 3 million acres and is one of the largest ancient forest type in California. The Scottish biologist David Douglas first named the blue oak in 1831 for the bluish color of its leaves.

The habitat of blue oaks is open savanna to open woodlands with shrubby understories. At lower elevation it merges with annual grasslands, and at higher elevations it blends with chaparral, pinyon and juniper woodlands. The blue oak often grows among gray pines and other oaks species such as live oak, black oak and valley oak.

Blue oaks are adapted to drought and dry climates. They can survive temperatures above 100° F for several weeks at a time. Average maximum temperatures in July can range from 70° to 100° F. In January minimum temperatures can range from 10° to 35° F. Annual precipitation averages 20 to 40 inches and mostly falls in the form of rain.

The blue oak is a short tree with an open canopy. The canopy is typically rounded with many crooked branches. The tree grows to average heights of 30 feet. In deep, moist soil it can grow up to 60 feet. It is a winter deciduous tree, but will sometimes shed its leaves during severely hot and dry years and go dormant. The litter of leaves and twigs decomposes into a soil high in nutrients and organic matter, holding water better than the surrounding areas. This contributes to high species diversity under the canopies.

Leaves of the blue oak are simple and grow alternately on the twig. The leaves are about 1-3 inches long and have wavy, shallow and irregular margins, usually with 7 lobes. They have a blue-green color above, and yellow-green on the lower surface. A waxy



coating covers the tough and thick leaves to help conserve water.

Male flowers are yellow-green catkins. Female flowers are small and often solitary. These grow in the axis of the leaves on new twigs. Blue oaks flower from April through May.

The acorns are long, thin, and gently tapering. They are 3/4 to 1 1/2 inches long with shallow caps. The acorns ripen in one year, and can germinate after one month, unlike other oak varieties, which germinate the following spring. From the beginning most growth is in the roots instead of the shoots. This allows it to tap into available water sources right away, and survive dry conditions. The acorns are palatable to livestock and wildlife. It is an important food source for black-tailed deer, game birds and rodents. At least a dozen species of songbirds also eat the acorns.

The blue oak has an extensive root system. It can grow through cracks in rocks to depths of 80 feet to reach ground water. Its root system allows it to survive in fire prone and arid regions. Blue oaks reproduce both through seeds and vegetatively from burnt or cut stumps. The light colored bark is thick and helps reduce fire damage.

The blue oak isn't used in manufacturing because of its crooked growth habit. But it is used as fence posts and fuel wood. Native Americans made meal from blue oak acorns, and used the acorn leachate for dying baskets. The wood was used to make bowls.

Stands of blue oaks are typically 80 to 100 years old. Blue oaks are slow growers, and small plants can be 25 years old. Some blue oaks are as old as 200 to 500 years old. The number of blue oaks has decreased because there has been no natural regeneration. It is not considered endangered, however, because of its wide distribution across the region.

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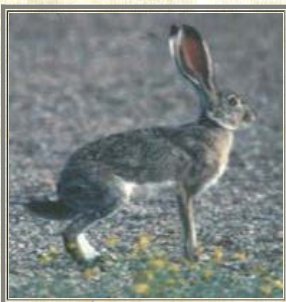
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Climate

Return to Chaparral

Black-tailed Jackrabbit

Genus: Lepus
Species: californicus



Although it is called a rabbit, the black-tailed jackrabbit is really a hare. Hares are different from rabbits because their babies, called leverets, are born with all their fur, and their eyes open. Jackrabbits live in the extreme environments of the desert and chaparral, where temperatures are hot during the day and cold at night, and there isn't a lot of rain.

Jackrabbits have huge ears. It can regulate its body heat by increasing or decreasing the blood flow through its ears. This helps the jackrabbit absorb heat or cool off. They prefer to live in

open areas where they can see predators coming. With its long, rangy legs it can run in bursts of up to 36 mph. Their incredible speed helps them outrun many of their enemies. The soles of a jackrabbit's feet are covered with fur. This cushions their feet on hard ground and insulates them from the scorching heat of the desert sand. Their fur is a silver and tan color that blends in well with the desert and chaparral habitat that it lives in.

Male jackrabbits can weigh from 9-11 pounds, and females 11-13 pounds. As you can see from their weight, female jackrabbits are larger than males. They can be anywhere from 16-28 inches, with a 2-5 inch tail. They reach sexual maturity in 1 year. After mating, the female, or doe, will have a litter of 1-6 leverets every 3-4 months. The mother will leave the leverets in separate hiding places, and come back in the evening to nurse each one. After one month they are on their own.

Jackrabbits aren't picky eaters and can eat tough grasses, leaves, and twigs. They will also eat sagebrush and cacti. They only come out at night to feed. They conserve water by eating their food twice. This is kind of gross, but when they poop out their food the first time, they will eat the poop and digest it again, getting even more of the moisture out. Jackrabbits rarely have to drink and get most of their water from the plants they eat. Fifteen jackrabbits can eat as much as one full-grown cow in one day.

The jackrabbit is common in the western United States and northern Mexico, and in many places is considered a pest. People put up fences and poison to try to control them.



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Chaparral Climate [Mediterranean Climate \(Cs\)](#)

In the winter the Chaparral climate, also known as the Mediterranean climate, is mild and moist, but not rainy. During the summer it is very hot and dry. The temperature is usually mild but it can get very hot or nearly freezing. The temperature range is between 30° and 100° F.

This biome only gets about 10-17 inches of rain all year, and most of it comes in the winter. Because of the long period of dryness in the summer, only plants with hard leaves can survive, such as scrub oaks, chamiso shrubs, pines, cork and olive trees. Many leaves are also hairy so they can collect the moisture out of the air and use it.

There are many fires in the chaparral because of the heat and dryness. Some plants have adapted even to the fires. Their seeds will lie dormant until there is a fire. Their seed casings will crack and the seed will sprout only then.

Chaparrals exist in a mid-latitude climate and lie in a belt of prevailing westerly winds. This is why chaparrals tend to be on the west sides of continents. It is classified under Köppen's climate classification system as **Cs**. The **C** stands for warm temperature climates, where the average temperature of the coldest months is 64° F. The **s** stands for a dry season in the summer of the hemisphere it is in.

Chaparrals can be found from 30° to 50° N and 30° to 40° S latitudes. The chaparral climate occurs in central and southern coast of California; the coast areas of the Mediterranean Sea; coastal western and southern Australia; the Chilean coast in South America, and the Cape Town region of South Africa.

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Mediterranean Chaparral [Mediterranean Climate \(Cs\)](#)

The Mediterranean chaparral has a very interesting climate. It has four seasons. These are spring, summer, fall, and winter. The chaparral has significantly hot and dry summers. Fog off the ocean is the only source of moisture during the summer. It has cool and moist winters with tropical storms bringing lots of rain. Spring and fall are usually a mix between both summer and winter, with a moderate amount of rain and heat.

The vegetation is mostly made up of shrubs. These include evergreen shrubs and most deciduous forms of shrub. Some of the adaptations of the vegetation are that the yucca rosette shape defends the growth in the inside of the bulbs from ruin except from extremely hot fires. Another adaptation of the vegetation is that the pinecone resin, which coats the closed-cone pines melts and allows the cones to open and spread their seeds. Also, the small, leathery leaves of thyme, oregano, and rosemary keep the moisture in the leaves. Leaves and branches are usually hairy to trap moisture from fog and rain, and to insulate them from the high heat in the summer.

The fauna is very interesting. Some of the adaptations of the Mediterranean chaparral fauna are that they don't need a lot of water. They have learned to live in their biome by being nocturnal, and are usually small.

What I find interesting about my biome's climate is its natural forest fires. These are caused by two things. One is the shortage of rain in the chaparral during the summer. Another is that many types of shrubs and flora are aromatic, like sage, thyme, rosemary, and oregano. These hold highly flammable oils. Did you know that the chaparral burns out every 30-40 years?

There is very little precipitation in the Mediterranean chaparral. The average annual precipitation is 10-20 inches in the form of rain. The average rainfall for the entire winter is 6.8 inches. The average rainfall for spring is 2.2 inches. The average rainfall for summer is .2 inches. The average rainfall for fall is 4.2 inches.

The average annual temperature is 59 ° F. The highest temperatures can reach 91°F, and the lowest temperature 37°F. The average temperature for winter is 46°F, while the average temperature for summer is 71°F. Average temperature for spring is 56°F, and the average temperature for fall is 65°F. Summers are dry and hot while the winters are somewhat cool and moist.

The latitude range for the Mediterranean chaparral climate is between 30° and 40° North. Köppen's climate-classification letter code for the chaparral is **Csa**. **Cs** stands for a mild, humid climate with a dry season in the summer of the respective hemisphere. The **a** means the summers are hot with the warmest month over 72°F.

by Sarah Nelson, 2001

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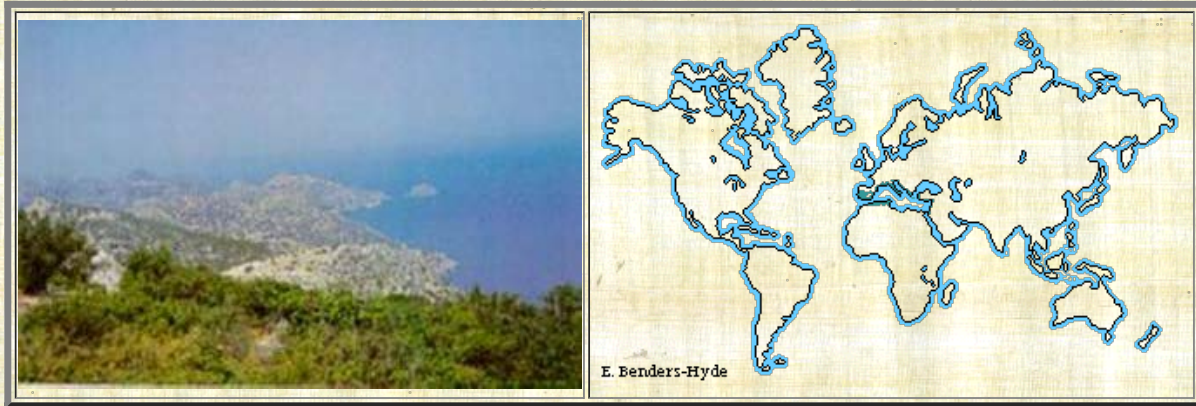
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Mediterranean Chaparral



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California Chaparral

Chaparral, or Sclerophyll forest biomes, occur in Europe, Africa, Asia Minor, North America, and South America. Chaparrals exist between 30° and 40° North and South latitude on the west coasts of continents. The favorable climatic conditions which produce this biome includes shore areas with nearby cold ocean currents. Mediterranean Chaparral biome is localized in the coastal areas surrounding the Mediterranean Sea including parts of Europe, North Africa, and Asia Minor.

This subtropical Mediterranean biome, composed of shrub lands and woodlands is called the maquis in Europe. Chaparral is the California name for this biome. Cactus and other water storing plants do well in this environment. The cacti often form dense thickets. Most of the plant growth is leafy and relatively short, less than eight feet tall. It is important for plants to be drought resistant, to survive the short wet winters and long dry summers. The geography of this region begins at the seashore and extends through rolling farmlands, with grazing and cultivation, into the mountains. The climate in this area is unique with the wet season occurring in winter. Many plants that do well in other European areas are unable to thrive in this Mediterranean biome due to the summer drought, with annual rainfall of only 15-40 inches. Temperatures are affected by cold ocean currents and fog, limiting the growing season.

Shrubs and low growing vegetation are the main components of this biome. In some areas the growth extends to larger trees and hard leaf forests, as well as aromatic plants. The vegetation must be hardy and drought resistant and will include evergreens, cacti, olive and fruit trees, and cork oak, among others. Small hard needles are an asset in this environment, as well as plants with small leathery leaves. Aromatic plants and herbs, such as rosemary, thyme, sage, and oregano do well in this biome. These aromatics do contain highly flammable oils which could contribute to forest fires.

The Mediterranean biome houses many forms of wildlife such as wild goats, sheep, cattle, mouflon, and horses. The land supports lynx, wild boar, rabbits, vultures and three types of eagles. Many small mammals, reptiles and insects inhabit this region. Local people graze goats, sheep, cattle, donkeys, and horses on this rugged land. This

area is also known for the breeding of the famous bullfighting bulls.

Animals have adapted to this sparse and rough terrain by becoming agile climbers, foraging over larger areas, and varying their diet to include the often scrubby brush lands. Plants have adapted by storing water through thick bark or waxy coverings, and by growing thorns to prevent animals from eating them. Adaptations also include regeneration after fire.

People have adapted by grazing herds over large areas, even tying them to the roadsides to make the most of the roadside vegetation. Herding them from area to area to maintain adequate feeding grounds for their herds. People profit by growing olives, oranges, culinary herbs and harvesting cork.

The Mediterranean chaparral differs from similar areas in Australia and areas adjacent to the Caspian Sea. Specialized plants and animals have developed in these localities as well. For example, the subtropical climate of Australia supports eucalyptus and the koala that feed on it. The Caspian area supports antelope, sand badgers, jerboas, and sand marmots which are not found in the Mediterranean biome as described herein.

Mediterranean regions have long been impacted by humans especially through the use of fire and livestock grazing. We know the Mediterranean was formerly forested with live oaks, pines, cedars, wild carob and wild olive. The shrub lands are more extensive today than before aboriginal burning and Spanish livestock grazing. Today the Spanish Mediterranean area supports extensive olive groves, cork forests, cattle farming and the production of sherry.

by Kevin S. 2001

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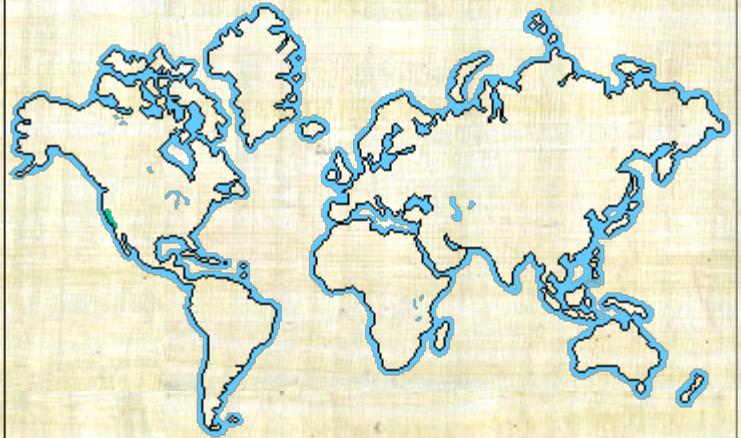
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California Chaparral



Plants

The Chaparral, also known as California woodland and grasslands, is found on the coast of California in western North America.

Animals

You could find this biome in a section of the Sierra Nevada. Its latitude range is 53° to 65° North in the coastal range but the mountain range is at 32° to 60° North.

Climate

The California Chaparral has peaks that rise up to 5,000 feet above sea level and the mountains are steeply sloped. The valleys and streams are narrow and widely spaced. The chaparral biome climate is usually hot and dry in the summers, and rainy and mild in the winters. The temperature ranges from 53° to 65° F in the coast range and 32° to 60° F in the mountains. Precipitation ranges from 12 to 40 inches per year, and comes down mostly as rain. Most of the rain falls in the fall, winter and spring. It increases with elevation. The snow that comes in winter melts fast. Frost and a little freezing weather occurs in the winter. The Chaparral biome contains all four seasons: winter, fall, spring, and summer.

Return to Chaparral

The plants that live in the Chaparral are oaks, pines and mahoganies, and brush such as narrow leaf golden brush. These different plants are adapted to the Chaparral because of the climate and all the room they have to grow. The plants have adapted by conserving water through small, waxy leaves and being able to live with as little water as possible. The Chaparral contains approximately 2,036 of plants other than trees.

Some of the animals and birds that live in the chaparral are the Sonoma Chipmunk, Suisu Shrew, Scrub Jays, and Acorn Woodpeckers. There's 100 different kinds of birds. The animals and birds have adapted to the Chaparral because the climate and the food (other animals and plants). The animals also have adapted to the fires in the Chaparral. Many of the animals and plants depend on the fires for regeneration. The plants need fire because Laurel Sumac seed coats need fire to open them so new plants can grow.

Humans have hurt the California chaparral by cutting down the trees which the birds and animals live in. People are cutting down the trees because they need fire wood and pasture. In some ways people have helped the chaparral by repairing ares and water sources which have been destroyed by domestic animals and water diversion.

by Sophia W. 2002

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Animals

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Return to Rainforest

Bengal Bamboo

Common Names: Spineless Indian Bamboo, Calcutta Cane

Genus: Bambusa

Species: tulda



The *Bambusa tulda* can be found in the biome of the Southeast Asian rainforest. It often grows as an undergrowth scattered or in patches in the forest. It does very well in a moist environment with a lot of rainfall. It likes temperatures between 40 degrees Fahrenheit and 100 degrees Fahrenheit. Rainforests get around 100 inches of rain per year. Rainforests are found mainly around the equator. They hold many varieties of plants and animals. The vegetation in rainforests grows in layers. Some of the layers get sunlight, but the bottom layers get little or no sunlight.

This particular bamboo can grow anywhere between 40 feet and 80 feet in height. It is approximately 3 inches in diameter at maturity. This bamboo has dark green straight stalky culms,

which are the stems. The leaves are long and narrow and green in color. They grow alternately on opposing sides of the stem, in two rows. Usually the blades fall off when the leaves have matured. This leaves a sheath like base. Bamboo is a perennial plant. Believe it or not, bamboo is not a tree or a shrub, it is a grass. It is the largest grass. It is very fast growing. In two to three months it is full grown. The culms or stems never get thicker after they are full grown. They only flower once in their lifetime and die after they bloom. No matter where they grow, different plants of the same species flower at the same time. New plants grow from the seeds that resemble rice kernels. This species life span is 25 to 40 years.

Bambusa tulda is important to its environment. It can reduce soil erosion. It sucks up water from heavy rains that might cause flooding. It also provides shelter for many animals. A rainforest has plenty of water for this plant to grow. It physically adapts to its environment by growing tall fast so it gets a lot of rain and sunlight.

Bambusa tulda is mainly used by the Indian paper pulping industry. It is also used for furniture, making baskets and reinforcing concrete. This type of bamboo is used to make a sacred flute called the "Eloo". It is also used for fishing rods. It is one of the most useful species of bambusa.

Rainforests are disappearing at the rate of 80 acres per minute, which is a little over 1 acre per second. *Bambusa tulda* is not on the endangered species list. It is native to India, Burma, Bangladesh, Myanmar and Thailand. Although there is no formal conservation plan, some of the local people are trying to conserve it in their area. They do this in their homestead and settled forest areas by planting it and being cautious about how much they harvest.

By Zachary C. 2002

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Photo Credit: © Hans Erken

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Climate

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African Forest Elephant

Common Names: Pygmy Elephant

Genus: *Loxodonta*

Species: *cyclotis*



It was always thought that there were two species of elephant in the world; the African savanna elephant, (*Loxodonta africana*) and the Asian elephant, (*Elephas maximus*). But now, through DNA testing, it has been discovered that there is a third species; the African forest elephant.

When a DNA identification system was set up to trace where poached ivory was coming from, scientists found that the African elephants consisted of two very different species. They expected slight variations in the genetic makeup of the savanna elephant, but were surprised to discover the two different species.

The new species, the forest elephant, was considered to be a subspecies of the African elephant, and was known as *Loxodonta africana cyclotis*. That means scientists thought that, although the elephants had adapted to their forest habitat, they were still savanna elephants. But DNA evidence shows that about 2.5 million years ago two genetically different strains of elephants evolved in Africa. The forest elephant, now known as *Loxodonta cyclotis*, found its niche in the equatorial forests of central and western Africa. Here they have lived hidden from view and practically forgotten.

Some scientists consider the two species as different as lions are from tigers, or horses are from zebras. Genetically the difference between the two species of elephant is more than half as big as the differences between the African elephant and the Asian elephant, or 58%.

When you think of the African elephant you probably picture the savanna elephant. It is a huge animal, standing almost 12 feet tall at the shoulders. It has large ears that come to a point at the bottom. The tusks are long and slightly curved. They live on large, dry grasslands with a few thorny acacias dotting the plains.

The forest elephants look very different from savanna elephants. For one thing, they are smaller and stockier than savanna elephants. Forest elephant males only get to be about 8 feet in height while large savanna elephants can reach 13 feet. Their ears are rounded

and their tusks are straight and thin with a pinkish tinge to the ivory. The lower jaw is longer, giving the forest elephant a long, narrow face. Forest elephants also live in smaller family groups. Forest elephants are also darker than savanna elephants.



Forest elephants are adapted to living in dense forests. Their tusks are straight since curved ones might get caught in the underbrush and vines of the forest. They are smaller so they can move around the dense forests more easily.

Not much was known about the forest elephants because tracking them was very difficult. Scientists have begun tagging forest elephants with tracking devices so they can be more easily followed. It has recently been discovered that forest elephants can have a home range of about 2,000 square kilometers (1,243 square miles).

Seventy years ago three to five million elephants inhabited Africa. Today only about 500,000 elephants remain. One third of these are forest elephants. Because there are now two separate species, there are fewer elephants of each species. Elephants in Africa are now more endangered than previously thought. The hard and pink ivory of the forest elephant is highly prized by poachers who are difficult to catch in the cover of the rainforest. Logging is another threat to the forest elephant.

The African elephant, *Loxodont africana*, is listed as endangered under the Convention on International Trade of Endangered Species (CITES). Conservationists are afraid that declaring the forest elephant as a separate species could open a loophole under the current treaty and open up hunting of forest elephants for their ivory. A study of the forest elephant's status is under way, sponsored by the National Geographic Society, European Union, National Science Foundation, National Institutes of Health, and U.S. Fish and Wildlife Service.

by E. Benders-Hyde 2002

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Tropical Moist Climate [Tropical Moist Climates \(Af\)](#)

In an average year in a tropical rain forest, the climate is very humid because of all the rainfall, which amounts to about 250 cm per year. The rain forest has lots of rain because it is very hot and wet. This climate is found near the equator. That means that there is more direct sunlight hitting the land and sea there than anywhere else. The sun warms the land and sea and the water evaporates into the air. The warm air can hold a lot of water vapor. As the air rises, it cools. That means it can hold less water vapor. Then as warm meets cold, condensation takes place and the vapor forms droplets, and clouds form. The clouds then produce rain. It rains more than ninety days a year and the strong sun usually shines between the storms. The water cycle repeats often along the equator. The main plants in this biome are trees. A lot of the rain that falls on the rain forest never reaches the ground. It stays on the trees because the leaves act as a shield, and some rain never gets past the trees to the smaller plants and grounds below. The forest floor is called understory. The canopy also keeps sunlight from reaching the plants in the understory. Between the canopy and understory is a lower canopy made up of smaller trees. These plants do receive some filtered sunlight.

The tropical rain forest is classified as Af meaning tropical forest. The A is given to tropical climates that are moist for all months which have average temperatures above 18 degrees Celsius. The f stands for sufficient precipitation for all months. The latitude range for rainforest climate is 15° to 25° North and South of the equator.

The annual precipitation of a rain forest is greater than 150 cm. In only a month the rain forest receives 4 inches of rain. The rain forest is different from a lot of other climates. In other climates, the evaporation is carried away to fall as rain in far off areas, but in the rain forests, 50 % of the precipitation comes from its own evaporation.

The average temperature of a rain forest is about 77° Fahrenheit. The rain forest is about the same temperature year round. The temperature never drops below 64° Fahrenheit. Rain forests are so hot because they are found near the equator. The closer to the equator you are, the more solar radiation there is. The more solar radiation there is, the hotter it is. Rain forest are never found in climates which have temperatures 32° Fahrenheit and below because the plant life will not be able to live because they aren't adapted to frost. All the plants will die out if the rain forest is cooler.

The plants that make up the understory of a rainforest have adapted to the small amount of sunlight that they receive. Ferns and mosses do well, along with epiphytes. These are plants that grow on other plants. They can be found growing on branches of tall trees where they can get sunlight. There are many different plant species found in the rain forest.

by Michael G. 2001

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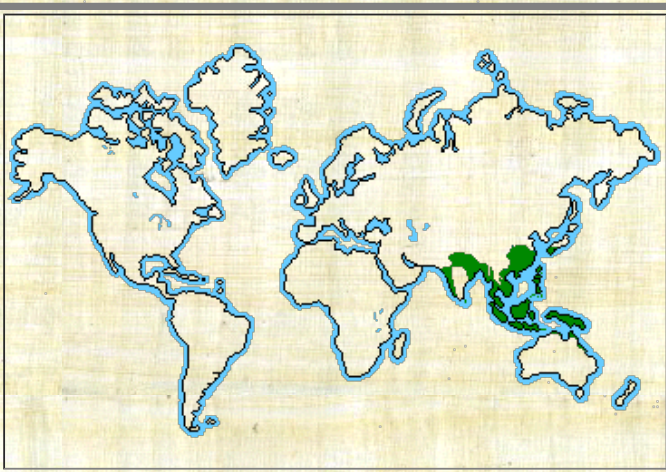
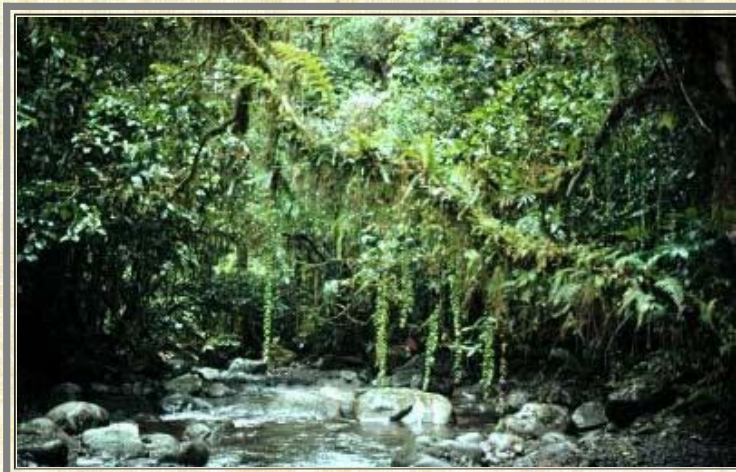
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Southeast Asian Rainforest



Photograph by © WWF-Canon/William F. RODENBURG

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Tropical Rainforests

The Southeast Asian rainforests are the oldest, consistent rainforests on Earth, dating back to the Pleistocene Epoch 70 million years ago. It has a biological richness and diversity unequaled by that of the Amazon or African rainforests. Yet Southeast Asia is losing its rainforests faster than any equatorial region, and has the fewest remaining primary rainforests. It is projected that most of the primary rainforests of Southeast Asia will be destroyed in the next 10 years.

Southeast Asia is a 3,100 mile long chain of about 20,000 islands strung between Asia and Australia. It covers an area of 1,112,000 square miles, almost twice the size of Alaska. The area lies from latitude 20° north and 16° south, and longitude 95° to 105° east. The average daily temperature varies from 70°F to 90°F. Humidity is always high.

Millions of years ago, as the rest of the world went through cooling and warming periods, the climate of the Southeast Asian region remained more or less the same. This was due mainly because of its location on the equator and being surrounded by water. Because the climate on the equator doesn't change much and the surrounding oceans provide plenty of moisture in the form of rain, the region was able to have consistent forests over very long periods of time. As sea levels rose and fell through warming and icing cycles, small pockets of forests survived as "forest refugia", or reservoirs of wildlife from which various species could reestablish themselves. Malaysia and the islands of Borneo, Sumatra and Java were all part of the same landmass during the last ice age. When the glaciers melted and sea levels rose many of these reservoirs were cut off from each other. This forced species to develop their own distinctive evolutionary paths in response to local environments, leading to an amazing diversity of species of every kind.

One interesting feature of the lowland rainforests of Malaysia, Borneo and Sumatra is the dominance of one family of trees, the Dipterocarpaceae. Dipterocarp are emergent trees and can reach heights of 120 feet. Their crowns are supported on large straight trunks.

Many epiphytes, like orchids and ferns grow on the trees. Lianas, vines and **strangler figs** cling to the trees as they grow towards the sunlight. The emergent species is the tualang (*Koompassia excelsa*) which can reach heights of 280 feet. It is the 3rd tallest tree species in the world, and is almost never cut down because of its hard wood and massive buttresses. But most importantly it is home to large honey bees (*Apis dorsata*) whose honeycombs hang like enormous wedges from the underside of its branches. These trees are worth more money when left standing.

Trees and shrubs in the lower canopy have elongated crowns as the leaves reach for light. Shade tolerant species flourish here. Leaves are set at the best angle to receive light. Special swollen joints at the base of the stem, called pulvinus, rotate the leaf to follow the sun.

On the forest floor the soil is shallow with most nutrients close to the surface. Leaf litter and dead trees are quickly consumed and broken down by fungi, insects, and other decomposers. The nutrients decomposition creates are immediately taken up by the biomass of the forest. Because the nutrients are close to the surface, roots don't grow down very far, and trees have adapted by growing buttressed roots up to 30 ft high, or stilt roots which hang down from their trunks and branches.

There are many mutualistic relationships within the ecosystem of the rainforest. **Dawn Bats** are the prime pollinators of the **durian** tree. Each of the hundreds of fig species have their own species of pollinating wasp (Agaoninae spp), without which they would quickly fade into extinction and vice versa. **Silvery Gibbons** (*Hylobates moloch*) live their entire lives in the high canopies of the dipterocarp forests, never descending to the ground. Their survival depends on the dipterocarp and fig trees which house and feed them throughout the year. Links within the tropical rainforest ecosystem extend to thousands of plants which support mammals and birds. If a keystone species is eliminated, additional losses will be triggered and create a dominoes effect of extinctions.

Trees don't flower and come into fruit at the same time in the Southeast Asian rainforest. Some trees only fruit once every three years, some only every ten year. The short nutrient cycle makes it difficult for trees to produce large amounts of fruit at regular intervals. Many trees complete the flowering cycle in only one day, and are only receptive for a few hours during the day or night. Very few trees depend on the wind for pollination since there is little air under the dense canopy. These trees depend on animals and insects to pollinate and disperse their seeds. Emergent trees like the Kapok (*Ceiba pentandra*), dipterocarps, or Tualang which can grow to heights of 240 ft, can afford to have air-borne seeds. Their crowns grow high above the canopy and are exposed to the winds that blow there.

When seeds drop to the ground they almost always need to germinate in shady conditions. The forest floor is a difficult place to begin life, and many seeds surround themselves with fleshy, aromatic pulp as an immediate source of food. Smell plays an important part of a plant's life cycle, and many plants will have strong smelling flowers and fruits. The Rafflesia smells like a rotting corpse, and the durian fruit smells almost too bad to eat, although it is known as the King of Fruit and tastes delicious. The powerful smell attract animals and insects that eat and disperse the seeds far from their parent tree.

Hundreds of animal and plant species are on the brink of extinction in Southeast Asia. The critically endangered two-horned **Sumatran rhinoceros** survives in small forest pockets of Sumatra and Borneo. Their entire population is thought to be only 300 to 500 individuals. The Javan rhinoceros has already slipped into extinction. The Sumatran tiger, like its cousin the Javan tiger will soon be extinct as well. The Asian elephant is another large forest herbivore which needs large amounts of forest to survive. Human encroachment and logging are shrinking their habitat to the extent that they can no

longer support the elephants. The Malayan tapir is the largest of the 4 species of tapir still alive and no more than 50 animals still live in the wild. Another animal found only on Sumatra and Borneo is the orangutan, or "man of the forest". They were once found on mainland Asia from Thailand to southern China. They feed mostly on fruit and move through the forest following the fruiting trees. There are thirteen separate species of primates in Borneo's lowland forests alone. Most have overlapping home ranges but have different diets and foraging methods.

The climate of Southeast Asia is classified as a tropical wet climate in the Köppen climate zone system. The climate is influenced by maritime wind systems which originate in the Indian Ocean and the South China Sea. It has two monsoon seasons. The northeastern monsoon occurs from October to February and brings heavy rains to the eastern side of the islands. These storms carry the same punch as Atlantic hurricanes but spend much of their energy over the Phillipines. The southwestern monsoon is more powerful and occurs from April to August. Heavy rains saturate the western side of the island chain. Rain shadow effects create dryer but windy conditions on the opposite sides of the islands and the Malaysian peninsula during monsoon seasons. There are two inter-monsoon seasons between the two main monsoon seasons. Southeast Asian rainforests get an average of 79 inches of rain annually.

Any change in the monsoon cycle can have devastating results. In 1992-1993 one of the largest fires ever burned in Kalimantan. Widespread logging had degraded the primary forest and made it prone to fire. The drought brought on by the El Niño of that year created a catastrophe when agricultural fires got out of control. Twentyseven thousand square km burned out of control.

The same events unfolded in 1998. The El Niño of that year created a very weak monsoon season. Thousands of forest fires burned over Malaysia and the Indonesian archipelago, destroying rainforests and the plants and animals within them. A haze of smoke spread for thousands of miles across the region. Untold mutualistic relationships may have been destroyed, keystone species eliminated. It is still unclear what effects the events of 1998 had on the ecosystem of the rainforests. Unfortunately, in the year 2002 another strong El Niño is developing over the Pacific.

Political instability in the Indonesian archipelago has resulted in little law enforcement within protected wildlife areas. In 1992, feeling betrayed by the government of President Suharto, local people took control of the land and began indiscriminate logging and farming in the dipterocarp rainforests. Little regard has been given for the long-term environmental effects, and at the present rate of destruction there will be no primary lowland rainforests remaining in Indonesian Borneo by the next decade.

In Indonesia illegal logging has led to a "biological catastrophe" affecting thousands of plant and animal species and upsetting the natural biologic equilibrium that keeps a rainforest healthy and stable. The mutualism that sustains numerous species has been destabilized and could lead to massive extinctions. For the plants and animals and the myriad species that inhabit the rainforests of Southeast Asia it may be too late and there is no "forest refugia" left from which to replenish their species. Fragmentation of habitats will cause more interaction of animals with humans, and many animals will be killed or captured for the pet trade. Huge numbers of species will become extinct before their role in the rainforest will have become known, and the rainforest ecosystem of Southeast Asia will collapse.

E. Benders-Hyde 2002



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Curare

Common Names: Curare, Grieswurz, Pareira Brava, Pareira, Vigne Sauvage

Genus: Chondrodendron

Species: tomentosum

Parts Used: Leaf, Root



Curare grows as a large liana, or vine, found in the canopy of the South American rainforest. The vine may get as thick as 4 inches in diameter at its base. It has large alternate, heart-shaped leaves which may be 4-8 inches long and almost as wide, with a 2-6 inches long petiole. The leaves are smooth on top with a hairy white bottom, and deeply indented veins radiating from the leaf base. Clusters of small (1/16-1/8 inches), greenish-white flowers are made up of separate male and female flowers. The

fleshy fruits are oval, narrow at the base, and approximately 1-2 mm long.

Some Indians of South America crush and cook the roots and stems, and add other plants and venomous animals, mixing it until it becomes a light syrup. They call this mixture "ampi", or "curaré", which they use on the tip of their arrows and darts to hunt wild game. Crude curare is a dark brown or black mass with a sticky to hard consistency and an aromatic, tarry odor. The name comes from Indian word meaning "poison."

The active ingredient in "curaré", D-tubocurarine, is used in medicine. Brazilians consider the root a diuretic, and use it internally in small quantities for madness and dropsy, and externally for bruises. It is also used for edema, fever, and kidney stones.

Curare is an alkaloid, and acts as a neuromuscular blocking agent to produce paralysis in muscles. It first affects the muscles of the toes, ears, and eyes, then those of the neck, arms and legs, and finally, those involved in breathing. In fatal doses, death is caused by respiratory paralysis. Curare must get into the blood system for it to work. It doesn't hurt to eat something killed by a poisoned curare arrow, for instance.

Geographic Location: Amazon Basin of South America.

2000

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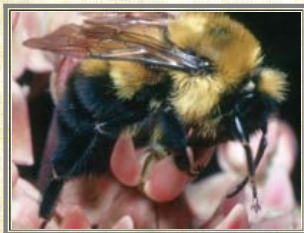
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Return to Grassland

Bumble Bee

Genus: Bombus

Species: bimaculatus



Imagine you are sitting on a nice grassy field having a picnic with a couple of friends. Suddenly you spot a black and yellow flash speeding right toward you. You panic immediately but sit as still as possible. That would be the best thing to do when you see a bee. It is very likely that they wouldn't sting, but some people like to horse around with bees and try to kill them. That is when the trouble starts. The truth is, bumble bees are practically completely harmless. You just have to

leave them alone and let them do their job. Let me explain more thoroughly.

Bumble bees are always the traditional bee colors of black and yellow. They are covered with long thick hairs. To us bumble bees look small but for an insect they are pretty big. Queen bumble bees are about 3/5 to 1 inch long. The other types, workers and drones, are slightly smaller than that.

Bumble bees live all over the United States and in every grassland you could find, but *Bombus bimaculatus* is native to the state of Iowa. In the summer they make their homes in abandoned underground nests of mice or other small creatures. The bumble eats some of the pollen that it carries from flower to flower on its hind legs like the honey bee. You may also know the stories of the bee hive and the bears always trying to get some honey. The bee mainly feeds on that honey.

When the queen first comes out of her winter resting stage, called diapause, she finds an abandoned tunnel. She makes a small mound of pollen, and lays about 5 to 10 eggs in this mound. She then seals it off with a wax cap. When the eggs hatch they are called larvae and will feed from the pollen. The queen forages and feeds the larvae herself until they turn into bees. Then they start caring for the new larvae and forage themselves. Only then does the queen stop foraging and concentrate only on laying eggs. Like the honey bee, bumble bees have workers and drones. They only store enough honey to last them through rainy days or other days that they can't fly.

Bumble bee's nests are annual. When the end of summer is near, the queen will lay some queen eggs. When these hatch, the drones fly away with the new queens and mate. The new queens will then find a protected place to spend their diapause. Only the

queen survives through the winter, all the other bees die off with the first hard freeze. She wakes up in the spring and starts to make another hive.

Bumble bees play a huge role in our world. They are unique because of their sting. Unlike honey bees, the stinger of a bumble bee doesn't come off when it stings something. They fertilize or pollinate different plants or flowers in their area, helping them produce fruit. Their long tongue makes them important in pollinating certain flowers that other bees can't reach. They are also active in much cooler weather than honey bees and can pollinate plants that flower in the early spring. Without bees, many plants on our planet would not be able to reproduce and their species would become extinct. Without all those plants, animals that depended on them would starve and die. We depend on many of those animals for our food supply. We also depend on many of the plants that bumble bees pollinate.

Bumble bees have many enemies including the beetle, fly, ant, mite and wasps. They are hunted by birds and skunks. Many people do not like them because of their sting. But their population is very high. If your father or mother has a garden, next time you go outside look at the flowers and see if you can find a bee. Don't be afraid, just be silent and watch it work. I assure you that you will soon be wrapped in amazement at the bee's quick and thorough job.

Sarah B. 2000

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Big Bluestem Grass

Common Names: Turkey Feet, Beard Grass

Genus: Andropogon

Species: gerardii



This grass is also called Turkey feet because the shape of the seed heads look like turkey feet. It is also called beard grass. The name big bluestem grass comes from the fact that this grass can grow to very big, 3 to 10 feet as a matter of fact. It blooms from June through September.

Big bluestem is known as a bunch grass because it grows in little hill shapes. This grass forms 3 inch

bronze to purple or green seed heads. The tall and slender stems are blue-green in the summer.

The hairy blades, which can get to be 12 inches long and 1/2 inch wide, will get a red tinge on the leaves as they get older, and turn bronze in the fall.

Big bluestem grass grows in dense stands. This keeps other grasses from getting any sun and growing. As a result there are usually large areas covered only by big bluestem grass. This grass has very deep roots. This kept the wind that constantly blows on the prairie from blowing away the dirt. When settlers plowed the big bluestem grass there was nothing to keep the dirt from blowing away. That is how the dust bowl disaster of the 1930s began.

This type of grass was an important food for the American bison, because it was the biggest type of grass there was. This type of grass is part of the tall grass prairie, which is located in the midwestern United States. It does best growing in moist, well drained soil. Big bluestem is the tallest grass in the tall grass prairie.

Celeste G. 2000

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Grassland Climate Dry Midlatitude Climates (Bs)

There are many types of grasslands around the world. Some of the grasslands are tropical and some are dry grasslands. Grasslands in North America are known as Prairies, and in South America they are known as the Pampas. Eurasia has the Steppes, and in South Africa they are called Savanna and Veldt.

The prairies of the midwestern United States are both tall-grass and short-grass. West of the Mississippi River the temperature is moist and humid. This allows for some very tall grasses of up to 10 feet. Summers are warm and humid. Winters are cold but not to the extreme. The farther west and in the interior of the country, the temperatures becomes drier. Moisture from the Pacific Ocean is blocked by the mountains. This is where the short-grass prairies are found. Summers are hot and winters very cold. There are no natural barriers, like trees, so there is a constant wind. Grasses with deep root systems keep the soil from blowing away. Most animals have adapted to the open, treeless prairie by digging burrows. Even owls, like the Burrowing Owl, use the holes dug by prairie dogs as nesting sites. The mean temperatures for the prairie in January is 20° F, and 70° F in July. Annual precipitation is 10-30 inches.

The Savanna is a tropical grassland in Africa. This grassland has a very hot, wet season when warm, moist air from the equator moves in. This is followed by a cooler dry season that can last for 8 months or more. Hot, dry air moves in from the Sahara. It is cooler by a few degrees Celsius because there is no moisture to trap the sun's radiant energy, and most of the heat escapes into space again. The Veldt is in South Africa and is pretty much like a savanna, except in the southern hemisphere.

Another southern hemisphere grassland is the Pampas of Argentina. Moist, tropical air dominates this area and there is a lot of rain. Here tall-grass varieties of grasses grow very well.

The Steppes have a cold, dry climate. Here you find short-grass type of plants. The Himalayas block warm, moist air from the Indian Ocean, so there is very little precipitation. Nothing blocks arctic winds though, so winters are very cold and windy.

The grassland biome climate is in a mid-latitude zone. It is classified as a type "B" category, with a "Bs" subtype climate under the Köppen classification system. The grasslands have a very large latitude range, spanning from 55° N to 30° S. This

is because of the many different types of grasslands throughout the world. The grasslands are on every continent, except for Antarctica.

by Emma K. 2000.

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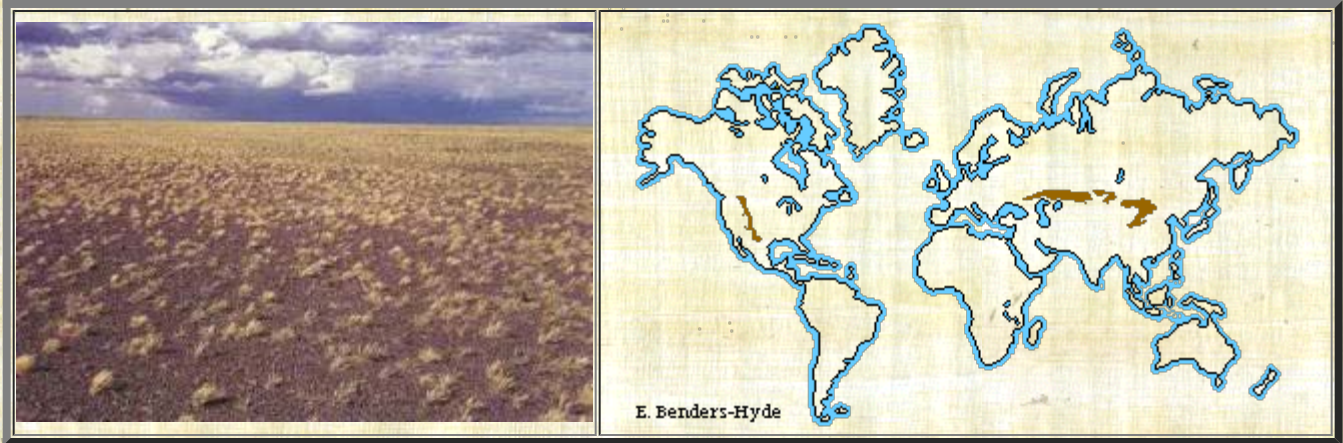
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Steppe



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Grasslands

The Steppe biome is a dry, cold, grassland that is found in all of the continents except Australia and Antarctica. It is mostly found in the USA, Mongolia, Siberia, Tibet and China. There isn't much humidity in the air because Steppe is located away from the ocean and close to mountain barriers.

The Steppe biome is usually found between the desert and the forest. If it got more rain, it would become a forest. If it got less rain, it would become a desert. The average rainfall is 10-30 inches per year. But in May, June, and August, the Steppe can get up to 4-5 inches a month.

There are many plants in Steppe. The main ones are different grasses. The grasses are separated into 3 different groups, depending on how much rain they get. The tall grasses grow up to 4 1/2 feet because they live closer to the forest. The short grasses can be less than 1 1/2 feet. They are closer to the dessert. 1 1/2 feet is a small amount, considering that people don't cut the grasses. The last group is the mixed grasses. They grow 2-3 feet high and get 15-20 inches of rain per year.

Very few people live in the Steppe climate because it's only grass and it has very few other traits. Farmers would have a hard time growing crops because the soil is so poor and its so cold. There is also a lot of wind in the Steppe because there are few trees.

Steppe has warm summers and really cold winters. There is often a lot of snow in the northern Steppes. All the Steppes experience long droughts and violent winds. Sometimes the summers are so hot that the grasses catch on fire. That is more dangerous than usual because the grass is so dry that it spreads quickly.

A lot of the animals that live in Steppe are grazing animals, such as rabbits, mice, antelopes, horses, etc. Smaller animals have little defense from predators. Since it is such an open environment and predators can find animals fast, they either form herds or make burrows. There are many endangered animals on the Steppe. More and more people are trying to protect them.

A true natural grassland is becoming harder and harder to find because people are taking them over. They are plowing the grass for farming and digging holes in search of oil. The Steppe biome is becoming endangered, just like the animals.

by Mary Elizabeth v. N. 2000

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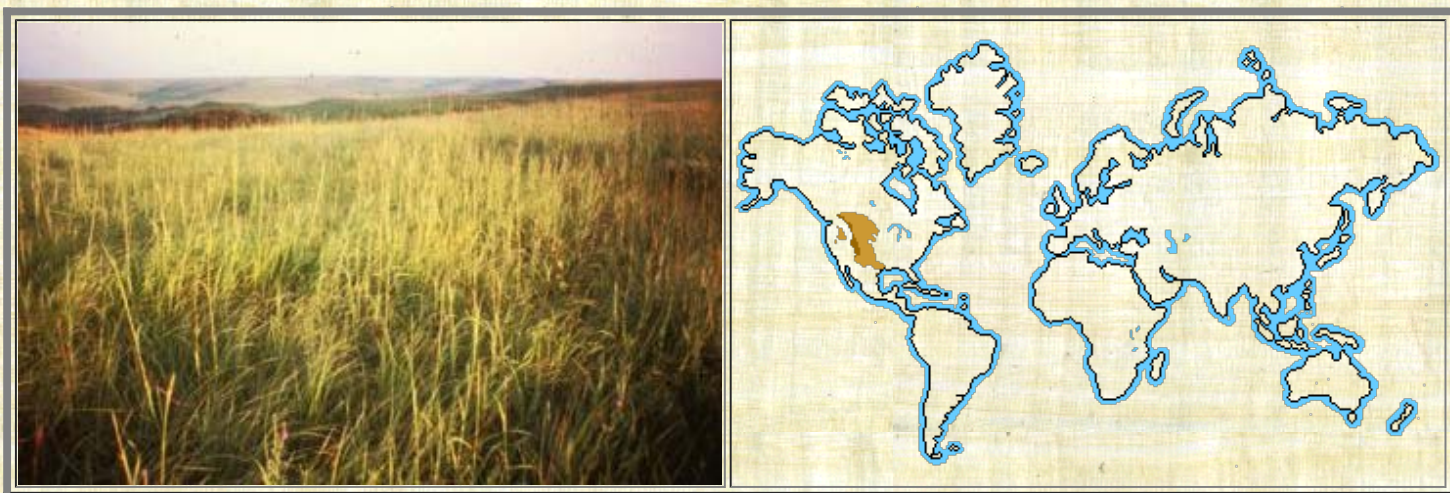
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North American Prairie



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In the middle of North America is a huge area of land which was once covered with grasses and colorful wild flowers. The French called the rolling plains of grass "prairie", from the word for a meadow grazed by cattle. The prairies are a type of grassland dominated by herbaceous plants and grasses. Very few trees grow on the prairies and are usually widely scattered.

The prairies form a triangular area from Alberta, Saskatchewan, and Manitoba down through the Great Plains to southern Texas and Mexico, and approximately 1,000 miles from western Indiana westward to the Rocky Mountains. They cover about 1.4 million square miles.

As you move from east to west, the rainfall in the prairies decreases. Climates are more moist close to the mountains and to the east and north; they are driest in the central portions. This creates different types of prairies, with the tallgrass prairie, known as the true prairie, in the wetter parts. Grasses such as big bluestem, and Indian grass, and many species of flowers grow here. The plants can sometimes grow to be 10 feet tall. Mixed-grass prairies are found in the central Great Plains, and shortgrass prairie towards the rain shadow of the Rocky Mountains. The rain shadow causes Pacific ocean moisture to rise and cool, dropping as rain or snow on the western side of the mountains instead of on the prairies.

Precipitation in the prairies can reach from about 12.6 inches in the shortgrass prairie to 21.7 inches in the tallgrass prairies.

The prairies were maintained in their natural state by climate, grazing and fire. Rainfall varies from year to year in the prairies. There is usually a long dry period during the summer months. Every 30 years or so there is a long drought period which lasts for several years. The most famous drought was in the 1930s, when the prairies were called the "Dust Bowl".

The climate of the prairies is influenced by its mid-continental location, and the sheltering effect of the Rocky Mountains. Being located far from the moderating effects of oceans causes a wide range of temperatures, with hot summers and cold winters. Strong winds blow across the endless plains during both summer and winter.

Every one to five years fire would spread across any given area of land. These fires moved rapidly across the land and did not penetrate into the soil very far. They killed most saplings, and removed the thatch of dead grasses, allowing early flowering spring species to grow.

Prairie plants have adapted to fires by growing underground storage structures, and having their growth points slightly below ground surface. The soil under a prairie is a dense mat of tangled roots, rhizomes, bulbs, and rootstock. The plants die back every winter, but are kept alive from year to year by the underground root system. Roots of prairie plants can be longer than the plant is tall. The roots of big bluestem may be 7 feet long, and switchgrass roots can be 11 feet long. Two-thirds of most prairie plants are below the ground. Some roots die each year and decompose, adding lots of organic matter to the soil. That's why the soil of prairies is so fertile.

Before settlers moved west, the prairies were covered with herds of grazing animals, such as buffalo, elk, deer, and rabbits. These animals increased the growth in prairies by adding nitrogen to the soil through urine and feces, and creating open areas for plants that like to have the soil dug up. [Prairie dogs](#) dug huge underground tunnel systems which aerated the soil and allowed water to reach several feet below the surface.

Today very little of the original prairies survive, only one to two percent. Much of the land has been turned into agricultural uses, urban areas are moving in, and fires are being suppressed. The genetic and biological diversity of the plants are disappearing. The herds of thousands of buffalo were all but wiped out. There is a strong movement to educate people about prairies. Many states are rehabilitating what is left of their prairies and reintroducing the native wildlife and plants.

Please visit our [image gallery](#) of the prairies.

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The Pampas



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Grasslands Biome

The Pampas of South America are a **grassland biome**. They are flat, fertile plains that covers an area of 300,000 sq. miles or 777,000 square kilometers, from the Atlantic Ocean to the Andes Mountains. It is found primarily in Argentina and extends into Uruguay. The word Pampas comes from the Guarani Indian word for level plain. The Argentinean Pampas are the home of the 'Gaucho', the original South American cowboy. The pampas is located just below Buenos Aires, between 34° and 30° south latitude, and 57° and 63° west latitude.

The average temperature in the Pampas is 18° C. The pampas has a 'high sun' or dry season in the summer, which in the Southern Hemisphere is in December. The wind blows most of the time. The climate in the pampas is humid and warm.

There are many kinds of animal and plant life in the Pampas. Native plants and animals on the Pampas have made adaptations to living in a windy grassland. Many animals browse on grass or burrow in the ground. There is even an owl that builds its nest in underground burrows. A few of the plants in the pampas include cattails, water lillies, reeds. These plants usually prefer wetlands but they have adapted to the dryer Pampas grasslands. There are not very many trees because fires frequently occur in the pampas. The fires do not kill the grasses, which regenerate from

their root crowns, but destroy the trees, which have shallow root systems. The exception is the [Ombu](#) which has made adaptations to protect itself from fires.

Some animals include seed eating birds such as the Double Collard Seedeater, the great Pampas Finch, the grassland Yellow Finch, and the Long Tailed Reed Finch. It is also home to the [Greater Rhea](#), a relative of the African Ostrich and the Australian Emu. In addition to birds, several interesting mammals can be found in the pampas. The [Geoffroy's Cat](#), for example, with its gray coat and black stripped legs, is almost invisible in the mesquite and bunchgrass. The Maned Wolf has very long legs so it can see over the tall grasses. Also, one can find a llama-like Guanaco that lingers among the ponds. It is important to know that at least fifteen mammal species, twenty bird species, and fifteen plant species are at serious risk of extinction in the Pampas.

The humid Pampas ecosystem is one of the richest grazing areas in the world. Because of its temperate climate and rich, deep soil, most of the Pampas has been cultivated and turned into croplands. Unfortunately, domestic livestock and farming have severely affected the pampas. Fertilizers and overgrazing are a serious threat to the pampas. There are only a very few pristine remnants of the legendary "ocean of grass" that was the Pampas. It is considered to be one of the most endangered habitats on earth.

by Claire L. 2002



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Return to Desert

Barrel Cactus

Common Name(s): Barrel Cactus, Compass Cactus

Genus: Ferocactus

Species: wislizeni



When you imagine a desert, what do you think of first? Maybe it's sand, heat, or Gila monsters, but most likely it's cactus. Cacti are probably the most memorable characteristic of the desert. In all of the Speedy Gonzales cartoons, Speedy is always leading his unsuspecting predators into a cactus. And what is in the background as Wily Coyote accidentally blows himself up with Acme dynamite? Cacti of course!

American deserts is the barrel cactus. The Barrel cactus can be easily distinguished from other cacti

because of its cylinder-shaped body. The cactus usually reaches from around five to eleven feet tall, and at that height it is one of the largest cacti in the North American deserts. This cactus is really a man-sized (or bigger) cylinder with numerous parallel ridges that run down the sides. These ridges are topped with dangerously sharp 3-4 inch spines. The barrel cactus is also a flowering plant. It has rings of yellow-green or red blossoms at its top.

Like many plants of the world, this cactus has numerous uses. Native Americans who lived in the desert found the barrel cactus very useful. In the vast untamed land and scorching heat, you couldn't really hop in your air-conditioned car and cruise down to the local A&P. The Native Americans had to look hard to find food. The barrel cactus provided some very important provisions for them. They stewed the Barrel Cactus to make a cabbage-like food. They got water to drink from the pulp and they made fish hooks from the spines, which are pointed at the end. The pulp is also made into "cactus candy".

The Barrel cactus is found in the Mojave, Sonora, and the Chihuahuas deserts. These deserts are found in the land of Speedy and the Roadrunner: Baja, Arizona, California, Texas, and Central Mexico. The barrel cactus grows in the desert washes and slopes, but can also be spotted growing along canyon walls.

The barrel cactus is my favorite of all the cacti because it is very

beautiful, but can really make you sore if you step too close. So keep an eye out for this cactus if you're anywhere in the vicinity of the southwest part of America. Just think, if you are ever stuck in the desert, you know what plant to boil for dinner.

Simone M. 2000.



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Climate

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Armadillo Lizard

Genus: Cordylus

Species: cataphractus



The nostrils of the Armadillo Lizard are formed into little tubes. The tubes help the Armadillo Lizards smell for food or predators. A ground dwelling lizard, it is active in the daytime and feeds on a wide variety of insects, as well as on spiders and other invertebrates. The head of the Armadillo Lizard is narrow in shape. It is fairly slow moving animal, but when the Armadillo Lizard thinks or knows it's in danger, it runs as fast as it can go for cover.

The body length is 15-17 inches, the tail is 14-16 inches long, and it weighs 8-17 lbs. Its back legs are a little shorter than the front. The head, body, and club-like tail are all flattened, enabling it to wriggle easily into rock crevices for shelter. It may also adopt a curious defensive posture when threatened by rolling itself up like an Armadillo, with its tail tightly held in its jaws, presenting a spiny ring to the predator and protecting the softer, vulnerable belly area. That's why its called the Armadillo Lizard. The armored Armadillo Lizard has protection all around its body so that predators can't harm any of its under parts. Also squeeze into small places for escape. Another protection is their spiny scales that go all the way around its body. Their tails and spines also can be used to defend themselves as well. The Armadillo Lizard can be found in the deserts of the southern tip of Africa.

The Armadillo Lizard has its babies in the late summer. Only 1 or 2 babies are born during that time. The Armadillo Lizards stay in family groups, and they will all live in the same rock crevice. When the lizards give birth, the babies are live-born, but do have a thin membranous shell that they need to break through.

The Armadillo Lizard is a prey animal. It is preyed upon by bigger and stronger predators, such as humans, etc. The Armadillo Lizard's armor is most usefull against many birds, mammals, and other reptiles.

The Armadillo Lizard is not an endangered species although it does have a lot of enemies to protect itself from. The Cape Provincial Ordinance helps the Armadillo Lizards when their injured or sick. That way the Armadillo lizards can be less endangered.

Zach S. 2001

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Desert Climate [Dry Tropical Climate \(BW\)](#)

The dry desert is in Köppen's **BWh** climate category. It is a Low Latitude climate. The *B* stands for Dry Desert climates. All months have average temperatures over 64° F (18° C). The *W* stands for desert climate. Finally, the *h* stands for dry and hot, with average annual temperatures over 64° F (18° C). I guess they're trying to tell us its hot, hot out there.

The description of this awesome biome climate is quite odd, but also as it is odd, it is also very interesting.

Dry Desert climates are formed by high-pressure zones in which cold air descends. Then the descending air becomes warm but, instead of releasing rain, the heat from the ground evaporates the water before it can come down as rain. The ground is super hot because the sun's rays beat down on it directly overhead. Not a lot of atmosphere to protect it from radiant energy.

By the way, approximately 1 in. (2.5 cm) of rain falls in dry deserts per year. The average annual temperature of these miles of hot sand is 64° F (18° C).

The latitude range is 15-28° north and south of the equator. Their global range covers about 1/5 of the earth, including the world's great deserts: Sahara, Sonora, Thar, Kalahari and the Great Australian.

Plants of the Dry Desert have adapted to the lack of water by using dew for moisture and taking in water through their leaves and stems.

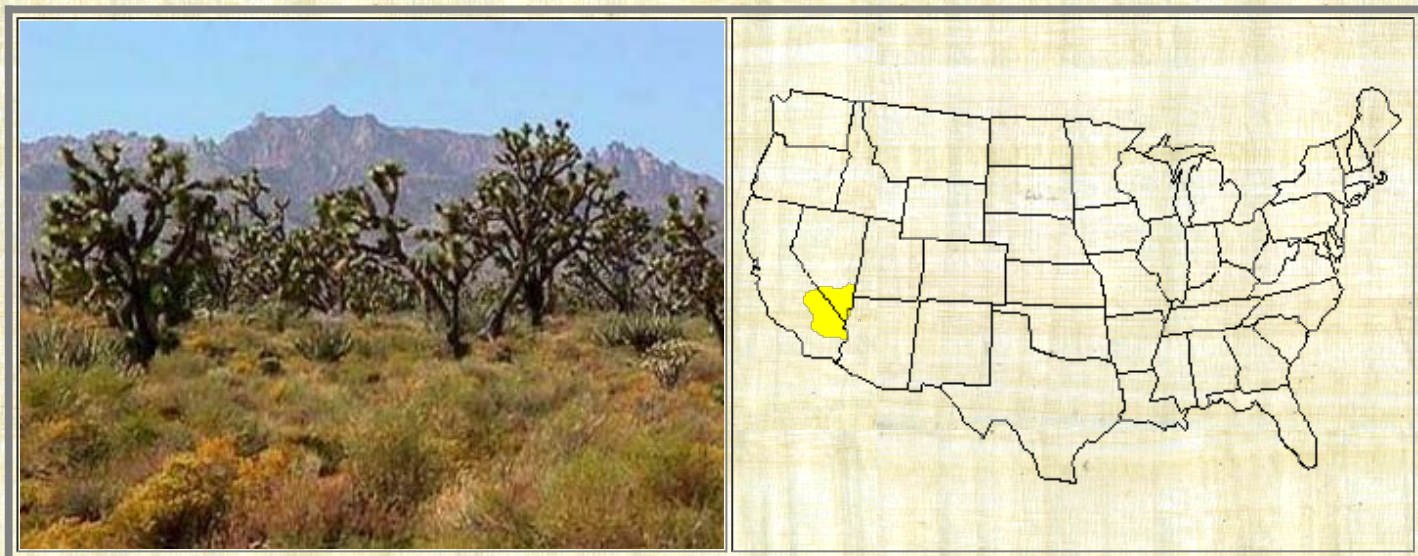
Justin S. 2000

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Mojave Desert



Plants

The Mojave or Mohave Desert, is the smallest of the four North American deserts. It lies in South Eastern California at 35° to 36° latitude North and 115° to 117° longitude East.

Animals

The Mojave Desert is situated between the Great Basin Desert to the north (a cold desert) and the Sonoran desert to the south (a hot desert). The Colorado River runs through the east of it, and the Sierra Nevada Mountains to the west.

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The Mojave Desert is special because it has a little bit of everything. People refer to the Mojave Desert as a "high desert" because it has an elevation of 2,000 to 5,000 feet. It changes from a cold desert in the northern section and a hot desert in the southern section. The Mojave Desert covers 25,000 square miles. There are some fascinating features to be found in this desert, especially the Kelso Dunes. The Kelso Dunes are the largest of the Mojave dune fields, reaching 500 to 600 feet in height. When you run down these dunes you can hear an unusual "barking" sound. It is not entirely understood yet but some people believe that grains of quartz and feldspar rubbing against each other cause it.

It is a desert filled with desert scrub like the [Brittlebush](#), [Creosote Bush](#), [Joshua Tree](#), and the Sagebrush. The Joshua tree is found in no other place in the world, except in some places in the Mojave Desert.

The Mojave Desert lies in the rain shadow of the Sierra Nevada Mountains. The hot,

moist air from the Pacific Ocean goes up the Sierra Nevadas and is turned back by the cold air in the mountains. Although some of the rain goes over the mountains, most of it is evaporated by the hot air of the desert before it can reach the ground. The Mojave Desert is considered a dry desert because of the rain shadow effect. Rainfall in the Mojave is very changeable from day to night, and can range from 2.23 to 2.5 inches a year. A large amount of rain that the Mojave gets is in the winter season from October to March.

Animals of the Mojave have light colored feathers and fur to reflect the light of the sun. **Desert tortoises** have a good adaptation for the desert. They can store up to one quart of water in their bladder. They feed on plants in the spring so that they have enough water to last them the rest of the year.

Plants have adaptations also, such as shallow root systems, spines, and thorns. Shallow root systems can easily absorb rain because they are so close to the surface. Spines store water by expanding like an accordion. In addition, thorns protect the plants from danger.

The Mojave Desert is jeopardized by large cities, such as Los Angeles, which are spreading rapidly through the desert. Military bases are moving in, and farms are developing along the Colorado River. Off-road vehicles are ruining the desert by churning up sand and destroying the shallow root systems. Due to wells and agriculture, the underground water tables are dropping to very low levels. In spite of all these dangers, half of the desert remains in its original condition.

Christopher R. 2001

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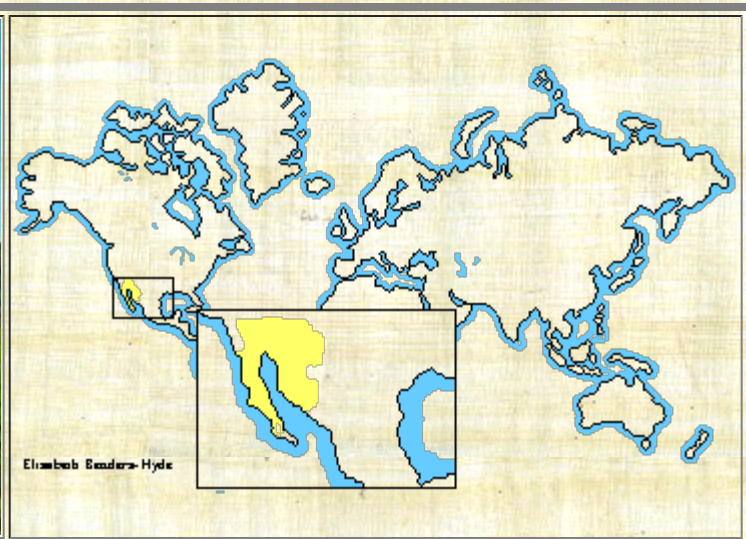
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Sonoran Desert



Plants

The Sonoran Desert is a big desert in the southwestern part of North America and people might just think deserts have not a living thing in sight, just hills of sand, well that is not true

Animals

Climate

The Sonoran Desert is located in North America and covers the southwestern parts of the state of Arizona, southeastern parts of the state of California in the United States and the state of Sonora in Mexico. The Sonoran Desert's location is at latitude 25° to 33° North and longitude 105° to 118° West.

More information on the Sonoran Desert

The key to the Sonoran Desert's climate is the amount of rainfall which falls. More rain falls on the Sonoran Desert than any other desert. When it does get rain, the desert is damp, and the air is cool. When it has no rain the desert is really dry and really hot. When the desert is windy, the sand gets picked up and tossed around which creates a sand storm or if the wind is blowing in a certain kind of way, it creates a whirlwind or dust devil. These mini-tornados move across the desert floor and they most often occur in hot weather. The desert valley is hot while up in the mountains it is cool and some mountains are even snow covered.

Return to Desert

The seasons are like any other. Spring is a time when flowers bloom if the winter and fall had enough rain that year. There is summer and in the summer it rains the most and that helps summer flowers grow. Then fall comes with a cooler breeze, which lets the deserts summer heat wear away. Winter brings snow to

the mountains and cold air to the desert valley.

Precipitation in the desert is probably less than any other North American state, but it is still a lot for a desert. The Sonoran Desert receives 10 or less inches a year; the eastern part of the Sonora desert, in Baja California, receives 10-12 inches because Baja is by the ocean. The ocean storms brew up more often producing more rain, while the western part of the desert only gets about 2 inches and in the mountains they receive 25 inches.

The geography in the Sonoran desert is quite interesting. The Sonoran Desert is located in two states, Arizona and California, and two countries, Mexico and United States. The rivers that flow through the desert are the Colorado River and the Gila River. The Salton Sea, the Gulf of California and the Pacific Ocean are bodies of water next to the Sonoran desert. The mountains in the Sonoran Desert are Mount Kofa and Mount Catalina; Mount Catalina receives most of the snow.

The Sonoran Desert is a hot place to be. It is sandy with a lot of cactuses, but there are forests on the mountains and it is a lot cooler in the forests. The Indians that lived at the edge of the desert carved designs into the walls or rocks. The plants in the Sonoran desert are very interesting, such as [fairy duster](#), jimson weed (poisonous), [tumble weed](#), night blooming cereus, devils claw, ghost flower, hedgehog cactus and showy four o'clock. There are some other plants with out really interesting names: The desert Christmas cactus, prickly pear cactus, desert willow, western wildflower, cave primrose and desert lupine. These desert plants adapt to their climate by seeking coolness. Their roots collect water when it rains. The [saguaro cactus](#) has shallow root systems allowing the cactus to store up to 160 liters of rainwater allowing it to live for weeks at a time without water. The other adaptations of the desert plants are that they live in the mountains where shade and coolness is found.

The Sonoran Desert animals fit in to the environment perfectly. Some of the animals in the desert are the Mexican gray wolf (el lobo), [the mountain lion](#) (cougar or puma), the great horned owl (*Bubo virginianus*), the golden eagle (*Aquila chrysaetos*) and the rattlesnake. The Sonoran desert is also the home to the Mexican jumping beans. Mexican jumping beans are fruits of a shrub. The movement of the moth larva in the bean makes them jump. The adaptations of the desert animals to the desert home are quite simple. The animals or reptiles can find little hideouts where the sun cannot get to them. Other animals live in the mountains where coolness and shade is found with green forests but the animals have another talent. They sleep in the daytime and the heat does not bother them. Most of the animals are nocturnal, which means they hunt at night when no heat of the day is found.

The Sonoran Desert is changing. We humans have been turning the land from the desert into tourist attractions. These parks have spread for miles taking up the land that belongs to the wild life. Then these creatures are pushed out of their natural habitat. Ranches have also been taking up the desert land and with our livestock. People plant crops and some of the seeds have been picked up by the wind or have been picked up by a bird and the seeds start to grow where they land. This cycle begins again and after awhile the desert starts to have plants that do not belong in the desert.

The Sonoran Desert is a wonderful place but you would never want to be stranded there. The desert has wonderful plants and animals and really beautiful sunsets that fade away on the deserts horizon.

By Elora P. 2003

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Return to Alpine Biome

Alpine Phacelia

Common Name(s): Silky Phacelia, Purple Fringe

Genus: Phacelia

Species: sericea



Alpine Phacelia is a tubular, bell-shaped or bowl-shaped flower. It can be blue, violet, or white in color. The anthers of the flowers stick way out past the flower, giving it a fringed look.

"Phacelia" comes from the Greek word "phakelos" which means "bundles". The flowers grow in clusters of 10 to 100 flowers around the top of a straight stem, which can grow to be 1 to 2 feet high. Several stems will grow from one long taproot.

The leaves have several narrow spreading lobes and grow around the stem. They are

covered with silky, wooly hairs. The lower leaves are large, with the upper leaves becoming smaller.

The Alpine Phacelia grows on rocky, open or wooded places in the mountains. In the United States they can be found growing at an elevation of 9 -10,000 feet east of the Cascade Range in Oregon, California, Nevada and much of Utah. They can be found on almost all mountains throughout the world.

The Alpine Phacelia blooms in mid-summer. Alpine Phacelias belongs to the Waterleaf family. These flowers are used for bordering peoples gardens.

by Sarah B. 2000

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Alpaca

Genus: Llama
Species: pacos



The alpaca is a type of llama that lives in the [Andes Mountains](#) of South America. The alpaca is part of the camelidae family and is closely related to the well-known [llama](#). The llama is a much larger animal, standing up to 4 feet at the shoulder and weighing 340 pounds. Both are semi-wild domesticated animals related to the wild guanaco. Some think the alpaca may be a cross between a llama and [vicuña](#).

Alpacas have small heads, a cleft upper lip, and big pointed ears. Their bodies are slender with long necks. They have long legs and short tails. The alpaca has 22

different shades of color for its coat, like black, gray, white, brown to name a few. They weigh 120-140 pounds on average. The alpaca is 3-3.5 feet tall at the shoulders, and measures between 4-7 feet in body length.

Of all the attributes of the alpaca, its history is the most interesting part of this animal. The oldest known recording of these charming creatures was 1,000 years before the great pyramids of Giza. The Inca nobles demonstrated their wealth by the number of alpaca's they owned, as well as showing off the beautiful fur garments. The trade in the fur of the alpaca, 2,000 years after the great pyramids, created a thriving Peruvian economy. So it continued for thousands of years with these magical animals creating wealth and prosperity for their Inca owners, until the 17th century when the Spanish Conquistadors conquered the Inca Empire.

The Incas sought refuge from the Spanish, and took a limited number of these precious animals to the heights of the Andes. If this had not happened, there may not be very many alpacas left today.

These animals are easily domesticated. Others describe their personalities as being warm, friendly and gentle. The special charm of this mysterious breed has been a well kept secret except for the limited people who have the privilege to keep such a prize.

The reproductive periods for the alpaca are from 4-16 years. In the Andes the mating period is in August and September. The alpaca has crias [babies] about every 11 months, which weigh 15-

20 pounds at birth. They live 15-25 years, with a few living up to 30 years. The alpaca live in herds. Alpacas live at elevations of 14,000 to 16,000 feet and on ranches throughout the world.

The alpaca has very thick fur to survive the cold climate of the Andes. Its long neck helps spot predators among the rocks of the mountain slopes.

The alpaca is a herbivore, which means that it eats plants. The alpaca grazes on grass and eats weeds, shrubs and trees. It has special stomach secretions that help it absorb 50% more nutrients than a sheep, allowing it to survive where there is only poor quality grass. The alpaca is prey to pumas, leopards, and other carnivores in the wild.

The alpaca were almost extinct following the invasion of the Spanish conquistadors in regions of South America. They are now plentiful in the wild at about 3.5 million strong. These animals have been domesticated for over 5,000 year.

Anthony C.2001.



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Alpine Climate

Highland Climate (H)

The Alpine biome is one of the coldest biomes in the world. It is so cold because of its high altitudes. Summer temperature range between -12 degrees Celsius to 10 degrees Celsius. The average precipitation is 30 cm a year.

It is very much like the Tundra biome. Both the alpine and the tundra biomes are cold and dry throughout the year. The Alpine biome is also similar to the arctic biome.

Alpine biomes are located all around the world in high altitudes. The Alpine and Arctic biomes cover 16% of the earth's surface area.

Alpine biomes are located on mountains where trees can't grow. The growing season (for plants) is about 180 days. The night temperature is almost always below freezing. Unlike the arctic tundra, the alpine soil is well drained.

The problem of light is quite different in alpine biomes than in other biomes. The little amount of atmosphere at high altitudes exposes the Alpine area to sunlight, especially UV, at a dangerous level.

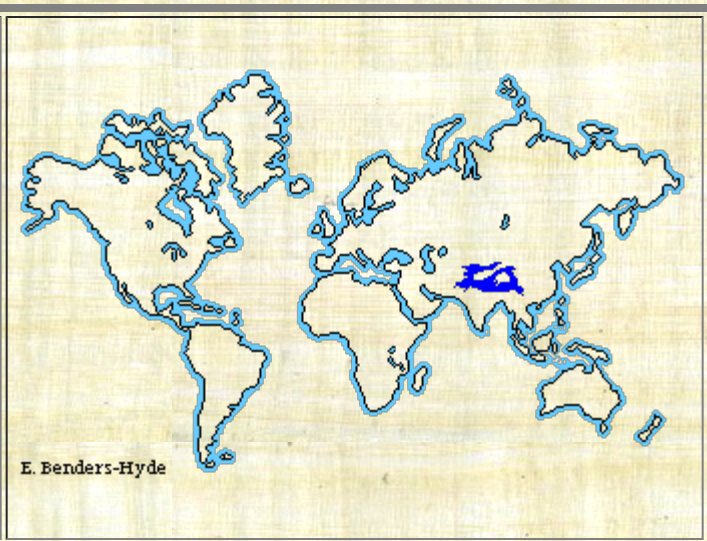
Some of the plants in an alpine biome are tussock grasses, dwarf trees, small-leaved shrubs, and heaths. Some animals in the alpine biome are; mountain goats, sheep, elk, beetles, grasshoppers and butterflies.

by Grace Murphy, 2000

Himalayan Alpine



Mt Everest



E. Benders-Hyde

Plants

The Himalayan Alpine range is located in Asia in the countries of Nepal, Tibet (China), India, Pakistan and Bhutan. The range makes a curve of 1,500 miles through Southern Asia

Animals

Climate

Because the Himalayan mountain range is at a high altitude the air is very thin. The air is also very dry and has a very low precipitation level. The mountains rise from the plains of northern India which are about 1,000 feet above sea level. From these plains many of the mountains rise more than 3 miles above sea level; Mount Everest is 29,028 feet above sea level. The climate is very cold and is hard to survive in most parts. There are two main seasons winter and summer. The winters are long and very cold and the summers are short and cool. It is so cold because of its high altitude.

Back to Alpine Biomes

Rhododendron plants grow on most mountains. Oak, laurel and chestnut trees are also found up to 7,000 feet above sea level. Pine trees are found up to 12,000 feet above sea level; above that point only lichens, grass and moss can be found, since it is so cold in the higher regions. Only certain plants are designed to grow in such harsh conditions.

Native peoples have learned to grow crops such as tea, rice and barley on the southern end of the mountain range. Also in that area tropical plants may be found, as well as animals such as the tiger, monkey, leopard and

the Asian elephant. One of the main animals of this mountainous biome is the yak. The yak can be over six feet tall and usually weighs 1,100-1,200 pounds. You may think its weight would make it clumsy, but actually it is very agile. When provoked it will charge with its horns. It has special bodily functions such as a lot of long hair for warmth.

The Himalayan biome is ever growing more polluted, due to the growing popularity of climbing the mountains. When people go up, all their supplies are left on the mountain because it takes too much energy to bring it down again. If someone dies, their body is left on the mountain. Many people have climbed Mount Everest, and right now a man is attempting to become the first blind man to reach the summit.

by Patrick T. 2001

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Andes Mountains



Plants

The Andes Mountains are located in South America, running north to south along the western coast of the continent. The latitude is 10° N. to 57° S. The longitude is 70° W. to 80° E.

Animals

The Andes Mountains are the longest and one of the highest mountain ranges in the world. They are located in South America and stretch 4,500 miles from north to south, along the west coast of the continent.

Climate

The climate is not the same throughout the biome because there are places nearer to the equator than others. The Andes are separated into three natural regions: the southern, central, and northern regions. In the northern region, it is hotter because it is closest to the equator. There are rain forests in this region, due to the more humid, rainy climate. In the southern region, the mountains are nearer to the Antarctic and it is much colder. It is not very populated in the southern area.

Alpine Biome

In the central region of this biome, the weather is more mild because it is not near either the equator or the cold Antarctic. The largest herb in the world, *Puya raimondii*, grows in this region and can survive at high elevations up to 13,000 feet. The herb can also live for 100 years. The herb's leaves all grow from one big stem, which allows for moisture to run down the leaves to the base of the plant. So during times of drought, the plant can survive.

Many of the plants which grow in the Andes Mountains are small in size to conserve energy. Their leaves can be stiff and strong to protect them from frost and cold weather if they are high in the mountains.

The Andes Mountains supply many birds with homes like the Flamingo, Andean Flicker, the Condor, and the Hillstar Hummingbird. Types of land animals include the Mountain Lion, the Red Perll, and Llamas to name a few. The Spectacled Bear also lives in this biome. The Giant Toad

and Andean Iguana are some examples of reptiles. This iguana is one of the few lizards found in that cold climate.

The Andes Mountains are hurt by humans because they cut down trees which shelter many unique Andean animals. Man also mines for gold, silver, and copper which then erodes the soil and hurts the plants of the Andes.

by Alan W. 2002

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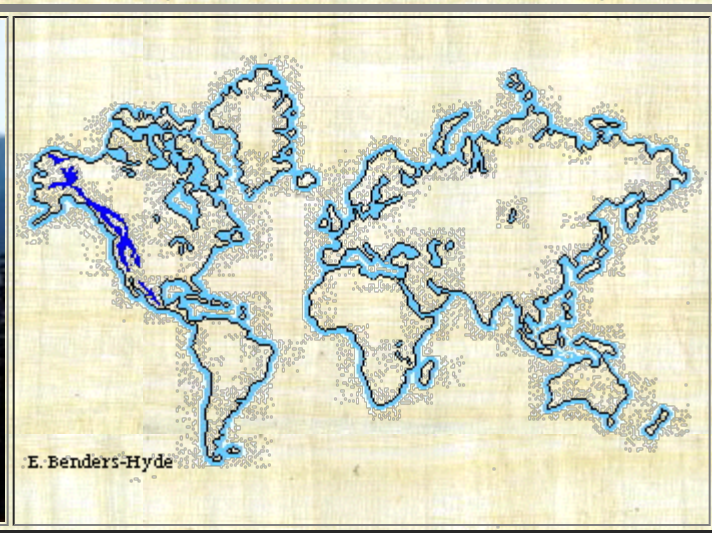
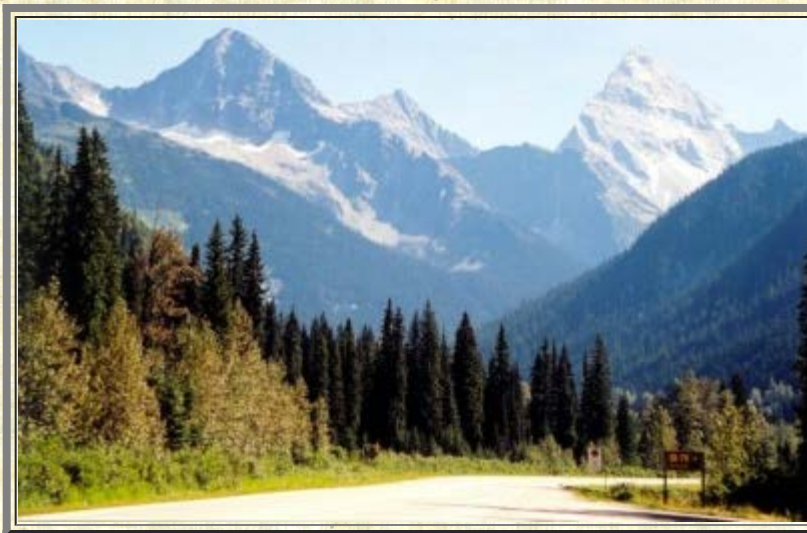
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Rocky Mountains



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Animals

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Return to Alpine

The Rocky Mountains are located in western North America. They are known for their beautiful scenery with mountains, trees and big game. People visit the Rockies for many recreational activities like hiking, hunting, camping, skiing and lots of other sports.

The Rocky Mountains have unpredictable weather which can change rapidly. As with other highland climates, the climate changes with increasing altitude. In general, the Rockies have mild summers, cold winters and a lot of precipitation.

The Rockies have very different seasons. In the winter there is deep snow, high winds, and sudden blizzards are common. At night it can get to -35° F or below! In the spring there is unpredictable weather. It could be wet or dry, cold or warm. In the summer there are sunny mornings, afternoon thunderstorms and clear nights. In the fall there are cool, crisp days, wind and decreasing precipitation.

There is lots of vegetation. The forests are full of pine trees, firs and spruces. Plants are very sturdy, most clinging to rock or hard soil.

Some adaptations that animals have made to the climate is that the hoofed species are very surefooted for the mountainous terrain they live on. Many animals migrate to lower and warmer elevations during the winter months. Some animals shed their brown fur to replace it with white so that they blend in with the snow. Some hibernate and some even have big feet so that they can walk on snow.

Koppen's letter code that describes the Rockies are H, Csb and Cfc. H means highland climate. C means warm temperature climate. s means dry season in summer. f means sufficient precipitation in all months. b means warmest month mean under 71.6° F. c means fewer than four months with means over 50° F.

The average temperature per year is 43° F. For Winter the average temperature is 28° F. 40° F is the average Spring temperature. In the Summer 59° F is the average temperature and for Fall it is 44° F. The highest temperature is 82° F in July. The lowest temperature is 7° F in January.

The average precipitation per year is 14 inches. The average for winter is 1.4 inches. The average precipitation for the season of spring is 4.2 inches. For summer it is 5.9 inches and for fall it is 2.6 inches. In the winter there are some snowstorms and blizzards. It snows later in the fall and there is decreasing precipitation. There is a lot of thunder and lightning in the summer. It rains and snows in the spring.

The latitude and longitude range is 35° N to 60° N, and 115° E to 165° E.

The Rocky Mountains are rich in environmental treasures. Conservation and protection is important to make sure the Rockies are just as wonderful as they are today for many generations.

by Hilary D. 2003

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Fringed Sagebrush

Common Names: Sagebrush, prairie sagewort, fringed wormwood, arctic sagebrush

Genus: Artemisia

Species: frigida



Fringed sagebrush is a woody shrub with silvery leaves and little yellow flowers.

Sagebrush has a strong odor after it rains that smells like turpentine or camphor.

Fringed sagebrush is a low, mat-forming shrub. It gets to be 4 to 16 inches (10-40 cm) in height and rarely grows taller than 24 inches (60 cm). Soft stems grow from a

woody base. It has many little leaves that grow from the stem and are finely cut. The leaves have a gray or silvery look to them. Flowers are yellow and very small.

Fringed sagebrush has a unique root system. It adapts to the conditions that it finds itself living in. It grows deep taproots where the water level is low, and lots of surface roots when the water is easy to get at. The adaptable root systems allows fringed sagebrush to survive drought periods which commonly occur in the Great Plains and the Mongolian steppe.

The sagebrush is used for livestock because it is so high in protein. Many wildlife species like to eat it during spring, fall, and winter but not during the summer. Many bird species use the sagebrush *Artemisia tridentata* for making nests. *Artemisia tridentata* is also used for fuel in places where other burnable woody plants can't be grown.

Fringed sagebrush can live in many places, but not in alkaline soil. It grows on dry open sites in the foothills, mountains, and plains from Mexico northward to Canada and Alaska, and into Eurasia. Fringed sagebrush grows especially in the high, cold plains of the United States, Canada, and Mongolia. This makes Sagebrush a steppe plant because it can grow in dry and cold climates.

2001

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Corsac Fox

Common Names: Cosac Fox, Steppe Fox

Genus: Vulpes

Species: corsac



The Corsac fox is a long legged, reddish gray fox with large ears and a short, pointy face. Its coat is grayish-red with silver undertones, and the under parts are white with yellow undertones. Its chin is also white. They have small teeth compared to other foxes. The Corsac Fox is slightly smaller than the red fox, about 50-60 cm, and as tall as an average sized dog.

Corsac foxes like to live in burrows on steppes and semi-deserts, and are originally from the steppes of Mongolia. You would not find them in areas that are used for agriculture. They are omnivorous so they eat small animals, birds, reptiles, insects and plants. They have some competition in getting their food, but they're good hunters.

The corsac fox is found throughout the southeast area of the former USSR and a large area of central Asia. They are also found in Turkestan, Afghanistan, Mongolia, Transbaikalia, and northern Manchuria.

Corsac fox mate between January and March with a gestation time that lasts 50-60 days. Typically between 2 and 6 young are born at a time, but there are some reported cases of a litter of up to 11 young. It is thought that the dog fox probably helps rear young but this is not known for certain. Males will fight with one another during the breeding season but then remain with the family pack. They live for 3 to 12 years.

They are more social than other foxes and some Corsac foxes go with others in burrows and form hunting packs. They can hear, smell and see very well. The hardest way for the Corsac Fox to escape an enemy is to run, because they run so slowly that a slow dog could catch them. They don't seem to have a home range that they protect from other foxes and migrate south when the food gets scarce.

The Corsac Foxes are not well spread around the steppe. Although hunting by humans has eliminated large groups, there are no conservation program for the Corsac Fox. Very little is known about the Corsac Fox but hunting and the plowing of land have significantly reduced their numbers. The fox has disappeared over much of its range.

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Arctic Moss

Genus: Calliergon

Species: giganteum



The Calliergon giganteum grows in the arctic tundra which is a harsh cold environment in the Northern Hemisphere within the arctic circle. There are strong winds, up to 100 miles per hour. In the tundra it is very cold: the average winter temperature is -25°C , and in the summer it is rarely over 10°C . The summertime only lasts six to eight weeks. In the winter it is dark most of the time, and even in the summer it is usually cloudy and

overcast; therefore plants get little sunlight. The tundra is also unusually dry; it gets an average of just 30 cm of rainfall per year. The growing season is very short. There is also a major lack of nutrients.

A cool fact about the tundra is that nearly 75 % of it is covered in permafrost. There are many cracks on the surface because of the earth freezing and thawing. This frozen soil prevents water from sinking into the ground, causing many lakes, streams, bogs, and fens (wetlands with a constant high water level) during the summer. Probably the most unique thing about the arctic moss Calliergon giganteum is that it grows in freshwater arctic lakes and in fens.

The Calliergon giganteum is an aquatic plant found growing on the bottom of tundra lake beds and in and around bogs and fens. It is a member of the Siberian tundra biome. Like all mosses, Calliergon giganteum is a bryophyte. They have rhizoids (tiny rootlets) instead of roots. They never have wood stems. They have tiny leaves, usually only one cell thick. There are lots of leaves on the stem. They do not have flowers. They can either reproduce by growing shoots or by sending out spores, which need to be wet to survive. They have two life stages; gametophyte and sporeophyte. There are some ways Calliergon giganteum is unique. It is very slow growing. It grows as slow as one centimeter per year. It also lives a very long time; the shoots live seven to nine years, the leaves live for four. It is brown in color. Its branches are crowded. It is one of the few plants on the tundra. It is "the slowest growing longest living freshwater macrophyte ever recorded" (Amazing Arctic Moss.)

The Calliergon giganteum has adapted well to its cold climate. When it is not growing, it stores nutrients so new leaves can be made quickly next spring. The more leaves the more they can photosynthesize. It is adapted to the incredibly strong winds because it grows near to the ground. Because it can grow under water it is protected from the drying winds and cold, dry air of the frozen tundra. Its long life and slow growth are probably adaptations to the short growing season and the cold.

There are few uses for the Calliergon giganteum. In the arctic, moss covers the ground and warms it up allowing other plants to grow. It is eaten by migrating animals such as birds. Some type of arctic moss was frozen for thousands of years and is helping scientists learn about life on our planet.

The Calliergon giganteum is fairly common. It is one of about 2000 plant species on the tundra, most of which are mosses and lichens.

by Micah T. 2002



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Arctic Willow

Common Name(s): Rock Willow

Genus: Salix

Species: arctica



Salix arctica whose common name is Arctic willow or rock willow can be found in the North American tundra. The North American tundra consists of Northern Alaska and Northern Canada. It stretches from 52 N to 65 N and from 60 W to 165 W.

The Tundra can be described as a treeless plain with uneven ground. Each year this treeless plain gets 15-35

cm (6-14 in) of precipitation. There are two seasons in the tundra. They are winter and summer. Salix arctica prefers to live in dry, cold, open places, hummocks in wet sphagnum bogs, sedge meadows, margins of pools, and muddy salt flats in coarse sandy soil. The Arctic willow likes cold climates, which makes the tundra a perfect place for it because the average temperatures range from -70 degrees F to 20 degrees F.

Salix arctica is 15-20 cm in height. It has many different shapes, but sometimes has long trailing branches that root where they touch the surface. Rock willows/Arctic willows grow prostrate, shrub, and carpet. The leaves are oval shaped with pointed tips, wedge shaped bottoms, and have little stalks. These leaves are 15-50 mm in length. The leaves are dark green on the bottom and a lighter green on the top. They have net like veins and long hairs that cover their leaves. The flowers of the Salix arctica are upright scaly spikes that are unisexual flowers with no petals. The Salix arctica blooms in the spring. They are 5 cm and are dark brown or sparkling pink. There's no fruit on the plant, only seeds. There are no taproots on this plant. The lateral roots are shallow due to the frozen ground underneath the permafrost.

Salix arctica has made many adaptations to the cold climate of the North American tundra. In its strongest growth season the Salix arctica forms a pesticide to keep insects like the Arctic woolly bear away. It has also adapted to the permafrost by growing a shallow root system. The leaves of the Salix arctica have also adapted to the cold weather by growing long fuzzy hairs.

The Salix arctica is very plentiful in the wild, but is still vulnerable because of the delicate habitat it lives in. It has a shallow root depth, which makes them susceptible to root damage. It also has a short growing season. There is also a limited food supply for herbivorous insects. There is also a low N.P.P. (nitrogen/ phosphorus/ potassium) in the North American tundra. This means that the chemical fertility of the soil is low. There are many studies being done on the Salix arctica. Some of the organizations involved are I.T.E.X. (International

Tundra Experiment), S.A.G.E. (Sustainable Arid Grassland Ecosystems). International Tundra Experiment placed open top chambers (O.T.C) in order to raise the average temperature a couple of degrees to find out how it affected the plants, insects, etc. Sustainable Arid Grassland Ecosystems studied the arctic grasslands and plants.

The Tundra is a delicate place where tire tracks can last for years. The Salix arctica has adapted well in these frigid non-fertile conditions. In such conditions small changes could drastically affect the Salix arctica.

By Loren G. 2003



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Bearberry

Common name: Bearberry, Foxberry, and Kinnikinic

Genus: Arctostaphylos

Species: uva-ursi

Parts used:



Bearberry is a low growing evergreen. It has a stem that rises 2-8" off the ground and is covered in a thick bark and fine silky hairs. On the stem are many oval-shaped, leathery leaves that are $\frac{1}{2}$ " to 1" long. The flowers have five petals and are pale pink or white. The petals are only $\frac{1}{4}$ " long and are curled around the narrow center. They bloom anywhere between March and June. The fruit is a red berry $\frac{3}{8}$ " in diameter. Bearberry gets its name because bears like to feast on these berries.

Bearberry is commonly found in dry, non-nutrient soils such as sand, soils

on rock outcrops and shallow soils. This plant ranges from northern California to Alaska, east from Oregon and Washington to the mountains of west Montana, and from there, south to New Mexico. Other areas of the world include Greenland, Iceland, and northern Eurasia. Bearberry is plentiful in the wild.

Since bearberry is a low growing plant it can stay out of the wind chill. Its fine silky hairs also help to keep it warm. Leathery leaves are also an adaptation to the cold of the tundra.

Bearberry is a very useful plant. All parts of it can be used in some way. The fruit can be eaten and cooked with other foods. The roots can be made into a tea that can treat a constant cough or slow down menstrual bleeding. A tea from the stem is used to prevent miscarriage and to speed up a women's recovery after childbirth. The leaves can be added to tobacco or used as a substitute for it. A tea made from the leaves can be drunk to treat

kidney or bladder problems.

Ben P. 2001

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Labrador Tea

Common Name: St. Jame's Tea, Marsh Tea, Swamp Tea, Hudson's Bay Tea

Genus: Ledum

Species: groenlandicum

Parts Used: leaves



The Labrador tea plant grows to be 4 to 5 feet. It will grow up straight in the southern latitudes of the tundra, but in the colder northern latitudes it will creep over the ground forming a carpet. It has woolly branches with narrow 1 to 2 inch leaves which are smooth on the upper side, with rusty hairs underneath. They droop slightly and edges are rolled under, and are a leathery green in color. At the ends of the branches are tiny clusters of white flowers with protruding stamen, which bloom in June and July.

The part used from this plant are the leaves, which were brewed for tea by Native Americans. The tea is very

rich in vitamin C. They were also scattered among clothes to keep moths away. Branches kept with grain are said to keep mice away.

They are also used for medical purposes. Externally it was used for all kinds of skin problems. Tea was used for stomach and nerve ailments. A syrup was made from the tea to be used for coughs

They usually grow in wet meadows, bogs, and forest areas mostly in the lower latitudes of the tundra biome. Bees are attracted to the flowers, but animals don't eat them because they are said to be slightly poisonous.

Eliot T. 2000

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Pasque Flower

Genus: Anemone

Species: patens



Pasque flower is a pretty tundra plant. It is a member of the Ranunculaceae family, which is Latin for little frog. The name was given to the family because a group of plants in this family grow where frogs live.

The Pasque flower has several stems that rise 6-8 inches off the ground. On each stem is one flower with 5-8 petals. The range of color in the petals is from dark lavender to almost white. In the center of the flower are yellow stamens. Below the flower, around the stem is a leaf covered in silky hairs, as is the rest of the plant. The fruit of the plant is a plum that is achenial, which means that one seed is attached to the ovary wall, like a strawberry seed.

Pasque flower is found in many areas in the [tundra](#). The plant only grows on southward facing slopes and is common throughout northwestern U.S. up to northern Alaska. The Pasque flower is also the state flower of South Dakota. It is popular in many home gardens. It likes well-drained, sandy, and gravelly soils as well as roadsides.

The Pasque flower, like all tundra plants, grows low to the ground to keep out of the cold [climate](#). It is also covered in fine silky hairs, which help insulate it.

The Pasque flower is useful to treat eye diseases like cataracts, which is opacity on the lens of the eye, which can cause partial or complete blindness.

The Pasque flower is plentiful in the wild. It can be seen any where from northwest U.S. to northern Alaska.

by Ben P. 2001



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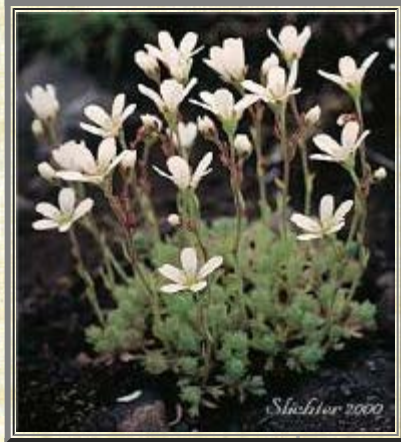
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Tufted Saxifrage

Common Name: Saxifrage

Genus: Saxifraga

Species: caespitosa



Tufted Saxifrage is a small perennial that grows in thick mats on the tundra. It has several straight flower stems which can get 3-15 cm high. The leaves are rigid and very hairy and only 5-10 mm long. Their tips divide into 3 lobes.

Two to ten flowers bloom from the top of each stem. Each flower has five white petals, that look like a bell when just opening and turn into a star when fully opened. This flower also has a small fruit which usually holds many small seeds.

There are many varieties of saxifrage

in the wild. Saxifrages like cool weather. The Saxifrage has a well-developed underground root system for storing carbohydrates, so that they can respond quickly to the cold weather of the tundra. Saxifraga heuchera is one of the few saxifrages used as an ornamental plant. It grows in the northwestern United States.

The Tufted saxifrage grows on the rocky slopes and crevices of the tundra. It can be found from Alaska to the Cascade and Olympic Mountains and northwestern Oregon. Saxifraga comes from the Latin word "rock breaker".

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Photo credit: Paul Slichter, <http://district.gresham.k12.or.us/>

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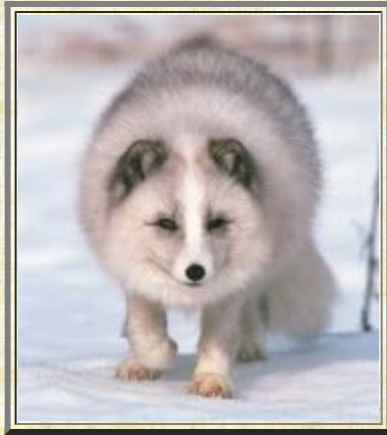
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Arctic Fox

Common Names: Polar Fox, White Fox

Genus: Lagopus

Species: alopex



The North American tundra is located at latitudes 60° to 85° North and longitudes 55° to 160° West which includes northern parts of Canada and the state of Alaska. The tundra is a cold barren wasteland that includes snow, rocks and very little variety in vegetation. It is in this place where the Arctic fox is found.

The Arctic fox (*Lagopus lagopus*) makes its home in small burrows in frost-free ground, often in low mounds, or in rock piles. Because the Arctic fox is a scavenger it can usually find food to eat. Sometimes the fox will follow Polar bears or other predators and feed off the remains they leave behind.

The Arctic fox is about 10 -16 inches long and weighs about 6-12 pounds. It is about the size of an ordinary domesticated house cat. It has short legs a long bushy tail that it uses as insulation by wrapping it around itself when sleeping. Its long hair is white in the winter, and "blue" or gray in the summer. Its head has a stubby muzzle, small ears, and large eyes. Its feet are lined with fur, which helps it conserve heat. The Arctic fox has adapted a stealthy movement due to its predatory nature.

Both male and female mature sexually at one year of age. The mating season is May-February and the gestation period for a pregnant female is 52 days. The number of pups born can range between 6-19, and the newborns weigh approximately 2 ounces. Whelps are helpless and blind when first born. They nurse until they can eat solid food. Both parents care for the pups. The

mother raises the young while the father hunts for lemmings and other food. They start to eat solids after 6 weeks and leave the den after 14-15 weeks. The whelp is usually dependent on its parent from summer to fall. Mortality rates for young foxes is very high. An average life span for the arctic fox is around three years.

The Arctic fox is a solitary animal. Arctic foxes usually live to 15 years of age. It is an omnivore (one who eats both plants and animals). A typical diet of this fox consists of birds, eggs, small mammals and fish. It will also eat berries, seaweed, insects and larvae, when other prey is scarce. The Arctic fox is a predator to lemmings (one of it's favorite foods) and voles, among other creatures. The population cycles of lemmings and voles are largely dependent on the arctic fox. The fox is prey to wolves, polar bears and golden eagles. Because it is a scavenger, it keeps the environment clean by eating dead animals and keeping the rodent population down. The Arctic fox is a diurnal creature.

The Arctic fox has adapted to its environment by growing long fur that changes color with the season for camouflage. It tends to eat whatever is available. Its movements are stealthy due to lack of cover on the tundra. Its legs, ears, and muzzle are short to conserve heat, and uses its tail like a muffler when cold.

The Arctic fox is not endangered world wide and it is estimated that there are several thousand arctic foxes left in the wild. Two arctic fox populations are endangered, however. One in Russia has been reduced to around 90 animals because of a mange caused by ear ticks introduced by dogs. The second in Fennoscandia (Norway, Sweden, Finland, and Kola Peninsula) was caused by over hunting around the turn of the century. The total number of breeding pairs there is about 140.

By Tye S. 2003

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Ermine

Common Names: Short-tailed Weasel, Stout, Royskatt

Genus: Mustela

Species: erminea



The ermine is found all over Canada, northern USA, and Eurasia. The Ermine lives in northern biomes such as taigas and tundras. The Siberian tundra is a vast land that is almost completely dark during the winter season because of its far north location. Also, the climate in winter is extremely cold. In fact, the Siberian Tundra is the coldest biome in the world. In the summer the Siberian tundra has many bogs and puddles scattered around the land because permafrost won't let the winter snow drain off. It is during the summer that most of the animals come out. Although the climate remains fairly cold, the Siberian Tundra is bright with sunshine. Ermines like to inhabit marshes, open spaces or rocky areas next to woodlands. The ermine is well adapted to living in this harsh environment. They make their dens in the old roots of a tree or in the crevice of a rock. Ermines are capable of having several dens.

Ermines may make their dens in the roots of trees farther south, but there are no trees on the tundra.

The ermine is a small animal that weighs between 3 - 15 ounces. The head and body length can range from 7 - 13 inches and the tail can grow up to 5 inches. The males are much longer than the females. In the spring and summer the ermine's coat is chocolate brown with a white underbelly and a black tip on the tail. In the winter the coat turns entirely white except

for the black end of its tail. The ermine's flexible spine allows it to do the "marten run" in which the hind feet are tucked in by the front feet, causing the back to arch, and then extended. Since the ermine is a carnivore, it has 34 sharp teeth. It has short legs and a long body and neck. The head is triangular shaped with small round ears, small, bright eyes and long whiskers.

The male ermine reaches maturity at 12 months. The female reaches maturity at 2 months of age. The mating season is during late spring and summer. They have babies every year. Three to thirteen young are born each mating season. The birth size of the ermine is a half an ounce. When the kits [babies] are 8 weeks old their mother teaches them to how to hunt. After the mother teaches them how to hunt the female kits [babies] are ready to mate. The males aren't ready to mate and leave their mothers the next spring. The females might stay under their mother's protection in her territory. Ermines are very territorial. The female ermine has the sole responsibility of raising the young. The males do not usually help raise the young. An Ermine's life span is 4 to 7 years. Aside from raising young, the ermine is a solitary animal.



The ermine is a carnivore and eats rabbits, small insects and rodents. Because of their sharp teeth they are able to catch animals larger than themselves. In different habitats ermines will eat birds or amphibians. It will also eat most small mammals. When the ground is covered with snow the ermine will hunt entirely under the snow for small rodents.

Their ermine paws have claws which enables it to dig. The front feet are smaller than the back which helps it fit into small, tight spaces. The coat of the ermine changes with the seasons and camouflages it from predators. In winter the ermine's coat is white blending in with the snowy

environment. In warmer seasons the fur turns brown again matching the color of the landscape.

In its Siberian tundra habitat ermines prey on a range of small animals and birds. In a different environment ermines are know to sneak into barns for a meal of chicken eggs. They are very adaptable in their diet depending on where they live. In their Siberian environment the ermine is prey to snowy owls, arctic foxes, lynx, gyrfalcons, hawks and other large mammals and birds of prey.

When it starts to get colder in Autumn the ermine sheds its brown coat it wore in spring and summer, and grows a new white coat for winter camouflage. A long time ago during the Middle Ages the fur of the white phase of the Ermine was popular in clothing. Now ermines are almost never used in clothing. Ermines are neither threatened or endangered.

by Maria C. 2002



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Grizzly Bear

Genus: Ursus

Species: arctos horribilis



Most bears are found in North America and Eurasia. Grizzlies are found on the Alaskan and northwestern Canadian tundra. They are considered a subspecies of the brown bear. Most grizzly bears are found in the northwestern part of North America. The grizzly bear's habitat can include forests, mountains, meadows, and valleys.

Grizzly bears have amazing physical strength and are surprisingly fast over short distances. They are very aggressive and have no trouble driving away predators like wolves and mountain lions. The grizzly also has a great sense of smell.

The grizzly has a heavy, stout body, a big head, and short tail. It has a distinctive hump between its shoulder blades. Its nose is dished, and turns up at the end, unlike the black bear, whose nose arches down. Most are brown, black, or blond. The tundra grizzly is often creamy yellow on the back with brownish legs and underparts. They can weigh up to 704 lbs, be over 8 feet in length, and stand 3 1/2 feet high at the shoulders. They are well suited to the cold climate of the tundra. Besides having a thick, shaggy coat of hair, they have layers of fat to insulate them. When winter comes the grizzly will bed down in a den packed with leaves and sticks. It doesn't go into full hibernation, and will occasionally come out of its den. It doesn't eat during this time but lives off stored body-fat until spring.

Grizzly bears have an amazing diet. Scientists discovered that 75% of the bear population live off plants alone. The grizzly will also eat insects, small rodents and honey. It is strong enough to kill a caribou and outrun a moose, but usually it doesn't hunt. It will eat abandoned kills made by other predators (by driving the predator away from its kill).

Females have cubs at around age five. She will give birth to 2 - 4 cubs, but usually twins in January. They weigh about 1 lb at birth and will suckle until May. The cubs stay with the mother until age 2 and then go off alone and repeat the cycle. Their life span is around 25 years.

The grizzly bear is a solitary animal because it doesn't need to form protective packs because it lacks natural enemies.

The population of the grizzly bear began to decline since the early 1800s. Around the 1970s there were only about 300 grizzlies left in the United States, outside Alaska. The US Fish and Wildlife Service lists the grizzly bear as an endangered species, except in Alaska. The grizzly bear population is now increasing in Yellowstone Park.

by Max S. 2000

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Photo Credit: Brian Wolitski, <http://www.bmwphoto.com>

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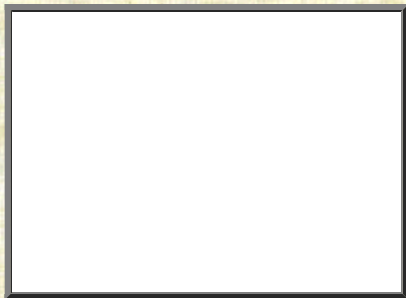
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Snowy Owl

Common Names: Cat Owl

Genus: Nyctea

Species: scandiaca



The snowy owl is considered to be one of the largest and most attractive of the owls. It is called the snowy owl because of its white feathers. The male and female owls have different markings. Male owls are mostly pure white with small spots and wing barring. The female has heavy gray-brown lines across her body and wings and speckled plumage. They both have large, yellow eyes, set in front of the face. Their ears are large

and hidden under dense, white feathers. The snowy owl weighs 4 to 6 pounds and is 21 inches to 26 inches in length. The wings can span 4.7' to 5.4' in width.

They reach sexual maturity at 3-5 years old. The snowy owls choose one mate every breeding season, because they migrate. Their nest is a hollow, formed out of frozen turf and moss on a ridge or hill.

The male owl uses his echoing calls to find a mate. They look for a mate late in winter. He brings his mate an offering of food and displays his feathers to get her attention. After mating they search for a place to nest. The female owls can lay 2-16 eggs, but usually lays 5-7. The eggs are round and white. Incubation period is 30-33 days. The female owl lays the eggs two to three days apart from each other. By the time the last egg is hatched, the oldest nestling could be 2 to 3 days older than the youngest. When food is scarce, the larger birds eat the weaker, smaller nestlings to survive. Both male and female owls provide food for their young. The owls' plumage helps to camouflage the female owl as she sits on her eggs.

The owl can see its prey with both eyes at once, like humans. Their eyes take up more space in the skull than the brain. The

snowy owls hearing is very sensitive and they can pinpoint voles and lemmings under deep snow. Their wings are long and broad, which allow it them fly close to the ground to catch its prey. Claws are long, curved and needle like. They act like weapons for catching and killing its prey.

These owls are silent, unless claiming their territory or protecting their nest. When they do this, they have a loud, deep, hollow hoot, which can be heard up to 2 miles away. When protecting the nest they use a loud barking and quacking sound. The female owls have a loud wail.

They are usually shy and hard to get close to. They will fly away at sudden sounds or movement, which can be heard a mile away. They inhabit low areas of open ground, where dry, rocky hillocks stand exposed from the snow. When traveling across the open sea, they will sometimes rest on icebergs or ice floes.

The snowy owls feed on arctic fox, rabbits, lemmings, voles, and various seabirds. When breeding, it will take food back to the nest to feed the chicks. The owl's stomach can digest the meat of its prey, but not the bones, skin, hair and teeth. The bones form a pellet (a tightly packed lump of these remains) which the owl later coughs out. These can sometimes be found on the ground where owls roost. By examining the contents, you can tell what it has been eating. Owls usually hunt at night, but because the snowy owl lives in the Arctic where there is no darkness in winter, they must hunt for their food during the day. They attack silently, using four powerful talons to reach out and grab its prey. To kill it, they bite its neck at the base of the skull. Smaller prey are swallowed whole. The snowy owl is a predator and helps to keep the environment from overpopulating.

At one time the snowy owl was hunted and trapped by man, but they are now protected. There is a threat of man inhabiting the remote areas where these birds live. This can become a problem, because it will limit the owls space to live and deplete its prey.

by Travis T. 2001

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Tundra Climate (E)

The tundra is a bleak and treeless place. It is cold through all months of the year. Summer is a brief period of milder climates when the sun shines almost 24 hours a day. It has been called "the land of the midnight sun". But even the sun can't warm the tundra much. The short summer lasts only 6 to 10 weeks. It never gets any warmer than 45 or 50° F. The warmer weather causes a layer of permafrost, ice that never goes away in the ground, to melt, creating bogs and shallow lakes that don't drain. They breed stinging insects, which make life even in the summer miserable for the inhabitants of the tundra. The wind blows constantly, whipping around the small plants.

During the long winter months the sun barely rises and it is dark for most of the day. Bitter cold winds scud across the barren snowscape, exposing high plateaus to barren ground.

Winter temperatures don't reach above 20° F and average -20° to -30°F. Endless hours darkness settle in and the winds blow even harder. The snow that falls is blown off the high plateaus and collects in the valleys. Animals hunker down, able to find only enough food to keep warm.

The tundra is an unusually cold and dry climate. Precipitation totals 6-10 inches of rain a year, which includes melted snow. This is almost as little as the world's driest deserts. Coupled with strong and drying winds, the tundra is an extreme weather biome. The tundra seems like a wet and soggy place because the precipitation that falls evaporates slowly, and because of the poor drainage caused by the permafrost.

You can find the tundra climate in Köppen's E climate category. The E stands for ice climates. The average temperature of the warmest month is below 50° F.

The tundra climate spans from most of Greenland to parts of Alaska, northern Canada, and northern Russia. The latitudinal range is 75° N to 60° N. Tundra climates can be found on the coastal areas of the arctic. The ocean water keeps the climate from falling to the extreme temperatures found in the interior of the continents.

by Sam A.2000

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Tundra Climate (E)

The tundra is freezing for almost all of the year with no traditional seasons, only a very long winter. Winter conditions in the tundra exist most of the year, with the exception of a very short mild season which passes for summer.

The type of vegetation that grows on the tundra are; grass, shrubs of willow, sedges, and lichens. The vegetation grows very slowly because of the hard winter.

The animals in the tundra put on heavy coats to adapt to the harsh climate. Examples of this adaptation would be the coats on the caribou, reindeer, musk ox, arctic hare and the arctic fox.

The Köppen system of classification would be Dfc. D In Köppen climate classification stands up for snow climate, f stands up for sufficient precipitation in all months and c stands up for fewer than four month with average temperatures over 50° F (1°C).

The average temperature per year is 16 degrees°F. The highest temperature can get to 45° F and the coldest temperature can get to 10° F below 0. That makes it one of the coldest regions on earth. This biome feels freezing most of the year.

The average precipitation per year is more than 18 inches, and most of it falls as the snow. Average precipitation per season is 4.5 inches. The type of precipitation that falls in this climate is mostly snow in the winter, and in the summer it is rain, with

occasional snow.

The latitude range for the tundra is from the arctic circle to 60° to 70° latitude North. Parts of Alaska and northern Canada contains tundra biome and climates. Tundra climate can also be found in northern Europe and Russia.

by Ilekea S. 2001.



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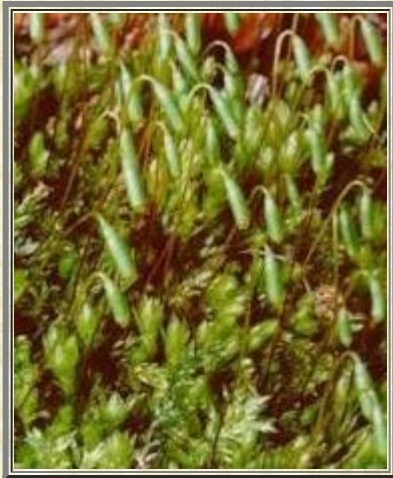
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Carpet Moss

Genus: Mnium

Species: hornum



Mosses are simple, rootless evergreen plants. They can live in a wide variety of habitats, but are most often found covering the ground, growing on stream beds, and on the base of trees in deciduous woodlands. Carpet moss grows in eastern North America and Europe.

Carpet Moss, like its name, carpets the ground. In the spring the carpet moss is golden green, and turns dark green as it gets older. It looks almost velvety. Its leaves grow parallel to each other and taper off to a point at the end. The edges of the leaves have long, narrow cells which grow in pairs and make the margins look serrated.

Mosses originated from aquatic plants and still have a lot of things in common with them. [Arctic moss](#) actually survives the bitter cold of the arctic by growing under water. They absorb water through pores which always stay open, and require constant moisture. They don't have true roots, stems or leaves. They reproduce through spores and not through seeds.

Carpet moss reproduces both sexually and asexually. When producing sexually, depending on weather conditions, mosses produce small female structures that produce egg cells, or male structures that produce sperm cells. These can grow on different parts of the same plant. The sperms fertilize the eggs and develop into a spore-plant, or sporophyte. The sporophyte begins to grow from the female plant, taking nutrients from its parent because it can't produce its own food. This sporophyte is the long stalk with a small capsule on the end that you often see growing out of carpet moss. The capsules produce the spores. When conditions are dry, the capsules open and release the spores. These spores grow into the leafy male or

female mosses.

Moss can also reproduce asexually when bits of stem or leaves are separated from the plant and develop into new plants.

Many people use Carpet Moss as a ground cover in gardening. Many years ago, people used to stuff their beds with Carpet Moss because they thought it made them sleep better.

2000



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Common Lime:

Common Name(s): Lime Tree, Linden, Basswood, Bast Tree, Spoonwood

Genus: Tilia

Species: x europaea



The common lime is a tall, stately tree, which grows in the deciduous forests of Europe, the British Isles, and the USA. In the USA it is known as a linden tree. It is the tallest broad-leaved tree in Britain. In the past it was found growing throughout the old growth forests of Europe. Today there are no original forests left there, but the common lime is still widespread because it is frequently planted along avenues and in gardens. The common lime can live up to 500 years.

The tree can grow to a height of 120-130 ft (25 m). Bushy side shoots grow along the trunk from near the ground. The lower branches arch out, giving the tree an upside-down pyramid look.

The leaves of the common lime grow

singly along a stem but not opposite each other, and about 4-7 inches (5-10 cm) wide. They are roundish and slightly heart shaped with small, fine-toothed edges. Their color is a dull, dark green color above and lighter green underneath. The tops of the leaves are hairless but have tufts of white hairs at the junction of the veins underneath. The leaves often have small blisters caused by aphids and other sap-sucking insects.

Flowers of the common lime are yellowish to dull white in color and are sweetly scented. They



hang from slender stalks in flattened clusters of 4-10 on a stalk. They have five petals and are about 1/2 inch (15 mm) wide. Insects attracted by the abundant nectar pollinate them. The common lime blooms in June and July.



The common lime fruit is a small round nutlet about the size and shape of a pea. Hairy and faintly ribbed, they hang together on green bracts. In October they float away from the parent tree on the wind.

The bark is smooth and a dull grey color when young. As it grows older, the bark becomes brownish-grey with perpendicular, shallow cracks. The stringy inner bark is called bass or bast. It is used to make mats, ropes, and fancy baskets.

The wood is white, smooth and close-grained. It is a light wood and doesn't become worm-eaten. It is useful for small things that don't need much strength. It is often used for carvings and the sounding boards for pianos, and for artist's charcoal.

The common lime has been used as a home remedy for colds, flu, coughs, epilepsy and indigestion. The inner bark contains a gelatin-like material that was applied to soothe skin irritations. Tea made from leaves and flowers is used to treat cold symptoms. However, drinking too much flower tea may cause heart damage.

During the Middle Ages statues of the Virgin Mary were carved from lime wood. They called the wood *lignum sacrum*, or sacred wood. In Germany the tree was thought to bring fertility and prosperity, and was considered the sacred tree for people in love.

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Guelder Rose

Common Names: European Cranberry, Cramp Bark, Snowball Tree, Red Elder, Rose Elder

Genus: Viburnum

Species: opulus



The Guelder Rose prefers to grow at low altitudes and in semi-shade in Scotland and England. It is native to the woodlands of the European deciduous forest. It is found at the edges of woods, hedgerows and marshes. In the United States it is found in agricultural zones 3 to 8, which is a relatively cool climate. It grows in both heavy clay and acidic soil. It was first cultivated in Gelderland, a Dutch province, then introduced to England.

The Guelder Rose is a deciduous shrub and a member of the honey-suckle family. This shrub is also like the Common Elder. The Guelder Rose's flower is snowy white with flat heads which are 3 to 5 inches across. The flower is wheel shaped and the outer flowers have five petals and are sterile. The inner flowers are fertile and very small. They provide nectar for the insects that pollinate them. The flowers turn into red berries. The Guelder Rose is beautiful in August when the berries are ripe, and the leaves turn to a bright red or rich purple before falling. It has maple-like leaves. This shrub can grow to 5 to 10 feet high.

The berries are bright red and attract birds that spread the seeds. The very large white outer layer of flowers also attracts pollinating insects to the inner part of the flower. Some can self-pollinate. Some species are sterile and don't have berries. It is an invasive shrub and will take over another plant's area and is able to spread out for more sunlight.

Its bark is used as an herbal medicine for cramps and asthma. The berries can be used for ink. It is also used as a decorative

shrub. In Canada it is used instead of cranberries. It is an important food source for insects and birds who eat the nectar and the berries.

The Guelder Rose can be an invasive shrub and therefore is definitely not threatened. It is definitely not an endangered species.

by Andy K. 2002



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Photo Credit: ©Anna-Lena Anderberg

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Lady Fern

Common Names: Northern Lady Fern

Genus: Athyrium

Species: filix-femina

Parts Used: the leaves are used for decoration



You may have Lady fern in your own house. Many people use it to decorate their homes. You may see it hanging or potted. People in Victorian times were crazy about Lady fern. However, Lady fern is not only found in the house. It also grows in the wild, especially in [deciduous forests](#) and the [taiga](#) of North America and Eurasia.

Lady Fern is a deciduous, perennial fern about 24 to 36 inches tall. Its light green, lacy leaves are about 24 to 30" long and 6 to 9" wide and tapered at both ends. The fronds are cut twice and

grow from a central base. The J-shaped spore casings, or sori, grow on the underside of the leaf.

In the wild, Lady ferns can be found growing in meadows, open thickets, moist woods, and along stream beds. They also grow in the cracks of rocks. In the taiga it usually grows in the understory of [white spruce](#), [black spruce](#), [Douglas-fir](#) and western hemlock. Lady ferns prefer shaded areas.

Many Lady ferns will grow in a group in the shape of a circle. As they grow farther and farther outwards, the centers die away, leaving a ring of Lady Ferns. Lady ferns reproduce by thick, scaly rhizomes and spores. They grow in most semi-shaded areas.

Grizzly bears like to eat Lady ferns as a major food source. Elk will also eat it also. Native Americans had many uses for Lady ferns. They used lady ferns for drying berries on, and covering food. The young shoots, or fiddleheads, were cooked, baked or eaten raw. Tea was made from the leaves to help urination and to

stop breast pain caused by childbirth. The tea was also used to ease labour pains. Roots were dried and ground into a dust to help heal wounds. Oil from the roots of Lady ferns has been used since the 1st century AD to get rid of worms. An overdose could cause weakness, coma, and often blindness.

Lady ferns are a dominant plant in the understory of the taiga, and will cover the forest floor. It is not an endangered plant.

2002

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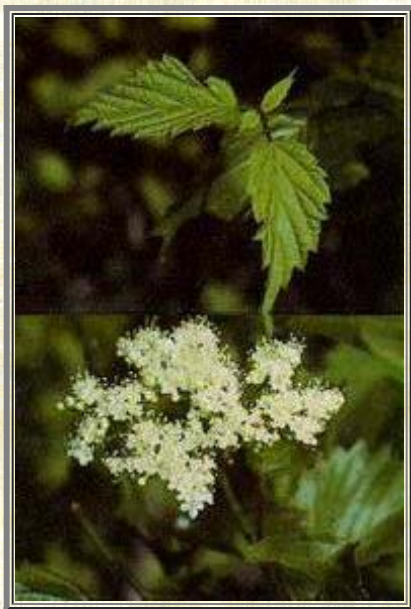
Northern Arrowwood

Common Names: Smooth Arrowwood

Genus: Viburnum

Species: recognitum

Parts Used: leaves and berries



These plants have dark green, oval deciduous leaves which grow opposite each other on the stem. The tips of the leaves are pointed and the bottoms are rounded or heartshaped. The leaves are about 4 inches long and 3 inches across. Northern Arrowwood is different from other viburnums because its leaves have big spiky edges, but its surface is smooth.

It has small white to pink flowers in flat-topped clusters about 4 inches across. The plant blooms from May to June. The leaves and flowers grow on the top of long shoots.

The fruits of the arrowwood are fleshy and blue-black in color about 1/2 inch across. They are a favorite food of Ruffed Grouse and chipmunks. Deer love to eat the leaves and stems. The shoots were once used by Native Americans for arrow shafts.

The bark of Northern Arrowwood is grey and smooth. This shrub can sometimes grow to fifteen feet in height.

The Northern Arrowwood is usually found in the deciduous biome. It grows from New Brunswick and southern Ontario, to south-east New York, northern Ohio and Michigan. It prefers wetland areas along rivers, streams and lakes.

by Robin B. 2000.

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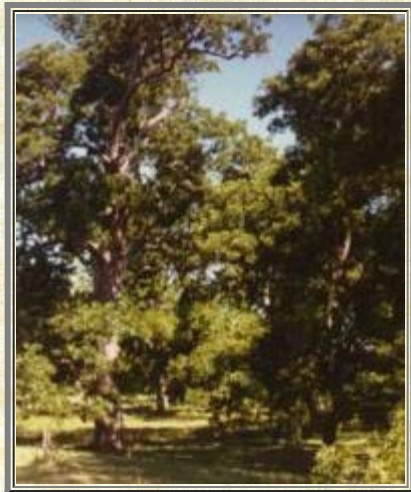
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Pecan

Genus: *Carya*

Species: *illinoensis*

Parts used: the nuts



The pecan tree can grow to enormous heights, sometimes to heights of 180 feet, and has an upright growing pattern. The bark is pale gray or whitish brown, scaly, and deeply furrowed. The bark on the pecan tree is rough and scaly, and is pale grey or brown. The heartwood is solid brown and black.

The leaves grow in groups of 11-17. Each leaf is slightly pointed at the tip. The width of the leaves are approximately 3 inches. Each full grown leaf is about 5 inches top to bottom. This tree is a perennial. The Pecan tree has a shallow root system. The flowers are tiny and hang down in tassels. The pecan uses wind to

pollinate. The pecan nut is long and pointed with a thin shell.

The pecan tree grows in North America. The tree is found in deciduous forests. Most pecan trees like humid climates. The tree is a member of the walnut family. The Pecan tree is the State tree of Texas. Pecan nuts were a major food source to the Native Americans. They would eat these nuts, and store them to survive through the winter. The tree is used for its wood to make furniture like cabinets, benches, stools, chairs, and other useful supplies.

The pecan industry produces 250,000,000 lbs. of pecans a year. Farmers harvest the nuts that have fallen off the tree. The nuts are not directly picked off the tree, because only the nuts on the ground are edible, and the ones on the trees are still growing. The nuts are put in boxes, and sold in stores and marketplaces. The

pecan tree is not on an endangered tree list because there are so many of them still growing.

by Davey C. 2001

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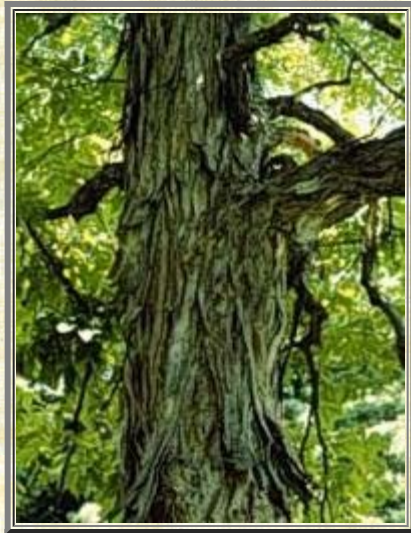
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Shagbark Hickory

Genus: *Carya*

Species: *ovata*



The Shagbark Hickory tree has an ashy gray bark similar to birch trees except its bark separates into long strips, which give the trunk its shaggy look. The Shagbark Hickory tree is tall and straight and can grow to about 100 feet tall. The Shagbark Hickories branches can spread to 25 feet, the lower branches somewhat droop while the upper branches are upright. The branches in the middle are just about horizontal. The wood of this tree is strong and tough. The Shagbark has both male and female flowers. Male flowers grow in bundles called catkins and female flowers are in clusters called petallets.

The Shagbarks leaves are compound and alternate, with five or seven

broad, toothed leaflets. The leaflets can be smooth or hairy and can be up to 10 inches long and 5 inches broad. The twigs bear brown buds. The nuts have thick husks, but the shell inside is thin and is edible with a sweet taste.

The Shagbark hickory tree usually grows among oak trees. It grows in wet and dry areas, but grows better in well-drained soils.

The Shagbark Hickory tree has long taprooms which grow straight down into the ground to help the tree get extra water if there is a drought. These roots will be helpful to the life of the tree.

The Shagbark Hickory tree has many uses, some of them include:

sports equipment, furniture, or as a smoke wood for meats. The nuts of the Shagbark tree are also edible and humans and squirrels both compete for these nuts. But if I were you I wouldn't eat one! The Shagbark Hickory tree is very common in the wild especially in the Eastern forests of the United States.

by Will J. R. 2001.

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Tawny Milkcap Mushroom

Common Names: Weeping Milkcap, Chichitake

Genus: Lactarius

Species: volemus

Parts Used: the Tawny Milkcap mushroom is edible



The Tawny Milkcap Mushroom can be found in most deciduous forests. On the North American continent it can be found in southern Canada and the eastern United States. It is also common in Europe. In Japan it is known as chichitake and is used to make a flavorful broth.

If you are a mushroom hunter, you may like to eat the Twany Milkcap. This species is edible and is a favorite of collectors. It is best

eaten fresh because a white "milk", or sticky latex, seeps out and turns brown when the gills are cut, giving it the name Twany *Milkcap*. It has a strong fish-like odor, especially when dry. Their flavor is mild, however.

The Twany Milkcap's cap is 2 to 5 inches wide, and smooth with a dry, velvety feel to it. The upper part is orange-brown in color. The edges of the mushroom cap turn up and becomes bowl shaped, making it look like and inside out umbrella. When they are young they have a darker, russet color, and turn almost pale yellow as they get older. The gills are close together and are almost white. They bruise easily and turn brown where you touch them. The stalk can be up to four inches tall and is also orange but it has darker streaks in it.

Tawny Milkcap Mushrooms are neither plants nor animals. They belong to the Fungi Kingdom, and like most fungi they are

decomposers. This means they break down dead organisms, and get all their food from other organisms. The mushroom we see growing above the ground is the fruiting and reproductive part of the fungus that lives mainly underground, called the mycelia. The mycelia are long, white, branching hairlike filaments that grow very quickly through the leaf litter. The mycelia send out a chemical that helps break wood down into nutrients. The decomposing mushroom keeps leaf litter from accumulating. Without decomposers the world would be buried under a mountain of waste. Because mushrooms don't have chlorophyll, and get their nutrients in other ways, they don't need light to grow.

The above ground mushroom part produces spores between the gills which, when released, find a moist area and germinate. The germinated spores sprout mycelia. The mycelia grow quickly, searching for nutrients and water. When they find a good place they begin reproducing, they make special reproductive cells which grow into tiny mushrooms. Spores can travel by wind and different animals. Insects are attracted to mushrooms by their smell and carry spores to different places. Animals, including people, eat mushrooms and their spores. This doesn't hurt the spores, which are deposited in a nice, nutrient rich, wet and warm package to start reproducing again.

Spike C. 2000.



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White Birch

Common Names: Canoe Birch, Silver Birch, Paper Birch

Genus: Betula

Species: papyrifera

Parts Used: leaves, sap, lumber,



The White Birch is a small to medium sized deciduous tree which grows to 70 or 80 feet in height. As far as trees go it doesn't live very long, only about 140 years. Small heart-shaped leaves are found at the ends of drooping twigs and branches. The paper birch has both male and female flowers called catkins. These turn into little winged nutkins, which ripen in early August to mid September. The wings help the seeds to fly away from the parent tree so there won't be competition for food and water.

You can identify this tree by its white bark which peels easily and is marked by narrow horizontal stripes. White birch trees can either have one slender stem or several stems. Moose like to browse on the young trees and will eat off the tops. This forces the tree to send up more stems.

The paper birch doesn't like shade and is the first tree to grow back in places that have had a fire or where trees have been cut.

Although moose and white-tailed deer will eat the leaves and tender shoots of the paper birch, it isn't their favorite food. Porcupines like to eat the bark and rabbits will eat the seedlings and young saplings. Yellow-bellied sapsuckers will peck little holes in the bark and feed on the sap. Hummingbirds and squirrels also drink the sap from the sap wells the sapsuckers made.

The bark is often used as a fire starter because it burns even when its wet. Native Americans also used the bark to cover their canoes. They also used it to make baskets, baby carriers, mats, torches and moose calls. Because the wood was strong and flexible it was made into spears, bows and arrows, snowshoes and sleds. The wood is now used for building lumber to make veneer, pulpwood and plywood. Syrup, wine, beer, and medicinal tonics are made from the sap.

The white birch is found in Newfoundland, Labrador, Canada, and from New England to North Carolina in the United States. It prefers colder climates, however.

2000.

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White Oak

Genus: Quercus

Species: alba



The White Oak tree can grow from 80 to 100 feet tall ,3 to 4 feet in diameter around the trunk and can spread from 50 to 80 feet. The Oak tree grows upright and its bark is whitish gray . The life span of the Oak tree, if undisturbed is 500 to 600 years old. The Oak tree's leaves have 7 to 9 rounded points which resemble finger like lobes. In May and early June male flowers appear in slender catkins. Female flowers are not noticeable to the naked eye. The Oak tree's seeds are commonly known as

acorns, they are small oval shaped nuts with a cap and they are mostly eaten by squirrels ,chipmunks and deer.

The Oak tree grows in many different habitats. It can grow from seacoasts to high mountain slopes. It also can grow from wet lowlands to dry mesas. When the White oak is only a seedling it produces a taproot. The taproot plunges into the ground during a drought to bring the tree water. This taproot disappears with age and then a fibrous root system with tapered laterals grows.

The white Oak tree is valued for its timber products such as furniture, flooring and pallets, cabinet making, barrel making, interior finishes, and for heavy construction. The Oak tree also produces acorns which are a food source for wildlife.

The white Oak is the most common tree species of the Eastern United States and is definitely not endangered.

by Will J. R. 2001

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American Bald Eagle

Genus: Haliaeetus

Species: leucocephalus



The Bald Eagle is a large fierce looking bird. It's name in Latin means "the sea eagle with a white head". It is the national symbol of the United States of America. Benjamin Franklin had suggested that the national symbol be the Wild Turkey, because the Bald Eagle was "a bird of bad moral character", but he was outvoted. Today it is seen on many things in the United States, such as money, seals, and other patriotic symbols.

The Bald Eagle generally lives forty-five to fifty years in captivity and twenty-five years in the wild. It is one of the largest flying birds seen in the United States. It stands between 30.4 and 36.4 inches tall, or about as high as an average office desk. It has a five and a half to eight foot wing span. That's about as long as a big dining room table. The head of the bird is white, the body of the bird is black, and the tail is

white. The feet are a dull orange and its beak is yellow.

Like many raptors it has an unusual trait that is called "reversed sexual dimorphism". This means that the female Bald Eagle is generally bigger than the male. In most species, the male is larger than the female.

This raptor is covered in large coarse feathers. The name "Bald Eagle" doesn't mean the bird is really bald. From a distance, it

appears bald because of the contrast of the light and dark feathers. To the early settlers in the United States, the word bald meant white, not hairless. Because of its appearance, its name came to be the Bald Eagle. It doesn't get its amazing colors until four to five years of age. Before that, the immature Bald Eagle appears to have a brown head and tail with a yellow beak. The Bald Eagle has a body that is midway between sleek and bulky.

What is fascinating about the bald eagle to me is that the Bald Eagle's wing span can reach eight feet. I find this fascinating because that is taller than most people.

The Bald Eagle reaches maturity between four and six years of age. It chooses one mate for its whole life. The climate it lives in affects its reproduction. The Bald Eagle tends to breed during the winter in the south, and during the spring in the north. It raises its family in large nests that are usually built near water. It may nest by itself or in an area where many other Bald Eagles live also. This bird of prey usually nests in tall live pine trees that are higher than the things that surround them. Occasionally the Bald Eagle may build its nest on the ground if there is nothing nearby to endanger them. The female eagle usually builds most of the nests. They are obsessed with working on their nests. The nests are made of natural materials such as sticks, mud and pieces of grass and can weigh up to one ton. The nests are sometimes larger than six feet in width. There was one eagle nest found in Ohio that was 9 _ feet wide, 20 feet deep, and weighed more than two tons. Unfortunately, the nest was destroyed when the tree it was built in fell to the ground in 1925. Nests are often used year after year. Some nests are built so well that they last for ten to twenty years even though they are unprotected from the weather.

Bald Eagles breed between the months of April and August depending on their location, reproducing every year on average. They usually have a clutch of two eggs. These eggs are laid several days apart so that it is not so hard to feed the eaglets. The parents feed the first eaglet for a couple of days before the next eaglet hatches. Because of this time gap, the older eaglet is bigger and stronger than the next bird to hatch. If there happened to be a food shortage, and the parents did not have enough food for them both, the older eaglet would take all the food and eventually the younger one would die of starvation. This promises that there is at least one healthy eaglet in the nest. Both the male and the female share the responsibility of the incubation of their clutch. Both parents also share the responsibility of nourishing and raising their eaglets. After the baby eaglets hatch, one of their parents is always with them for the first two weeks. After hatching in the nest, the young live with their parents for nine to fourteen weeks. After that time the parents may help them for another four weeks. Bald Eagles will tend to stay in their nesting

area year round if there is food available and the weather permits. If this is not possible, they will migrate to an area with a more suitable climate.

The Bald Eagle has five noticeable characteristics that make it very good at the jobs it needs to do in order to survive; these are called special adaptations. The first adaptation of the Bald Eagle is that it can see four to eight times better and further than humans. The second special adaptation is a bony overhang above their eyes. This overhang protects the eyes from the sun and potential injury, and helps while flying and searching for food. It shades the bird's eyes from any glare and enables it to see into the water more easily while searching for fish. The third adaptations are the little bumps on the bottom of their feet called spicules. These protruding bumps, along with razor sharp talons, help the eagle hold fish during flight. The final obvious adaptation of the Bald Eagle is their very curved beak. This is used to help tear fish apart while eating.

The Bald Eagle is a raptor and that means it is a bird of prey. They like to sit on a high perch near water to make it easier to spot their prey. Their diet is made up of mainly fish, but also includes small sea birds, mammals, and reptiles (mostly turtles). When Bald Eagles catch a large animal, they rip pieces off of it and eat it bite by bite. When they catch a small animal they swallow it whole. After they swallow it they make themselves throw up all the bones, feathers, and hair that they cannot digest. Surprisingly enough, in cold winter months, dead animals become part of this predator's diet when there is not enough prey. They often steal food from other raptors, particularly Osprey, while in flight. They grab the prey right out of the other birds talons and fly away with it. Although a great predator from the air, this specific bird has been seen wading into streams in northern states and provinces, to reach a struggling fish when the rapids are running too fast for the bird to see in.

The Bald Eagle is an amazing predator. Because of this, it is an environment helper. It helps the environment by eating a variety fish and other animals. This is good for the environment because it eats from a variety of different animals. Like the Osprey, the Bald Eagle returns each year to its nest. It would be unable to do this if it were to over hunt the prey in its area.

For many years the Bald Eagle was close to extinction. This close call was caused by a chemical that has now been declared illegal by the U.S. government. This chemical is called DDT and got into the eagle's body when they ate contaminated fish. The chemical caused them and many other raptors to come close to extinction. It affected the eggs that they produced. They all had really thin shells that would break during the incubation period. Because of this, there would be few baby eaglets, causing a big decline in the

eagle population. There was also a bounty put out on eagles. People thought they were killing farm animals and reducing the amount of fish available for fishermen.

Other things that have endangered the eagles are a result of our everyday lives. As more stores, buildings, homes and malls are built, eagles and other animals are losing their homes. Trees they live in are cut down and food they eat is poisoned.

As more and more people are listening to conservationists, more of these beautiful animals are being saved from extinction. The Bald Eagle is not an endangered species now, but it is still threatened by poachers. Across the United States, laws have been enacted that make it illegal to kill a Bald Eagle. All of these efforts are helping the Bald Eagle become a more commonly seen sight in the United States, which is especially nice because it is our national symbol.

by Jeffrey S. 2001

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American Black Bear

Genus: Ursus

Species: americanus



The American Black Bear, like most bears, lack the distinctive shoulder hump that the Grizzly Bear has. This bear can run up to 25 miles per hour, which is very quick for its 220-594 pound body. Their feet relate to humans, because they touch the ground in a "heel, toe, heel, toe, etc." pattern. They have rounded ears, a short stubby tail, and short claws that are useful in climbing trees. The American Black Bear is usually black but can have phases of brown,

cinnamon, beige and even a bluish- white. The length of this bear's body is usually 5-6 feet from nose to tail and 32-38 inches from paw to the top of its shoulder. They live in most of North America.

The female black bear reaches sexual maturity 4-5 years after birth, while the male reaches maturity 5-6 years after birth, they usually have 2 or 3 young. Their mating season is in the summer and they will give birth to their young in January or February. The cubs are blind at birth and weigh 8_ ounces to 11_ ounces. The males do not help raise the cubs, but leave to mate again like most other bear species. The Mother bear can be quite territorial if it involves her cubs. For example, if any animal gets between she and her cubs, she will relentlessly attack it until it is dead. The average black bear lives up 25 years.

The black bear's coat is well adapted to the cold weather of winter because of its many layers of shaggy fur. Its claws are also very adapted to its environment, this is because they are just the right length to climb the many trees that surround its forest home. This bear also hibernates to avoid having to find food in the winter.

Like most animals the Black Bear looks for food with the highest nutritional value. They will eat virtually anything, but 75% of its diet is made up plants and other vegetation, while the other 25% is made up of, carcasses, honey, small mammals and insects.

The black bear, like all bears, is a predator, and an omnivore. The black bear helps the environment by killing off the elderly, and weaklings of over populated prey. The black bear is not endangered and is widely distributed throughout most of North America.

Max S. 2001

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Coyote

Genus: Canis

Species: latrans



Coyotes can weigh from 15 to 44 lbs. Their bodies are 30 to 40 inches long and their tail is 12 to 16 inches long. They are about 15 to 20 inches tall. Their fur is grayish tan. They have a long pointed nose and large ears.

Coyotes can live almost anywhere. They now live in most of North America and Central America, from Alaska to Nova Scotia and Panama. They even live in the suburbs of large cities. People have even blamed them for eating their pets. But the coyote's original habitat was the big open grassland.

Coyotes become mature in 1-2 years, and have about 2 to 12 puppies, but usually 6. Dad stays with his family and both parents take care of the puppies.

When there is lots of prey around, coyotes will hunt alone or in breeding pairs. They eat mainly small mammals, like rabbits and mice, reptiles, fruit, insects. When there is only large prey, like deer, coyotes will form packs of three to eight members. They will stay together only as long as they need each other.

Coyotes are very intelligent. They have a terrific sense of smell which they use to locate prey. Their hearing is very sharp too. They use their ears to tell other coyotes how they feel and what rank they are in the pack.

When coyotes move into a place, they easily upset the balance of that place. They can kill the population of small mammals in a few years. Without the rabbits and mice to eat them, plants will grow tall. Shrubs will crowd together and kill off the grasses. The

animals that were depending on the grasses can not live there anymore and will die or move away.

In some parts of Canada and the U.S. there are so many coyotes that they are controlled by an open hunting and trapping season. The same controls have wiped the coyote out in Texas and most of North Dakota. The coyote is protected in 12 states in the US.

Amanda K. 2000.



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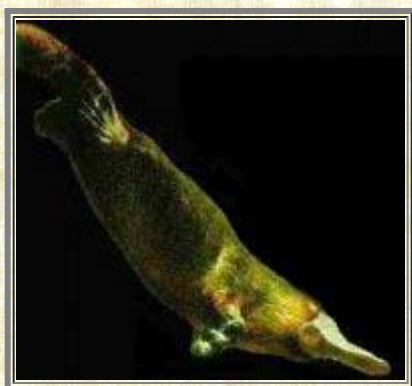
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Duckbill Platypus

Genus: Ornithorhynchus

Species: anatinus



The duckbill platypus lives in the deciduous forests of Australia. It is about half the size of a house cat. It has a thick covering of hair except for its bill and feet. Its back is a dark brown and has light yellow on its stomach. The tail has fatty tissue which is used to store energy. The body is streamlined and flat. It has short legs and webbed front feet. The back feet are partially webbed. Their feet have broad nails for digging. Males have hollow spurs on their ankles which carry venom. They use this venom as protection. It has a bill shaped like a duck's bill. This bill is sensitive to touch. It is flat, soft and

rubbery with many nerves. The bill has nostrils for breathing that can be closed when they go under water. When you look at a picture of a platypus, the eyes look about the size of a dime. The platypus does not have teeth, so it grinds its food with grinding pads in its mouth. The eyes are just behind their bill. The ear slits are behind the eyes. It can make sounds such as a growl, and a clucking noise. It weighs between 1 1/2 and 5 1/2 pounds. It is from 26 inches to 39 inches long. It can walk or swim.

The platypus is a monotreme and is one of three mammals that lay eggs. It reaches sexual maturity at two years. They mate between August and October. The female lays eggs 2 weeks after mating. The eggs are incubated for 10-14 days. There are usually two babies in each clutch. The female nurses her young until it can get food for itself. It leaves its mother's burrow at 17 weeks of life. The babies live with their mother while they are being raised. The father does not help raise the young platypus. Adults live by themselves and each one has its own territory. If the territory gets too crowded, the juvenile finds a new territory and settles in.

The platypus can live up to 15 years.

The platypus uses many things to survive in its environment such as webbed feet and a flat tail used to swim. Thick fur keeps them dry and warm. Their tails store fat for energy, and broad nails help them for digging and walking. Their bill has electroreceptors which are used to find its prey. Venom can be injected into a predator and is strong enough to cause a lot of pain in a human, and could kill a dog. Scientists think it is used for fighting other males for females.

The platypus eats early in the morning and in the evening. As a carnivore, it eats frog, shrimp, larvae, fish and tadpoles. It dives to the bottom of the river and wiggles its bill in the sand and mud in the bottom. It doesn't use its eyes or ears. There are pits in its bill that detect electrical discharges from its prey and that is how it finds its food. It stores its food in cheek pouches behind its bill until it comes to the surface and then the food is moved forward into its bill. It grinds its food with the pads on the bottom and the top of its bill because it doesn't have teeth.

The platypus lives along streams and river beds. It burrows one entrance underwater and another one above water so that it has two entrances to its burrow. It burrows into riverbanks in the soft mud. It uses its front feet like shovels to dig the burrow.

It was hunted for its fur and persecuted by fishermen. In the past it came close to extinction. Now it has protection by law in the National Parks and Wildlife Act of 1974 (from hunters and fishermen), and the population has grown back to a healthy size. But they aren't safe yet. Today people are destroying their habitats and hopefully something will be done about this problem.

Sam H. 2001

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Eastern Chipmunk

Genus: Tamias

Species: striatus



The Eastern chipmunk is a very cute little animal. It is a ground-dwelling squirrel about 5-6 inches long and weighing about 3 ounces. It is a brownish-red color. Its head has two white stripes above and below the eye. Its ears are short and rounded and stick straight up on its head. Five black stripes with white lines go down their backs. Its belly and sides are white and its tail is black above and rusty underneath. When it runs it sticks its tail straight up. It makes a sharp chattering or chucking noise when upset.

Chipmunks live in forests and edges of forests and are also found around suburban and rural areas. It has a home range of up to 1/2 acre, but will only defend an area about 50 feet around their dens. They like to rest during the day and are only active in the morning and late afternoon. They like to make their burrows in stone walls and rotting logs. The entrances to their burrows are well concealed. A burrow will have a main nesting chamber lined with leaves. Off of this chamber are several other chambers for storing food. They don't like open areas and will stay under the cover of plants whenever possible.

Although people think chipmunks hibernate, they don't go into deep hibernation. They actually move around during warmer weather. They live on the food they have brought into their burrows. Most chipmunks come out of their hibernation in March.

Eastern chipmunks will mate twice a year, in the spring and fall. Usually 2 to 5 babies are born. Babies don't open their eyes until they are 30 days old. When they are 2 months old, their mother weans them and they are on their own. A chipmunk can live to be 3 years old.

Chipmunks eat mostly what you would expect a squirrel to eat; grains,

nuts, berries, seeds, and mushrooms. They also eat bugs and salamanders. They also will raid bird nests, and eat the eggs and baby birds, if they are small enough. They have a special cheek pouch in which they carry their food. Chipmunks are valuable forest creatures because they move seeds around and store them underground. Some of these seeds sprout and become new trees. They are also important as a food source for other mammals, like foxes, coyotes, crows and birds of prey like owls. The chipmunk population rises and falls with the availability of their food sources. When seeds are plentiful, the chipmunk population goes up. This means more food for foxes and other predators, so their populations go up also.

Some people think of chipmunks as pests. They eat flower bulbs, fruit and seeds. When there are a lot of them they can cause damage to stone walls, patios, stairs and foundations by burrowing under them.

The Eastern chipmunks are native to North America and can be found in the deciduous forests of southeastern Canada and the eastern United States. They are not an endangered species and can adapt to deep forest or suburban living.

2001

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European Red Squirrel

Genus: Sciurus

Species: vulgaris



The European red squirrel lives in the European Deciduous Forest. The red squirrel prefers to live in the forest but in some places they live in gardens and parks. The

European Deciduous Forest has 4 seasons. It is cold in the winter and very warm in the summer. It spreads from northern Portugal to southern Norway. Eastern Europe is dry. There are not many species of trees in Europe. It rains 30-50 in. a year. The latitudes are 40°

to 60° North, and longitudes 5° to 40° East.

The red squirrel, like all squirrels is a rodent. They have strong teeth made to open pinecones and seeds. They have four toes on each foot with long, sharp claws to help it grab bark when climbing trees. They can support their entire weight when climbing. The red squirrel has a long bushy tail used to balance its weight while climbing a tree. The squirrel is about 36.5 cm. (13-18 in.) long, including their tail. They have ginger, red, brown fur over much of their bodies. Most have white fur on their chests. Adult squirrels weigh up to 350 g. (8-16oz.) They have larger ear tufts in the winter which disappear in the summer. To help the red squirrel keep safe in its environment, it climbs quickly. To show the squirrel is mad, it will wave its tail back and forth like a flag.

The European red squirrel reaches maturity at around 9-10 months old. They have 2 litters; one in February and the other in June. Each litter contains around 3 or 4 babies. Baby squirrels weigh 8-12 g. (0.5 oz.) and are blind, deaf and naked at birth. At

4 weeks their eyes and ears open. Squirrels are finally independent by 8 weeks but stay near their mother for a while. They learn what foods they can eat from their mothers. When they get older they don't like to try out new foods. The male doesn't help take care of the babies. The red squirrel lives around 4-6 years. They don't hibernate but will stay in their nests, called dreys, for several days when it gets cold. Red Squirrels are not territorial and their homeranges overlap each other.

The red squirrel mostly feeds on seeds. They consume acorns, hazelnuts, chestnuts and beech flowers. They also eat fungi, berries and caterpillars. In the autumn, squirrels bury seeds and nuts. In the winter if these supplies run out, the squirrel may die.

The European red squirrel's predators are birds of prey, Eurasian wild cats and pine martens. To keep safe, the squirrel climbs to the end of a branch. Since the branch can't hold much weight, the predator leaves. The European red squirrel is mostly a herbivore, but will eat bird eggs and sometimes nestlings. It is important to the environment because it disperses seeds. When it shares its niche with the larger gray squirrel it is usually pushed out.

Although they are common in Central Europe, the European red squirrel has become extinct throughout most of England and Wales and is protected by laws there. They are endangered because they can't compete with the more adaptable gray squirrel which was brought over from North America. In Finland and Russia, red squirrel are trapped for their fur. They are also endangered because their habitats are being destroyed. The only way to keep the red squirrel population up is to lower the gray squirrel's population.

By Olivia L. 2002

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Fat Dormouse

Common Names: Edible Dormouse, Squirrel-tailed Dormous

Genus: Myoxus

Species: glis



There are 21 different species of dormice. The fat dormouse is the largest dormouse in Europe. They can be found in Africa, Europe, Asia, and Japan. These rodents look like short, fat squirrels with bushy tails. The European and Asian dormice are the largest in the dormice family.

The fat dormouse is at home in European deciduous or mixed forests. In this habitat it can find the food it needs and shelter. It can adapt and thrive in many types of woodland but does not do well in evergreen forests. The dormouse finds shelter in hollow trees, rock crevices or even woodpecker holes. In the

deciduous forests the temperatures in the summer months are an average of 70° F. In the winter months the temperature is a little below freezing.

The dormouse is often mistaken for a gray squirrel. Its thick fur is soft and short with a silvery grey color on the upper part and creamy white on the under parts. The dormouse has small, round eyes surrounded with dark circles. It is about 5-8 inches in length and the bushy tail is about 4-6 inches long. The dormouse can weigh from 2.5-6 oz. They have large, round ears and short legs. The muzzle of the dormouse has bristly hairs that extend up to 2.5 inches long.

The large bushy tail helps the dormouse keep its balance while climbing on tree branches. The large ears are used to locate sound and provide excellent hearing. The whiskers help the dormouse find its way around in the night . The dormouse is

nocturnal.

The fat dormouse has a life span of five years. Several dormice may share the same home to stay warm. The dormouse mates in June, after waking from hibernation. The dormouse will usually produce one litter per year. A litter can have from 2-10 babies in it. The newborns are approximately 2 inches long at birth. The babies must stay in the nest for several weeks. While staying in the nest with the mother the newborns will open their eyes after 21 days, and grow fur. They are weaned at 5-6 weeks but stay with their mother until their first hibernation. The father does not help in raising the young.

The fat dormouse got its name by eating a lot before going into hibernation. The dormouse is an omnivore, and feeds on apples, pears, plums, grapes, seeds, berries, nuts, insects, and sometimes birds eggs. As autumn approaches the dormouse eats more to have fat and energy for hibernation. By the end of summer, their weight is nearly doubled. At this time the fat dormice will dig a tunnel about 2-3 feet long and 6-24 inches deep. Here they spend the winter safe from frost. Some dormice have been found hibernating in hay lofts or under logs. It is also known as the edible dormouse because the Romans considered it a delicacy. In some parts of Europe it is still eaten as a special dish.

The dormouse has several predators. Their main predators are snakes, hawks, owls, and humans. Humans are cutting down the natural forest which is its habitat. If the dormouse had no forest to live in, it would probably make a home in an old barn house, or a garage, etc. If that happened the dormouse would become a pest to humans and might become extinct.

The fat dormouse is currently on the IUNC near-endangered list. Humans are starting to make an effort to save them. In Europe, many volunteers are building nest boxes to induce the mating process. The volunteers are also monitoring the dormice to keep track of their growing population.

by Ryann E. 2002

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Least Weasel

Genus: *Mustela*

Species: *nivalis*



Deep in the woods of the Northeast Asian deciduous forest roams the least weasel. Its long slender body and sharp nails help this mammal hunt day and night. The least weasel is the smallest carnivore in the world. The least weasel's habitat consists of living in stone walls, hedges, farmland, and the woods. Least weasels avoid deep forests, sandy deserts, and open spaces. Male and female least weasels both have their own territory. Females

may overlap with another female, but a male's territory is all his, he may even fight for it. The male's territory may consist of 40 acres.

The least weasel is mostly found in the Northeast Asian deciduous forest, which covers Korea, Eastern Asia, Japan, China, and Russia. Least weasels can range in this area from 30 degrees to 47 degrees North latitude and 110 degrees east Fahrenheit to 145 degrees east Fahrenheit in longitude. The Northeast Asian deciduous forest has warm summers and cold winters. It is home to many mammals and birds but is currently threatened because of loggers chopping down trees.

The least weasel's coat is a dirty brown and dirty white color most of the year, but in the winter the fur turns to pure brown and pure white to blend in with the snow. The coat does not grow longer than 0.6 inches. It has a slender body, which are 4 to 10 inches long. A male's weight ranges from 1.5 to 8.75 pounds. A female's weight ranges from 0.8 to 4.3 pounds. The least weasel's head is long and an oval shape, like a ferret. Their eyes are usually black and their ears are short and stubby even though they have very good hearing. Least weasels have very good sense of smell with their long nose. Their paws have 5 toes with sharp claws used as weapons in hunting.

The least weasel becomes sexually mature at 3-4 months. Their mating seasons are spring and summer with a gestation period lasting from 35-37 days. The least weasel has 3-10 babies, weighing 0.04 to 0.06 ounces, and are wrinkled, pink and naked. They have no abilities. The mother raises the young by herself while the father leaves right after mating. The baby least weasels are weaned at four to five weeks and the mother hunts for them until they are 4 weeks old. At that time the training of adulthood begins. The least weasels are fully independent at 12 weeks old, at which time they leave their family. The least weasel's interval is its den and it is mostly solitary. These mammals live up to 2 years in the wild and up to 10 years in captivity. Least weasels are active day and night.

The least weasel's diet consists of mice, rats, moles, small birds, bird's eggs, rabbits, and poultry. The least weasel's claws and sharp teeth help this animal to catch their prey. The least weasel is the smallest carnivore in the world. It can kill prey up to 5 times its own size. The least weasel's predators are large hawks and owls. This animal benefits our environment because it kills rodents to keep the population low. One way a least weasel helps itself survive in its environment is its coat and how it changes to blend in with the snow. The least weasel is not endangered but more of them are dying because the loggers are pushing them out of their home. This animal has basically no predators but because of its short life span its not overpopulated.

Most interesting about the least weasel is that it is the smallest carnivore. It is amazing that something so small can kill something so much bigger than it can. Its habitat and biome, the Northeast Asian deciduous forest, is endangered. The least weasels are fleeing from their homes and drowning in oceans trying to get away from the loggers. If we try to preserve the Northeast Asian deciduous forest we can help the least weasel from being extinct.

by Phoebe H. 2003

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Photo credit: Rollin Verlinde

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White-tailed Deer

Common Names: Virginia white-tailed deer, Key deer, jumping deer

Genus: Odocoileus

Species: virginianus



The fur of the white-tailed deer is a grayish color in the winter then more red comes out during the summer. It has a band of white fur behind its nose, in circles around the eyes, and inside the ears. More white fur goes down the throat, on the upper insides of the legs and under the tail.

Only the males have antlers, which they shed in January to March, and grow out again in April or May. The white-tailed deer can be 3 to 3 1/2 feet at the shoulders. Males can weigh up to 400 pounds, and females from 70 to 200 pounds.

It is mostly active at night but they can be active at any time. They will feed mostly just

before dawn for several hours and again from late afternoon until dusk. They graze on green plants in the summer and nuts and acorns during the winter. They will also eat twigs and the buds of birch, maple and conifer trees in the winter.

After mating, which lasts from October to December, the doe will give birth about 7 months later to one or two fawns. The fawns are spotted with white, which they lose by their first winter. Fawns can walk at birth and nibble on grasses a few days later. They are usually weaned by six weeks. White-tailed deer live to be about 10 years, but some have lived as long as 20 years in captivity.

The white-tailed deer is usually a solitary animal, but females and fawns will band together at times. During mating season a buck may join these groups and try to keep other bucks away. During the winter white-tailed deer will form herds to keep warm.

The white-tailed deer has protective coloring, or camouflage, that allows it to hide in the undergrowth. If you were walking by and it was standing nearby, you probably would have to look hard to see it . When they are disturbed they make a snorting sound and stamp their hooves to alert other deer to danger. When they run away they will raise their tail, which will stick up like a white flag. This alerts other deer to danger and gives the fawns something to follow. They have very good eyesight and hearing, but depend mainly on their sense of smell to detect danger.

The white-tailed deer lives in farmlands, brushy and forested areas in most of southern Canada and except for two or three states in the west, all of the mainland United States. They also range throughout Central America to Bolivia.

The white-tailed deer was once nearly wiped out in much of the northeast and midwest of the United States, but because of hunting restrictions and fewer predators, there are now more than ever.

2000



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photo credit: Harold Wilions,
<http://home.earthlink.net/~h111/index.html>

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Japanese Macaque

Common Names: Snow Monkey, Nihon zaru

Genus: Macaca

Species: fuscata



Many of us are familiar with images of monkeys soaking up the watery warmth of a hot spring in the midst of a bone chilling, wintery landscape. These are the Snow Monkeys, or Japanese macaques of Japan, living at latitudes of 41° to 31° north of the equator, the only monkeys to live that far north in the world.

The Japanese macaque lives throughout Japan, with a range covering subtropical lowlands to sub alpine regions. The great differences in habitats have made it necessary for the macaques to adapt to large seasonal changes. In the central and northern areas of Japan the temperatures can range from 5° F (-15° C) and snow more than 1 meter deep in the winter, to 73.4° F (23° C) in the summer.

Although they can be found in forested hills, highlands and mountains, there are four different areas in Japan that the Japanese macaques are located. Their northern limit is on the Shimokita Peninsula in the northwest part of Honshu Island. Conifers and deciduous trees are the dominant vegetation here. In the central region of Japan the monkeys can be found in the Nagano Mountains near a number of natural hot springs heated by the Shiga Kogen volcano. The third area is on the seaside of the island of Oshima, just off the Hanto Peninsula. In these northern areas they experience both winter and summer seasons and the macaques will travel to different home regions in the different seasons. The southern most limit of their habitat is on the southern island of Yaku-Shima. Subtropical and temperate plants and broad-leaved evergreen forest can be found here. More macaques are found here than anywhere else in Japan.

The Japanese macaque has a very human-like, naked, red face, and expressive eyes. It is a medium sized, stocky monkey, about 2 to 4 feet long, and weighs from 22 to 66 pounds. It has a relatively short tail, less than a quarter of the head and body length. The males are on the average much larger than the females, which is something called "sexual dimorphism". It has a thick, furry coat ranging from gray to brown or mottled in color. In the winter the northern tribes of macaques will grow a heavy insulating coat to maintain their body temperature. During the summer they will have a lighter coat. Like most monkeys, the Japanese macaques have a fully opposable thumb. They use all four legs to get around, but



will also walk just on their hind legs when they're holding something with both hands. It has large cheek pouches for storing food in when it forages.

A troop of macaques consists of about 20 to 30 individuals, and is usually led by a dominant male who decides where the group goes and defends it against intruders. Two or three male sub-leaders help him out by keeping order in the group. Troops will have several males and females in it. Rank among males in the troop is very stable and has to do with the age of the males. High-ranking males tend to be more sociable than lower ranking males, who live on the outskirts of the troop. Males will leave the troop they were born into when they reach sexual maturity, and travel between different troops throughout their lives. The troop will spend its days foraging for food and sunning themselves. Young macaques spend a lot of time playing. In the winter they will sleep in deciduous trees to prevent accumulated snow from falling on top of them.

There is a strong social bond between the members of a troop, especially among the females. Females remain in the same troop, usually their entire life. There is a strict dominance hierarchy in both males and females. The offspring of high-ranking females will often inherit their mother's rank as they get older, with daughters gaining the same rank as their mothers. Interestingly, an alpha male will sometimes gain his rank because his mother was a high-ranking female. Younger offspring are ranked higher than older siblings, so it doesn't pay to be the first-born of a high-ranking mother. Macaques are very sociable, and will groom each other and share the job of raising their young.

Females become sexually mature at around 3.5 years, and males at 4.5 years of age. Both males and females have many partners in a breeding season, but interestingly enough, it's the female who picks who she wants to mate with. She tends to make her selection according to the rank of the male and how long he has been in the troop. She avoids choosing males whom she has mated with in the past 4-5 years, thereby avoiding inbreeding.

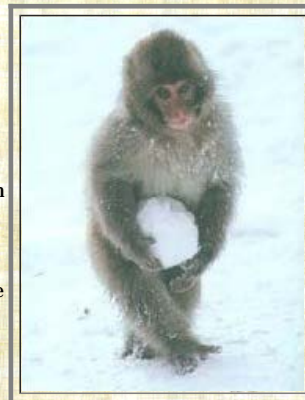


Macaques throughout Japan have a peak birth period from April through July, and May through September. A female is pregnant for about 5 to 6 months. She will spend less time grooming, moving and foraging, and more time resting on the day of the birth. She will have one baby at a time, forming a strong mother-infant bond that lasts for a lifetime. The infant depends on its mother for a very long time, not being weaned until well into its second year, which is very stressful for the mother. Older siblings will still be dependent on their mother while she nurses the infant, learning what to eat, where to sleep and how to raise infants from her.

An infant will begin to toddle at about 20 days, and start climbing at about one month. At this time it will also begin to ride on its mother's back instead of clinging to its mother's abdomen. It's rather difficult in the beginning but the infant soon is able to balance on its mother's back with her help.

The Japanese macaque are omnivorous, but primarily frugivorous. Their diet consists mainly of fruits, seeds, young leaves and flowers, insects, and tree bark. The variety in their diet is mostly due to the seasonal changes and their large habitat range. In the spring and summer, young leaves, flowers and shoots are eaten. In the fall they eat mostly fruit. Their winter diet consists mainly of buds and bark. They will also eat crabs, and bird eggs. Most of their foraging is done on the ground.

Scientists have begun to rethink their ideas on culture within monkey society in a large part because of the Japanese macaques. It has been observed that the macaques invent new behaviors and pass them on by imitation. In 1963 a young female named Mukubili waded into a hot spring in the Nagano Mountains to retrieve some soybeans that had been thrown in by the keepers. She liked the warmth and soon other young monkeys joined her. At first the behavior caught on only with the young macaques and their mothers. Over the years the rest of the troop took up the behavior, which now finds shelter in the 109° F (43° C) hot springs to escape the winter cold. Young monkeys have also learned how to roll snowballs, which doesn't have any survival purpose, but with which they have a lot of fun, much like human children.



Potato washing by a troop in Koshima was first started by a one and a half year old female named Imo. Researchers would put sweet potatoes along the beach to bring the monkeys out in the open. Imo found that she could get the sand off the potato better by dipping it into the river water, rather than brushing it off with her hands, like the other monkeys were doing. Her brothers and sisters imitated her first and then their mother. Over time the entire troop took to washing sand off potatoes with river water. At first they simply washed the sand off, but Imo soon found that the potatoes tasted better if seasoned with salt water from the ocean. They began to bite into the potato then dip it into the sea water to season it and bite again. Imo was a bit of a genius for a monkey because she also discovered wheat washing. She would make a ball of wheat and sand and throw it into the water. The wheat would float up to the top where she could pick it up and eat it without the sand.

The Japanese macaque is listed as threatened by the U.S. ESA. The subspecies *Macaca fuscata yakui* from the island of Yaku-Shima, is listed as endangered by the IUCN. In 1990 there were estimated to be around 35,000 to 50,000 Japanese macaques, with the numbers declining.

The main cause for the decline of the Japanese macaque population is the destruction of their habitat. This forces the adaptable monkey to find its food outside of its habitat where it can. An estimated 5,000 macaques are killed each year, despite being a protected species, because they raid nearby farms for food and thereby destroy the farmer's crops. Troops of macaques have invaded villages and terrorized its inhabitants by chasing after them and snatching food from children's hands. It was decided to build the Nagano macaques their own hot springs when they began to invade nearby hot tubs and human spas. Creating feeding stations in an efforts to save the macaques and prevent them from raiding nearby farms, has backfired to a certain extent, as the macaque populations in those areas have artificially soared.

The Japanese macaque, or *Nihon zaru* (Japanese monkey) have a long history in Japanese arts and history. The Japanese are very fond of their monkeys and do everything within their power to keep them wild and save them from extinction.





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Northeast Asian Deciduous Forest Climate **[Moist Continental Climate](#) (Cf)**

The Northeast Asian Deciduous Forest lies in the East Asian belt at a latitude range of 33 06° to 43 00° North and a longitude range of 130° to 145° East. Korea's peninsula is included in this biome. This biome has four distinct seasons with a wide range of temperatures. The precipitation is spread out evenly throughout the year. The animals and plants have to make many adaptations to live in this area.

The average yearly temperature is 50 degrees Fahrenheit and the average annual rainfall is 30 to 60 inches. The climate is divided into four different seasons with winter being very cold and summer being warm and humid.

Korea has four seasons: summer, autumn, winter, and spring. Summer is hot and humid from mid June to mid-September. The people of Korea call early summer "changema" which means the rainy season and they call late summer "hanyorum", which is hot and humid. Autumn is dry, sunny, and is the shortest season. It begins in mid-September and ends in mid November, with the average temperature of 70 degrees F. In the month of November there is an important holiday called the "celebration of chusok" where Koreans celebrate the clear weather. Winter is cold and dry and goes from mid November to March. The Siberian air mass causes the winters to be very cold, and January is the coldest month. Spring is short, mild, sunny, dry and warm and goes from April to June. In early Spring yellow dust blown in from the Mongolian desert known as Hwangsa moves into the country.

North Korea: The climate is both continental and monsoonal. Continental relates to the interior of the country and monsoonal means that most of the forest is hot and humid in the summer and cold and dry in the winter. The average precipitation only 20 inches each year. The growing season in this part of Korea is approximately 175 days long each year .

The average temperature throughout the year ranges from 43° F to 61° F. The coldest season is winter with an average temperature of 21° F to -8° F in the south. The hottest month is summer with an average temperature of 68° F in the north. Autumn's average temperature is 55° F to 65° F in the south. Springs average temperature is 55° F in the southwestern plain. The highest temperature is 79° C and the lowest temperature is 41° F. The average precipitation is 48 inches. Autumn has very little precipitation and that is the same with winter and spring. Summer is different and many typhoons occur. Typhoons are funnel shaped tubes that occur when heavy winds pick up.

Autumn has very little rain and snow with an average precipitation of 228.4 in. Summer has heavy rainfall and many typhoons and monsoons occur and has an average precipitation of 443.1 in. Winter has occasional snowfall and an average precipitation of 506.9 mm and spring has very little precipitation with an average precipitation of 339.8 in.

The seasons are all very distinct and the climate is similar to the one that we have here. The animals have also adapted the same way that the animals do here. These ways are by migrating when it gets cold and coming back in the summer when it gets warm. The Northeast Asian Deciduous forest in many ways have the same similarities that the Island that I live on has.

South Korea: The average yearly precipitation is 30 to 50 inches . Most of this happens during the summer months. Many monsoons affect the climate and bring in hot and humid weather. Both the south and the north receive monsoons at the same time of the year from June to September.

Many different plants grow in this climate. Three main layers of growth are found here. The first is the forest floor which has moss, ferns and lichen. The second is the shrub layer, which has plants like rhododendrons and huckleberries, and third is the tree stratum, which has trees like maples, oaks and sometimes conifers.

The Northeast Asian Deciduous Forest is broken down into three types of forest zones including the warm forest, the temperate forest, and the cold forest. In the warm forests there are the evergreen and the deciduous forest zones, which include the Japanese coral tree, oak, and chestnut tree. The next zone is the broadleaf deciduous tree zone. The species found here are oaks, loose flower hornbeam, and Korean Ash. The evergreen coniferous tree zone is in the cold forest zone. Many species grow here including the Korean pine, the Japanese stone pine, and the Japanese yew.

The animals in the forest have adapted in different ways to survive. Migration is one adaptation that birds have made to fly to places that are warm and also have good food sources in the winter. Some animals hibernate to survive the cold winter months. They make homes in a hole in the ground or in another place were they can survive during the winter. Food storage is an adaptation that squirrels, chipmunks, and some jays use to have food throughout the winter. After it is gathered food is stored in holes in trees. The cold temperature prevents the decomposition of the nuts and seeds that the animals store, making them last.

Vegetation has also adapted in this climate. In the summer the trees grow and make seeds when they have a lot of energy they can use. As the tree runs out of energy the leaves fall off. When the snow comes in the winter the branches are not damaged because they are bare and the snow doesn't weigh them down. Trees have also adapted by growing thick bark barriers that makes it hard for animals to use them as homes so no damage is done to them and they do not die.

Köppen's letter code describing the climate is **Dfa**. The **D** stands for the major biome type - Moderate Continental. The **f** stands for the minor biome type - woodland. The **a** represents the average temperature of the biome.

by Matthew F. 2003

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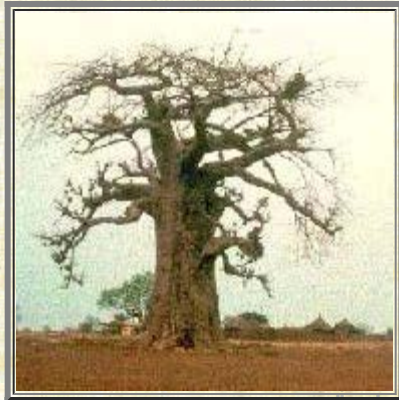
Baobab

Common Name: Baobab

Genus: Adansonia

Species: digitata

Parts Used: all parts of the tree are used



The baobab is found in the savannas of African and India, mostly around the equator. It can grow up to 25 meters tall and can live for several thousand years. The baobab is leafless for nine months of the year. If I were to describe the baobab, I would say that it looks like it has been picked out of the ground and stuffed back in upside-down. The trunk would be the tap-root, and the branches the finer capillary roots.

The Arabian legend of the baobab is that "the devil plucked up the baobab, thrust its branches into the earth and left its

roots in the air". Another legend describes what happens if you are never satisfied with what you already have;

"The baobab was among the first trees to appear on the land. Next came the slender, graceful palm tree. When the baobab saw the palm tree, it cried out that it wanted to be taller. Then the beautiful flame tree appeared with its red flower and the baobab was envious for flower blossoms. When the baobab saw the magnificent fig tree, it prayed for fruit as well. The gods became angry with the tree and pulled it up by its roots, then replanted it upside down to keep it quiet."

The baobab looks like this for a reason. In the wet months water is stored in its thick, corky, fire-resistant trunk for the nine dry months ahead.

The baobab's bark, leaves, fruit, and trunk are all used. The bark of the baobab is used for cloth and rope, the leaves for condiments and medicines, while the fruit, called "monkey bread", is eaten. Sometimes people live inside of the huge trunks, and bush-babies live in the crown.

Nirvana H. 2000

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Bermuda Grass

Common Names: Bahama Grass, Devil's Grass, Couch Grass, Wire Grass, Indian Doab

Genus: Cynodon

Species: dactylon

Parts Used: the stems and the leaves



Bermuda grass originally came from the savannas of Africa and is the common name for all the East African species of Cynodon. It grows in open areas where there are frequent disturbances such as grazing, flooding, and fire.

Although most of these species have remained in Africa, today Cynodon dactylon is found in warm climates all over the world between 45° south and 45° north latitude. It can be found growing in pastures and the understories of open woodlands and orchards. It is called bermuda grass in the United States because it was introduced from the Bermuda Island.

Bermuda grass is a creeping grass, and will creep along the ground and root

where ever a node touches the ground, forming a dense mat. It also reproduces from roots under the ground. It has a deep root system, and in drought situations the root system can grow 47 to 59 inches (120-150 cm) deep. Most of the root mass lies 24 inches (60 cm) under the surface.

Its blades are a gray-green color and are short, usually 1 to 4 inches (3-10 cm) long with rough edges. The erect stems can grow 0.3 to 1.3 feet (0.1-0.4 m) tall. The stems are slightly flattened, and an inflorescent purple in color.

Bermuda grass reproduces through seeds and through runners and rhizomes. The seedheads are on 1-3 inch (3-7 cm) spikes and are themselves about 2 inches long. Bermuda grass will put out seeds about 3 months after planting. The seeds germinate at temperatures above 68° F (20° C), and begin to grow within 2 weeks. One plant can cover an area of 3 square yards (2.5 sqm.) in just 150 days after germinating.

Bermuda grass can grow in poor soil. During droughts the upper parts die off, but the grass will keep growing from its rhizomes. It prefers moist and warm climates, and where there is more than 16 inches (410 mm) of rainfall a year.

Bermuda grass is an early successional grass, and is first to grow back after grass fires, which burn quite often on the African savanna.

To the Hindu in India, bermuda grass was a sacred grass because it fed their sacred cows. In ancient Roman days they squeezed the juice from the stems and used it as a diuretic and an astringent to stop bleeding.

Bermuda grass is considered a very invasive and competitive weed. Few herbicides are effective against it. Before mechanized farm machinery, bermuda grass was the farmer's worst weed. However, back then it saved thousands of acres of farm soil from erosion. It was the most widely grown pasture and turf grass in the South. Bermuda grass is highly nutritional for cattle and can be fed to sheep.

2002

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Candelabra Tree

Genus: Euphorbia

Species: ingens



Candelabra trees are found near the equator and in the East Indies and Africa. They live in the savanna biome. The candelabra tree can grow up to 30 to 40 feet (10 m) tall. The branches all grow from one trunk, and look like little cactuses that grow near the top, giving it the shape of a candelabra. It has little yellow flowers in mid-winter.

The candelabra tree is beautiful, but poisonous. If a drop of the white sap from the inner tree comes in contact with the skin a blister will form.

It will blind you if it touches the eyes and even breathing the fumes burns. This sticky poisonous latex along with its sharp spines makes it so animals don't feed on it.

The candelabra tree is sometimes used as a living fence probably because it has sharp spines on its branches, and touching it burns.

by Nirvana H. 2000

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Elephant Grass

Common Name: Napier grass, Uganda grass

Genus: Pennistum

Species: purpureum

Parts Used: leaves for animal fodder



Elephant grass is a tall grass that originally came from Africa in 1913. It grows in dense clumps of up to 10 feet tall. In the savannas of Africa it grows along lake beds and rivers where the soil is rich. Local farmers cut the grass for their animals, carrying it home in huge piles on their backs or on carts.

Yellowish or purple in color, the stems are coarse and hairy, and about 1 inch thick near the base. The leaves are 2 to 3 feet long, pointed at the ends, and about 1 inch wide. The edges of the leaves are razor-sharp. This makes stands of elephant grass nearly impenetrable. Many bird species make their home in the stands.

The dense seed heads of elephant grass are about 9 inch tufted plumes, usually a tawny or purple color. Elephant grass does reproduce sexually, but the seeds are very small and don't germinate well. The grass reproduces mainly through its rhizomes (root-like underground stems that produce roots below and sends up shoots to the surface).

Elephant grass can be very invasive and clogs the natural waterways of Florida which have to be cleared periodically. It likes tropical weather and can be killed by a light frost. The underground parts will stay alive if the soil doesn't freeze.

2000

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Gum Tree Eucalyptus

Common Name: Gum Tree, Silver Dollar Gum; Argyle Apple; Corkscrew Eucalyptus

Genus: Eucalyptus

Species: cinerea

Parts Used: leaves and essence



The Eucalyptus cinerea grows to an average of 20 to 30 feet tall. Young leaves are round, grey-green, and about 1 inch in diameter and grow opposite each other on the stem. They become longer, more oval shaped with pointed ends as they get older. The flowers are a creamy white and grow in 1 inch clusters. The bark is reddish-brown and fibrous. The Eucalyptus must grow in sunny, dry climates because it does not tolerate cold weather. Eucalyptus trees are found commonly in the plains and savannas of Australia.

The Eucalyptus tree serves as primary food to the koala bear. Bees are attracted to the flowers of the Eucalyptus, and the honey from these bees is highly prized in Australia. Because of its aromatic and long lasting quality, the young leaves are a "best seller" in flower stores.

Doctors and herbalists around the world use Eucalyptus in medicines to treat many sicknesses such as: infections, colds, flu, sore throats, bronchitis, pneumonia, aching, stiffness, neuralgia and even some skin infections.

Eucalyptus trees are native to Australia, but they are also found in the western United States, especially in Arizona, California, and Nevada. They can be planted anywhere where there is a hot, dry climate.

Lucy M. 2000.

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Jackal Berry Tree

Common Names: Jackalberry Tree, Jakkalbessie, African Ebony

Genus: Diospyros

Species: mespiliformis

Parts used: bark, leaves, twigs, and roots



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The Jackalberry tree is found throughout Africa, from Senegal and the Sudan to Namibia and the northern Transvaal. It is most commonly found on savannas or savanna woodlands where it can be found growing on termite mounds. In heavy soils the termite mounds provide the tree with aerated soil, and a source of moisture. The roots provide protection for the termites, who don't eat the living wood. Jackalberry wood is almost termite-resistant after it has been cut down.

The tree prefers moist soil, rocky soils. It grows well in red loams,

volcanic and loamy sands. Jackalberry trees are also commonly found along river beds and swampy areas.

The Jackalberry tree can grow very tall, up to 80 feet, with a trunk circumference of 16 feet. Most trees don't grow that tall, however, and heights of 15 to 18 feet are more usual. The trunks grow straight and high, with the first spreading branches growing far above the ground. The mature trunks from older and heavier trees have fluted, flattened ridges along the trunk which buttress and strengthen them. The bark is dark brown when young, turning dark gray as it matures with a rough texture, forming deep horizontal grooves.

They have a dense, dark green and spreading crown. The single

leaves are elliptical in shape, up to 5.5 inches long and 3 inches wide with smooth or slightly wavy edges. Older leaves have a glossy, leathery look, darker green above and a lighter green below. Young leaves and twigs are covered with downy hairs. While they are young the trees don't lose their leaves, but as the tree gets older it will shed its leaves in early spring. New leaves will grow from June to October and be pinkish, orange or reddish in color.

Jackalberry flowers are small and inconspicuous. The fragrant, white to pale cream hairy flowers are separate genders, growing on different trees. The females grow singly on a hairy stalk while the males grow in clusters. The fruit only grows on female trees. The tree flowers during the rainy season, and fruits in the dry season.

The fruit of the Jackalberry tree is a favorite of many animals. The fleshy fruit is oval, almost round in shape and about 1 inch in diameter and yellow or yellow-green in color. Five sepals of the calyx of the flower remain on the bottom of the fruit, their tips curling backwards. Two to six wrinkled seeds can be found inside the fruit. The skin is tough but the edible fruit has a chalky, floury consistency with a lemon-sweet flavor. They can be eaten fresh or preserved. They are also dried and ground into flour. A beer and brandy is also brewed from them.

When the Jackalberry fruit is fully ripe, it turns purple, but one hardly ever sees it this color since it is eaten by various animals long before it can get that ripe. Animals such as kukus, nyalas, impalas, warthogs, baboons, parrots, and hornbills, to name a few, love to eat the fruit of the Jackalberry. It got its name because the Jackalberry seeds are also found in the dung of jackals. The leaves are eaten by elephants, rhinos, giraffes, buffaloes, and kudus. The larvae of the bushveld emperor butterfly also eat the leaves of this tree.

The Jackalberry tree is part of the Ebenaceae family, and is also known as African ebony. Wood from the tree is hard, heavy and very strong, and almost completely resistant against termites. The heartwood is fine-grained and good for floors, high quality furniture and pestels. It varies in color from light, reddish brown to almost black. The trunks are used to make canoes.

It is also traditionally used for medical purposes. Tanin is contained in the leaves, bark and roots, and acts as an astringent that helps stop bleeding. The tree is also supposed to have antibiotic substances that help heal wounds. A mixture made from the roots is used get rid of parasites like ring worm, and dysentery and fever. It is also considered a remedy for leprosy

Although Jackalberries aren't found in very many places outside of the savannas and savanna woodlands of Africa, they aren't in

danger of becoming extinct eirher.

2001



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photograph "jakkalsbessie.jpg" © [Willem van der Merwe 2001](#)

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Jarrah

Common Name: jarrah, swan river mahogany

Genus: Eucalyptus

Species: marginata



The jarrah is one of the many species of eucalyptus. The jarrah tree usually grows to about 40-50 meters high, with a trunk diameter of three meters. The trunk of the jarrah is long, straight, and has no branches on it. The jarrah tree has rough grayish brown bark with vertical grooves, which sheds in long strips.

The leaves of the jarrah tree are about 8 to 13 centimeters long. The top of the leaves are dark green and the bottom side is lighter. The species name of the plant "marginata" relates to the light colored vein around the edge of the leaf. The curved leaves are found at the top of the tree amongst the flowers.

The flowers of a jarrah tree are white with a cone shaped bud cap, 5-9 millimeters long. The flowers are found in groups of 7-11.

The flowers have a magnificent scent, while the ball shaped fruits grow to about 9-16 millimeters long. It flowers every other year making it a special event for bees to pollinate it and make honey. The jarrah tree can live as long as 500 years.

The jarrah tree usually grows in gravelly soil, but occasionally it is found in sand or loam. The jarrah tree has widespread distribution in the dry Australian Savannah. It forms its forests or woodlands ranging from Albany to Gingin, and there is one very old tree in Manjimup that is dated 500 years old.

One of the adaptations the jarrah tree has made is called a lignotuber. The lignotuber is a large swelling underground. This swelling can store carbohydrates, and can make it possible for a

young jarrah to grow back after a fire. Another adaptation the jarrah tree has made is its long roots. This makes it possible to pull up underground water during a drought. This drought resistance is helpful in its natural dry habitat.

The jarrah tree is mostly used for timber. Jarrah wood makes very durable, strong furniture and building materials, such as wharves, bridges and railroad ties. Before modern asphalt the streets of Berlin and London were paved with blocks of jarrah.

Another use of the jarrah tree is honey. Every other year when the jarrah flowers bloom, beekeepers have their bees pollinate the tree and make wonderful honey.

To some animals the jarrah tree is very useful. Birds and other animals use big holes in the jarrah tree to nest. Feral bees make their hives in holes in the tree. Nectar from the jarrah tree is also a main food source to many insects, marsupials, and birds

The jarrah trees population is decreasing because of heavy timbering. It is also very defenseless against dieback. Die back is a sort of algae that causes root-rot. This organism is related to the one that killed the potato crops of the Irish famine. Researchers are trying to make genetic transfers into the jarrah trees from the dieback resistant Marri gum, but it will take a long time.

by Celeste B. 2001

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Kangaroo Paws

Common Name: Red and Green Kangaroo Paw, Mangles' Kangaroo Paw,

No-la-mara

Genus: Anigozanthos

Species: manglessi



The biennial red and green kangaroo paw is the floral emblem of Western Australia. What really catches the eye is the plants green unscented flowers that can grow up to 10 centimeters long. The green furry flowers are attached to the sturdy red stem. The sturdy stem makes a perfect perch for many birds, and can grow to a meter high. Honey eaters or wattle birds, the pollinators of the plant, are often seen perched drinking the plant's nectar. The stem is attached to the green flattened basal leaves. The leaves of the plant are usually about 30 to 60 centimeters long. The kangaroo paw was given its name because of the plants bright red ovary and its paw shaped flowers.

The red and green kangaroo paw only occurs naturally in southwest Western Australia.

The specific spots are from

Shark Bay to Scott's River and at Mt. Barker. It is common around Manjimup, along the Murchison River, Busselton, Lake Muir, and King's Park near Perth. It grows in sandy or gravelly soils in burnt or disturbed areas. When the red and green kangaroo paw is in its natural habitat it flowers between August and October.

The red and green kangaroo paw's adaptations are tiny wooly hairs on its flowers. The little hairs help by making it taste weird to

predators, so they won't eat it. The little hairs also help by holding on to water because it grows in a dry climate. It also has adapted by having a sturdy stem for its pollinators to perch on.

The red and green kangaroo paw makes a great plant for the home garden because of its unusual shape and bright colors. They also make great cut flowers because they last long in water. It is also exported to various places around the world. In the U.S.A., Israel, and Japan they are grown commercially.

by Celeste B. 2001



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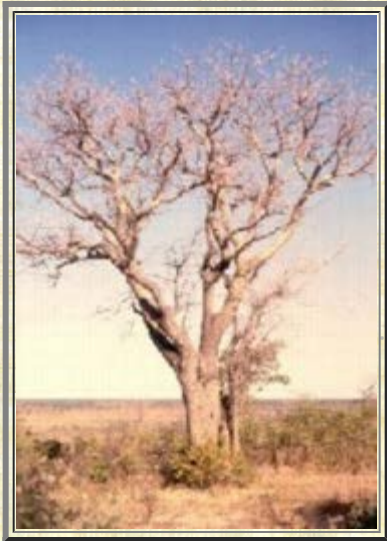
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Manketti Tree

Common Names: mongongo nut, feather weight tree

Genus: Schinziophyton

Species: rautanenii



The African savanna is a lush area filled with life. There are many trees in this area, one of them, unknown by many, is the manketti tree. The Schinziophyton rautanenii (formally known as the Ricinodendron) is found in the African savanna. Its habitat is dotted with trees and does not receive enough rain to be considered a prairie. The countries that lie in this biome are Mauritania, Guinea, Liberia, Ethiopia, Sudan, Chad, Mali, Niger and Uganda. The savanna has two seasons, summer and winter. Temperatures average from about 68 to 86 degrees F (20 to 25 degrees C). The average precipitation ranges from 10 to 30 inches (100 to 150 cm) per year. It lies between 20° North to 34° South latitude and 15° to 35° East longitude.

Most of the

southern and eastern part of Africa is more than 3,000 feet above sea level while the western, northern and central parts are between 500 to 2,000 feet. The savanna has a long dry season and is filled with many grasses and scattered clumps of trees.

Some common names for this tree are manketti tree, mongongo nut and featherweight tree. The manketti tree prefers hot and dry climates with low amounts of rain. It also prefers to grow in wooded hills and sand dunes. The manketti tree has a large, straight trunk with stubby and contorted branches and a large spreading crown. It has an upright manner of growth and is about 49 to 66 feet (15 to 20) meters tall. The leaves are a distinctive hand shape and are compound. The leaflet is a wide lance to an egg shape. They are composed of seven leaflets that are carried on hairy stalks that are up to 6 inches (15 cm) in length. The leaves are about 6 inches (15 cm) long and both sides are dark green in color. They are covered in fine hairs and are arranged alternately on branches.

The flowers are somewhat oval in shape, and are about 1 1/4 inch (3.5 cm) long, 3/4 inch (2.5 cm) wide, and are about 1/2 inch (10 mm) in diameter. They flower in early summer. The whitish flowers are carried in slender loose spays.

The taproot on the manketti tree goes down until it reaches water. In this case, it is long because it is located in the savanna. The lateral root is very small. The manketti tree is deciduous. It has made many adaptations to its environment including a trunk that can store water, a long taproot to reach water, thick bark to resist annual fires and leaves that drop off in the winter to conserve water.

The manketti tree is distributed widely throughout the southern savanna (South Africa etc.). It is considered a rapid growing tree and has been designated a protected tree in Namibia since 1952, probably because of its socioeconomic importance. Also, the nuts and fruit are very popular and are part of the African daily diet. The nuts also give oil and are considered one of the most important nuts in Africa. The fruit is about 1 1/4 inches (35 mm) long and 1 inch (25 mm) wide. The fruit ripens on the ground and the color turns from the original yellow to reddish brown with ripening. This tree is important to African life and will hopefully continue to prosper in the wild.

by Beau M. 2003

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River Bushwillow

Common Names: Vaderlandswilg (Afrikaans), Hiccup Nut

Genus: Combretum

Species: erythrophyllum



The Combretum erythrophyllum, or river bushwillow, is a member of the Combretaceae family. This family comprises 20 genus and 500 species, tropical and warm, especially African trees and shrubs. Other names for the river bushwillow include vaderlandswilg and hiccup nut. The reason for the name "hiccup nut" is because the seed, if eaten, will cause violent hiccups.

This plant can be found in the African Savanna at 5 degrees to 15 degrees North latitude and 15 degrees to 50 degrees East longitude. Countries that lie in this biome are Madagascar, Senegal, Guinea, Upper Volta, Ivory Coast, Ghana, Nigeria, Cameroon and Ethiopia.

The African savanna, where the river bushwillow is native, is a rolling grassland with few trees. There are only two seasons, winter and summer, on the savanna. The average temperature in winter is 68 degrees to 78 degrees Fahrenheit. During the summer it is 78 degrees to 86 degrees Fahrenheit. The annual precipitation of 10-30 inches falls during the summer. The river bushwillow prefers full sun and grows along riverbanks. The river bushwillow likes a warm and dry climate. It is 30-35 ft tall with a dense spreading crown. The branches grow rapidly and at crazy angles with an upright manner of growth. The shape of the leaf is a kind of elliptic form, growing on opposite sides of the stem. The leaves are three inches long and one inch wide. The young leaves are pale green, later becoming dark green above and lighter beneath. In early autumn, the color of the leaves is yellow changing to red in mid-winter. The margins are smooth. The leaf base often has two gland-containing flask-shaped cavities at the base. Flowers of the river bushwillow are dense spherical spikes and are 0.4 inches in diameter. The flowers are cream or pale yellow and grow on the tips of the branches just past

the new leaves. The fruit is poisonous; causing severe hiccups and is called the Samara. The taproots are long. This is because it is hydrophilic (needing a lot of water to grow). It is easily grown from seed but it is hard to find seeds without parasites.

The river bushwillow has made adaptations that include a hydrophilic root system, thick bark to resist forest fires and leaf drop during dry periods to conserve energy and water. Leaf drop during dry periods is called "drought deciduous" and is an adaptation of plants that grow in dry climates. The river bushwillow is very plentiful with a widespread distribution. It is not endangered because it can survive the cold winters of below 32 degrees Fahrenheit, is fast growing, highly adaptable and grows near rivers where it gets plenty of what it needs (water/sun). It is used for medicinal purposes, commercial wood (carved household utensils) and as a tropical/glasshouse ornamental.

Interesting facts about this plant are:

- The roots are used as a de-worming remedy for dogs,
- Gum exuded by the plant contains a substance that prevents hot glue from setting while it cools.
- Giraffes utilize it for grazing during the spring.

Its adaptability, fast-growing habit, dense spreading crown, interesting fruit and attractive foliage make it a popular ornamental shade tree.

by Phebe Bates, 2003

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Whistling Thorn

Common Name: Whistling Thorn, Swollen Thorn Acacia

Genus: Acacia

Species: dreparalobium



The whistling thorn is an acacia tree commonly seen on the savannas of equatorial East Africa, particularly the Serengeti plain.

This acacia can grow about 18 feet tall, but is often stunted in its growth. The whistling thorn acacia protects itself with pairs of long thorns up to 3 inches long.

Interspersed with these are modified thorns, called stipular spines, which are joined at the base by hollow bulbous swellings about 1 inch in diameter. These are home to four different kinds of stinging ants who pierce these swollen thorns with tiny holes. When the wind blows it turns old and abandoned spines into tiny whistling flutes, which gives the tree its name.

It isn't clear yet whether the relationship

with ants is a symbiotic or parasitic one. This particular acacia doesn't have the toxic chemicals that ward off insects and browsers like other species of acacias do. The stinging ants protect the tree by swarming out of their nests and attacking an intruder at the smallest movement. Giraffes and other browsers are thought to be able to detect the pheromones the ants give off, and leave the tree alone.

However, some ant species, like *Crematogaster nigriceps*, will prune the branches and flowers of their whistling thorn so that enemy ant colonies on other trees can't get to their tree. This pruning stimulates the acacia to produce a sugary secretion at the ends of their leaflets which feeds the ants. Unfortunately, it also kills the tree's growth tips and effectively sterilizes it so it can't propagate itself.

It is believed that the ants have developed the habit of living in trees

because the soil of the savanna turns spongy in the rainy season and dries out and cracks in the dry season. This makes it very difficult for ant to build nests under ground.

The whistling thorn acacia, like other acacias, has developed several ways to survive the severely hot and dry climate in which it lives. Because of the heat the tree must find ways to conserve moisture. Their leaves have evolved into many tiny leaflets (pinnae) which can turn to absorb sunlight, or avoid it and reduce transpiration. The many leaflets are also beneficial when animals graze on them. Some will be left behind to continue the vital task of photosynthesis.

During the dry season on the savanna, the whistling thorn acacia will drop its leaves to conserve water. At the beginning of the rainy season fragrant creamy-white flowers bloom before the leaves grow back. The flowers look like little puffballs and resemble those of the cultivated mimosa tree, which are in the same family. Long seed pods develop, whose seeds are very nutritious and a favorite of many animals, including humans.

2000.

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African Elephant

Common Name: Savanna Elephant

Genus: *Loxodonta*

Species: *africana*



African elephants, also known as the savanna elephants, are the largest land mammal in the world. They weigh up to 10,000 pounds and grow to 12 feet tall. They have a long trunk that is very flexible and has nostrils on the end. It is used to pick up food and water and carry it to its mouth. On the sides of its mouth there are two long teeth that extend out from inside its mouth. These are called tusks, and are made of ivory. They have thick, gray skin on their bodies that protects them from deadly predator bites.

African elephants live on the savannas of Africa. There are two species of elephants in Africa; the savanna elephant and the forest elephant, (*Loxodonta cyclotis*). The savanna elephant's habitat is usually savannas or grasslands. They are herbivores, and feed on grasses, fruits, tree leaves, bark, shrubs, and vines.

African elephants live for about seventy years, and die when their molars wear down; they can't eat so they starve. There are usually 10-15 related elephants in a group. Related family members stay in close range of each other. The leader is always a female. They communicate with sounds lower than human hearing.

An elephant's gestation period is 20 to 22 months. When born, a calf weighs around 200 pounds, and is about three feet tall. A mother is usually helped by another cow during birthing. The calves nurse until they are in their third year and are very dependent on their mothers for 8 to 10 years. When they are mature, male elephants leave the herd to join bachelor herds.

Females stay with the herd they were born into.

Elephants are very social animals, and learn about what to eat, where to find water and how to behave from their mothers and older bulls. Recently some orphaned bull elephants were killing rare rhinos in South Africa's Hluhluwe-Umfolozi Reserve. In a conservation effort several decades ago, orphaned elephants were moved from Kruger National Park to Hluhluwe-Umfolozi Reserve where there were no elephants. They grew up without the influence of their mothers or older bulls. It is thought that without role models they didn't know how to behave and were taking out their aggressions inappropriately on the rhinos. Older bulls were brought in to teach them how to behave themselves.

The African elephant's size makes them hard for predators to eat, such as leopards, lions, or jaguars. At night, the adults form a circle around the calves to protect them from danger. But in the day, an unlucky calf might wander away from the herd and be some predator's lunch. But adults have thick skin, making it hard to bite.

These animals have a special job in savannas. They keep the savannas clear by eating shrubs and trees which helps the grass grow. This allows the many grazers on the savanna to survive.

Today there are about 150,000 elephants in the world. They are endangered because poachers and hunters kill them for their ivory tusks to sell. In October 1989, the African elephant was moved from Appendix II, which requires permits to hunt or trade, to Appendix I, which is the highest level of protection and doesn't allow international trade.

Allison F. 2000.

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African Wild Dog

Common Names: African Hunting Dog

Genus: Lycaon

Species: pictus



The African wild dog lives in grasslands, savannas, and open woodlands of eastern and southern Africa. They are mostly found in the African plains; they do not live in jungle areas. They also live in parts of Namibia, Botswana, Mozambique, Swaziland, and in the Transvaal of South Africa. The savanna is an open grassland dotted with trees. The grass can grow to be 3 to 6 feet tall. The average temperatures is 64°F.

In the savanna there are two seasons; in the winter it is very dry and in the summer there are heavy monsoon rains. Many animals the African wild dog hunts migrate during the dry season. The African wild dogs don't follow them. During migrations the dogs survive on bugs and rodents.

The African wild dog's scientific name literally means painted wolf. Their fur is colored with red, brown, black, yellow, and white areas. Each animal has a different pattern of colors. The African wild dog has short fur. The fur on their muzzle is black and the end of their bushy tails are white. Their ears are very large and rounded. Their muzzle is short and they have powerful jaws.

They have a thin, long body, and muscular legs with only four toes on each foot, because their dew-claw is missing. The African wild dog's over all body length is between 75 and 100 cm (29 and 39 in), and they stand between 61 and 78 cm. (23 and 30 in.) at the shoulders. Their tail is between 30 and 90 cm. (12 and 15 in.). They weigh 18 to 36 kg (37 to 79 pounds). The males and females are about the same size. The African wild dog is the largest dog in Africa, and the only member of the Lycaon genus.

The African wild dog is perfectly built for the chase. Like greyhounds, they have a light body and long legs. The bones of its lower front legs are fused together to keep them from twisting when it runs. It has large ears which help radiate heat away from its body. Its short and broad muzzle has powerful muscles that allow it to grab and hang on to its prey. Its multicolored coat helps it blend in with the surroundings.

Only the dominant pair of the African wild dog pack breeds. These two stay mates for life and keep other females from breeding. The African wild dog breeds between December and March. The female is pregnant for 10 weeks. Two to twenty puppies are born, but the litter size is usually about 10 puppies. They are probably the size of a regular puppy. The mother will give birth in a grass-lined burrow, and the puppies will stay there for 3 to 4 weeks. The whole pack cares for the pups once they are out of the burrow. The adults take turns to hunt so the pups aren't left alone. They stop drinking their mother's milk after 5 months. A female wild dog will give birth every 12 to 14 months. The puppies reach maturity after 12 to 18 months, but don't breed until they are much older. Their life expectancy is about 10 years.

The African wild dog is a carnivore and feeds on medium sized antelope, gazelle, and other grazing animals. It can also kill larger prey, like wildebeest. Wild dogs will follow a herd of animals until one of the animals becomes separated. They will chase the animal until it drops from exhaustion. They start to feed immediately without a killing bite. African wild dogs always eat fresh kills and never scavenge for food. Like domestic dogs, they don't eat plants or insects, except a little grass.

The African wild dog is not in competition with hyenas and jackals for food because they are not scavengers. They prey on medium sized gazelles and antelopes and are not in competition with lions for larger prey. Their only predators are humans.

The African wild dog is on the IUCN's endangered species list and studies are being done on its conservation. Projects to reintroduce them into areas of Mkomazi, Tanzania and into the Etosha National Park in Namibia have been started. The main reason for its decline is that this species is hunted by man. People haven't had much sympathy for the African wild dog because of its hunting methods, and the dogs are perceived as vicious killers of game and livestock. Another reason is disease. The African wild dog is vulnerable to domestic dog diseases like canine distemper, rabies and anthrax.

by Aaron G. 2002

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Black Mamba

Genus: Dendroaspis

Species: polylepis



The Black Mamba is the most deadly snake in the world. They grow 14 feet in length, and can travel at speeds of up to 12 mph. They have a head shaped like a coffin. The Black Mamba is not actually black. They have a brownish-gray body with a light belly and brownish scales along its back. It gets its name from the color of the lining of its mouth, which is purple-black, and which it displays when threatened.

The Black Mamba lives in South Africa. They like open, low habitats such as savannas, rocky places and open woodlands. They are active during the day. They often sleep in hollow trees, burrows, rock crevices, or empty termite mounds, and will come back to the same place every night.

The Black Mambas feed on small mammals and birds, like voles, rats, squirrels, mice, rats, or bush babies. Once a Mamba was found with a parrot in its stomach, another with a full grown Forest Cobra! It will strike a large animal and then release it. It then stalks their victim until it becomes paralyzed. With smaller animals it will strike and hold on until the animal becomes paralyzed. Its flexible jaws and scales makes it possible to eat the animal whole.

Several weeks after a pair of mamba mate, the female will find a good place to lay 6-17 eggs. The burrow must be damp but not wet, and warm, but not too hot. After she lays her eggs the female leaves. The young snakes are about 16-24 inches long when they hatch three months later. They reach maturity when they are 3-4 feet in length.

The Black Mambas are found in pairs or small groups. They are very nervous, and head away fast when a human approaches.

When the mamba feels threatened it will raise its front and head about 3-4 feet off the ground, open its mouth, spread a flat hood, and shake its head. When they attack they will make several quick strikes, and escape as fast as they can. They can strike from 4-6 feet away. Before antivenins were developed, a black mamba bite was 100% fatal.

They are invulnerable, because no animal can actually kill them. Their venom can kill just about anything, so they don't have much to worry about. The mamba is mainly threatened by habitat destruction.

by Allison F. 2000.



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Caracal

Common Names: Caracal, desert lynx, itfah, anaq al ardh, washag

Genus: Felis

Species: caracal



Felis caracal can be found in the Veld Grassland in South Africa, and in central Africa and India from 30° North to 35° South latitude and from 20° East to 25° West longitude. This environment is generally dry and hot. The cat's habitat can also be savannah, scrub and acacia woodlands, or mountains and hilly areas.

Its head/body is 24-36 inches long, and its tail is 9-12 inches long. Its shoulder height is 15-20 inches. Its weight is 28-42 lbs. It has a shape like a cat but it's bigger and has bigger ears. The cat

has a short coat whose color varies from tawny-brown to reddish-grey, sometimes even getting as dark as wine-red. Its head is shaped like an upside-down triangle. The ears are black on the outside and pale on the inside, with two-inch tufts of black hair coming out of them. The fur around the eyes is paler than the rest of the coat. The caracal has powerful jaws on a short muzzle. Its claws can retract into its large paws. It is faster than any other cat its size.

The caracal male is sexually mature at 12-15 months of age, and the female at 14-16 months. They mate year-round. Their gestation period is 69-78 days, and they usually have 1 to 6 young. The kittens weigh about 10.5 oz. As soon as they are born, the kittens have bold facial markings. At first, they only eat, sleep and make some noise. Their mother carries the kittens in her mouth by the back of the neck. They play with each other, and they learn to hunt that way. They are independent after about a

year, when their mother will have another litter. The male does not help to raise the children; caracals live alone, not in pairs or groups, except when the mother raises the cubs.

The caracal is solitary, and can live as long as 17 years in captivity. They are active at night, mostly hunting smaller mammals, such as rabbits and porcupines, or even larger mammals like sheep, young antelope or deer. They have a special skill at catching birds. Their strong legs enable them to jump high enough to actually bat birds out of the air with their large paws.

The caracal's only predator is man. Humans hunt the caracal for its fur and meat in many places, sometimes to prevent this cat from killing livestock, mostly in Namibia and South Africa. There is no national legislation to protect the caracal. However, in some places these animals are protected legally. Hunting the caracal is forbidden in 10 countries in Africa. Hunting and trade are regulated in 6 countries in Africa. However, in areas where the caracal is not in danger, there are no laws protecting them.

by Shir L. 2003

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Chacma Baboon

Common Names: Dog-faced Monkey, Savanna Baboon

Genus: Papio

Species: ursinus



Baboons live mostly in the African woodland savanna, and highland grasslands. They never wander far from trees, or a source of water. The chacma baboon is found in the countries of Angola, Botswana, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe.

Baboons are the savanna's version of the monkey, and are the largest member of the monkey family. The males can weigh from 59 to 97 pounds (30-40 kg) and are about 20 to 30 in. long (50-70 cm). Females can weigh from 31 to 37 pounds (15- 20 kg) and are 16 to 24 in. long

(40-60 cm). It has beady, close-set eyes under a heavy brow, and a dog-like muzzle with sharp tusk-like upper canine teeth. Its muzzle is bare, as is its rump under the tail. They are very hairy animals with olive-gray fur. Its fur sticks up all over its body. They walk on all four feet with their tails held in a crooked arch over their back. Their tails are around 2 feet long.

Unlike what you would expect, baboons do not live in trees. They spend most of their time on the ground. The only time they go into trees is to escape predators, get food, or spend the night. They might also spend the night on tall rocky outcroppings. Baboon babies go up in trees to horse around and play with each other. Baboons mostly eat fruit from trees, roots, an assortment of plants, and of course, bugs.

Baboons live in groups known as troops. Each troop consists of a dominant male and female, and other adult males and females and offspring. When they travel they have their own specific

formation. The dominant male is in the front and the dominant female is behind him. The other males form a circle with the rest of the females and the offspring in the center. Baboons have a very complicated social system which is really just based on becoming and staying dominant.

Couples will often stay together to raise an infant and males will even become a foster parent if the mother is killed. Infants will start riding jockey-style when they are about 6 weeks old. By the time they are 4 months old they are climbing trees. They depend on their mother's protection and guidance for about a year. The baboons are unique in that all the members in the troop or family are related in some way. Baboons can live to be 45 years old.

The baboon have cheek pouches in which they can store food. They can also rely on others in the group or family for food and water. Everybody helps to find food and water in the family. Baboons can run up to 35-40 miles per hour. They also have very sharp teeth which they use for defense if they get into a scrap with a predator. Their main predator is the leopard, but it avoids large males who will gang up on it and sometimes the leopard gets badly injured.

Baboons inadvertently feed other creatures by dropping or leaving food behind when they eat. Other creatures scavenge the leftovers. When a predator catches and kills a baboon, it provides food for that predator and its family and scavengers. Baboons are diurnal and are always on the move so they don't strip an environment of its vegetation.

Like the lion, the baboon is also endangered, and like the lion we need to try and save it. So please do whatever you can to help save these wonderful creatures of the African savanna.

by Chase S. 2000.

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Egyptian Mongoose -

Genus: *Herpestes*

Species: *ichneumon*



The Egyptian mongoose is the largest of all mongooses in Africa. The Egyptian mongoose lives in Africa on the savanna. The savanna is a massive grassland with scattered trees such as thorn trees, and shrubs. The savanna has two seasons, winter, which is very dry, and the summer is wet and warm. They have also been seen in southern Spain.

Egyptian mongooses live in shrub thickets, rocky areas, and small woodlands and forested areas within the savanna. These mammals prefer to live in forested areas near water. All mongooses are known for being talented snake killers. The famous novel written by Rudyard Kipling called *Rikki Tikki Tavi* made more people aware of the mongoose's snake killing talents.

The Egyptian mongoose ranges anywhere from 19 to 23 inches in height. Adults weigh 4 to 7 lbs. Its tail is 13 to 21 inches long and is very bushy with a black ring at the very end. Egyptian mongooses have long hair. Their coat is usually gray with brown dots. Their coat is sometimes a reddish brown with yellow dots but this is unusual. Egyptian mongooses have a slender, low-slung body. Their heads appear to be pointed due to the shape of their snout. The animal's ears are rounded and don't project over the head due to their small size. The eyes are surrounded by a naked strip of skin. Egyptian mongooses have five finger-like

claws on each short limb. The animal's hind feet are furless. Their front claws are curved and sharp for digging in the earth. They have 35 to 40 teeth that have evolved for tearing flesh apart.

Male and female Egyptian mongooses become sexually mature at the age of two years. Their mating season is in July and August. Actual mating lasts approximately five minutes. Their gestation period lasts approximately eleven weeks and the mothers usually have 2 to 4 young. When the babies are first born they are helpless but after 6 to 8 days they can follow their mother. At birth the babies are blind and furless. The youngsters first open their eyes at 6 to 8 days old. Both of the parents raise the young, but the mother does more so than the father. The juveniles are nursed for six months and remain with their mother for the remainder of the year. When in a pack, the females/mothers take turns babysitting the young. The males/fathers baby-sit the young ones but rarely interact with them. The juveniles are dependent on the parents for approximately one year. The male youngsters usually disperse from the pack or leave their mother before the females. The females may never leave their mother or the pack. Egyptian mongooses produce a litter a year but if the first litter is killed or lost they are able to produce another. The Egyptian mongoose has been seen alone, it has been seen in pairs and it has been seen in packs. The females lead the packs and there are usually six mongooses per pack. The animal generally lives for 7 to 12 years. The Egyptian mongoose is diurnal and is active all day.

Egyptian mongooses are mostly carnivorous. They also eat fruit if it is available where they are living. Their typical diet consists of rodents, fish, birds, reptiles, amphibians, insects and insect larvae. Egyptian mongooses also eat the eggs of the animals mentioned above. Egyptian mongooses' claws have adapted to digging allowing them to dig bugs out of the ground. Their teeth have adapted to tearing the flesh of animals they prey on. Egyptian mongooses also eat poisonous snakes. They can run backwards, roll over, swim and stand on two hind feet. They can puff their hair up to appear two times their actual size, change directions quickly and jump. This helps the Egyptian mongoose kill snakes and any prey they encounter.

They are preyed on by birds of prey and large carnivores on the savanna. Egyptian mongooses benefit the environment by killing animals that are considered to be pests by humans such as rats and snakes.

Egyptian mongooses are able to survive in the environment for the following reasons. The color of their fur blends in with the surroundings of the savanna. The Egyptian mongooses' claws also help it survive in the environment by helping it dig for food.

Egyptian mongooses are not endangered. They aren't endangered because they are shy which protects them. They are hunted because they attack people's chickens and they eat their poultry.

by Alex P. 2003

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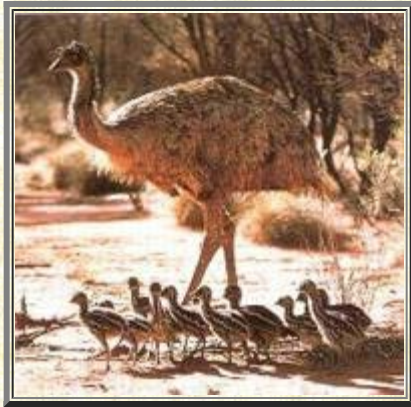
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Emu

Genus: Dromains

Species: novaehollandiae



The largest bird that inhabits the lush, grassy fields of Australia is the emu. Adults are about 5.7 ft. tall and weigh about 110-120 lbs. It has medium size wings, but it can't fly! The base feathers are white, while the feathers on the top are blackish brown. The feathers act as a "feathery-quilt" because they're so loosely connected. From a distance they look very course.

The weight of the female emu is 90 lbs., while the male weighs 80 lbs. They only have 3 toes, and they are very sharp, making it easy for them to run really fast. Emu's have long, strong necks, very sharp beaks, and bald, bluish heads.

Emu's usually mates during May-August, beginning when they're almost 18 months old! The female lays around 5-20 eggs in a shallow nest made out of mud, leaves, grass, bark, and twigs. The color of the eggs are greenish-black. When the babies are born, they're beige with dark stripes and little dots on their tiny heads. It takes 2 months for the babies to hatch. During those 2 months, the father sits on the nest, drinking little water and usually losing a total of 10 to 20 lbs. When the chicks hatch, the father emu takes care of them for several months.

The emu used to fly at one time, but lost the ability because they had no predators and didn't need to fly anymore. When the Europeans came, they started to hunt them, but by then the emu couldn't fly.

The emu eats mostly fruits, flowers, insects, seeds, and it absolutely adores caterpillars and green vegetation. Emus need to drink water on a regular basis in order to stay alive.

Emu chicks are killed by dingoes, foxes, and feral cats. The adult emu's are killed by humans, for there isn't a large

enough animal left in Australia to take it down. There once was, but they've become extinct in Australia.

The emu isn't endangered, but they might be someday. Most of them today are killed by farmers who say that the enormous bird destroy their crops.

Nina B. 2001.

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Grant's Zebra

Common Names: Plains Zebra

Genus: Equus

Species: burchelli bohmi



The zebra is the horse of the savanna. Grant's zebra is the most abundant of the 3 species of zebra. The zebra looks like a horse, only smaller. It doesn't sound like a horse, and "barks" instead of neighs. Its height is about 50 in. from shoulder to hoof, and weighs in at 500 to 600 pounds. It has rather short legs and a large head. The zebra has black and white stripes, a black nose, and black hooves. It also has a short, erect mane. The stripes on its side are vertical but bend to become horizontal on its rump. Every zebra's stripe pattern is different.

The zebra lives in close-knit groups called families or harems, led by a single male. There can be up to 17 members in each family. Everybody in the family relies on each other to look out for danger and help those who are in trouble. They stay close to each other even when they migrate in herds of 10,000 or more. They slow their pace for weak or young members and never leave them. They can live to be 28 years old.

When the zebra is attacked by a predator, it has several ways to defend itself. If they see a predator, the herd will bunch together and all the predator will see is a maze of stripes and it won't be able to tell one zebra from another and will not be able to tell it's front from it's rear end. Or a herd may run away. The zebra can reach speeds of up to 40 m.p.h. The male guards the rear. If all else fails, it will use it's strong hooves and sharp teeth against a predator. The zebra's main predators are hyenas and lions.

It is easy to see a zebra in the middle of the grasslands because of

its black and white stripes, but the stripes actually confuse a predator. There are about 300,000 zebras left on the savanna. They are fun to watch and study. They may not be endangered yet, but two rarer species are. Some subspecies are actually already extinct. Like the other endangered animals, we must help the zebra and try to make it so it does not reach extinction.

by Chase S.2000.



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Koala

Genus: Phascolarctos

Species: cinereus



This fuzzy marsupial is very muscular, quite lean, and is about 33 inches long. It has a fuzzy coat of fur, big floppy ears, and almost no tail! It's got a stubby little nose, small yellow, beady eyes, and strong bones to support its heavy body while climbing trees. Now you may wonder; how much do those strong bones have to support? Well, the females weigh between 13.2 and 24.2 lbs., while the male weigh between 17.6 and 30.8 lbs.

The koala has rough paws that act as traction so they don't slip and fall off the trees while hurrying away from predators that lurk beneath the trees. Each paw has 5 digits. The back paw consists of two "fingers" that are joined together to form a "grooming paw". These

help it get rid of off twigs or tics that may have gotten tangled in its thick fur. There are 3 other "fingers". Two of them are very sharp and those are used for climbing. The last "finger" which takes the place of a human thumb is stubbed; there are no claw on it. Meanwhile, the front paw has 2 tiny "fingers" that are substituted for 1 large thumb. It also has 3 normal "fingers" that are very sharp. Just like their back paws, these are used for climbing.

The koala has thick fur that is used to help keep it cool and at the same time warm. Their fur also acts like a rain slicker, repelling moisture. The color of their fur changes from gray to brown depending on the season. They have patches of white on their neck, chest, and inside the ears, legs, and arms.

The koala usually mates during September-March. The female

koalas start to mate with the male koalas when they're around 3 or 4 years old! They sometimes only produce one offspring per year. It takes about 35 days after the female koala conceives to birth a Joey (a baby koala). When the Joey's born, it looks like a pink, hairless, jellybean, with beady little eyes just like its parents. Get this; Joey's can't see or hear when they're born. That's probably because they don't even have ears when they're born! The babies are usually only 2 centimeters long and weigh only 1 gram. During the first few months, the Joey stays in its mother's pouch and sucks on something in its mother's nipple called "pap". "Pap" is very mushy, just like baby food. The Joey eats "pap" until it's 1 years old. Then the mother starts to feed it eucalyptus leaves.

Using its brown and gray fur, the koala can camouflage itself so they can hide from predators. Don't you think that the koalas might get hurt sitting on the sharp twigs, well they don't! Their bottoms are padded with so much fur, that they can sit on pointy branches and not get hurt! The koalas thick, fuzzy fur keeps them warm, but not too warm. Their sharp claws dig into the trees so that they don't fall off.

Even with their tiny noses, koalas have an excellent sense of smell. They can detect the poisonous leaves, just by sniffing them!

The koala doesn't have that diverse of a diet. The only thing they eat are eucalyptus leaves. The eucalyptus leaf is quite poisonous to other animals, but the koala's digestive system is immune to it. The only thing is, if they eat more than 3 lbs. of leaves a day, they'll get indigestion.

The koala is killed by foxes, dogs, dingoes, and most of all, humans and forest fires.

The koala used to be endangered, but there are now laws in Australia that forbid you to hunt koalas, especially just for their fur, which is what most people kill them for. Hundreds of koalas die because they have life threatening diseases. Their biggest threat now are slow moving forest fires. There are many organizations around the world just for [saving the koalas](#).

Nina B. 2001.

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Saving the Koala

The koala, one of Australia's most recognizable animals, is rapidly disappearing throughout much of its range because of the destruction of the woodlands and forests in which it lives. Found in the scattered dry eucalyptus forests of Eastern Australia, the koala eats only a small variety of the hundreds of eucalyptus species, and needs large areas of woodland to forage in.

European settlers arriving in the early 1800s, cleared the forests to build homes, farms, and towns. As the koala was pushed out of its habitat, its populations became scattered or died out. Only 20% of the original koala habitat remains today.

They were also extensively hunted for their soft, gray fur. As late as the 1920s more than 2 million koala skins were exported to Europe and the U.S. a year. The koala had to be reintroduced to South Australia from Victoria after the fur trade wiped out the local population.

Today habitat destruction poses the greatest threat to the koala. Legislation has been passed to protect the koala, but local governments are often unable to enforce the laws successfully. Also, as settlements spread, the danger of forest fires increases. Fires can wipe out 70% of the koalas in an affected area, from which their population seldom recovers.

Roads fragment their habitats and many koalas are killed by cars as they search for new territories. Introduced animals such as foxes, and domestic dogs also account for many deaths. Isolated populations of koalas become susceptible to inbreeding and disease. Fewer than 50,000 koalas are left in the wild

Today the koala's survival depends on the government of Australia to work with conservationists, communities and businesses. There are several organizations which are already providing a lot of information on koalas. The Australian Koala Foundation is educating Australians about the plight of the koala, and the Koala Habitat Atlas, a part of the Australian Koala Foundation, is identifying and assessing remaining koala habitat. Nature reserves are now including larger koala habitats. Public awareness of the plight of the koala is very important to its

survival. International recognition of the problem by the IUCN is also helping put pressure on the government and developers. Tourists coming to see the koala are bringing over a billion dollars into Australia.



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Lion

Genus: Panthera

Species: leo



The lion is the powerhouse of the savanna, weighing in at 265-420 pounds and up to 10 feet long. The lion is a powerful predator. Imagine a powerful looking beast that looks like your average house cat. But its bigger, faster, and stronger. Lions have dirty beige colored fur and rounded heads. Males have something females don't... manes. Manes are a ruff of long hair around the neck which is brown in the front and black in the back.

Lions live in the savanna of Africa south of the Sahara and a small area in Asia. Savannas are open spaces with tall beige, or green colored grass, where water is scarce in the summer season. Lions eat gazelles, buffalo, zebras and many other small to medium sized mammals.

Lions are the only cats that live in groups called prides. Each pride is like a community of 4 to 40 individuals. They all help hunt in order to keep every member healthy, and every cub fed. The pride is made up of one dominant male and maybe a few other males, and related females and their cubs. The males protect the pride and the females hunt and take care of the cubs. When the dominant male is killed or driven off by a new male, the previous male's cubs are killed. This makes sure that there is room for the new male's cubs in the pride. Cubs are born a little over a month after mating. They depend on their mother's milk for 3 or 4 months. They nurse not only from their own mother, but any other nursing female. They are off on their own in 2 years.

Lion's coats are perfect camouflage for sneaking up on their prey. They will sneak up to their prey as close as they can as a group. Some in the group will charge at their victim, while the others cut off their escape. But often they don't not get close enough so they

have to run them down. Lions can run up to forty miles per hour for short distances. They have sharp hooked claws which they can retract or extend at will. The pads on their feet protect their paws from the rough terrain that they might walk over. They have sharp teeth that are perfect for chomping, and biting and chewing up meat.

The lion can be crucial to other animal's survival. When a lion makes a kill and is done eating, there are usually leftovers, or scraps, which scavengers like vultures and the occasional hyena, come and eat, and thus are helped to survive too.

Lions indeed are very wonderful creatures. They are interesting to see and find out about. But they are endangered from over-hunting and loss of habitat. Efforts have been made to save there creatures but they need all the help they can get. If you see a way that you can help one of these beautiful creatures, please do, so that generations after ours can enjoy them too. If we don't...they will be gone, leaving a huge chunk out of nature's balance as we know it.

by Chase S. 2000.

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Nigriceps Ant

Genus: Crematogaster

Species: nigriceps



On the [savannas](#) of Kenya, Africa, there grows a tree that is exclusively inhabited by four species of stinging ants, some of which live nowhere else; Crematogaster nigriceps, Crematogaster mimosae, Crematogaster sjostedti, and Tetraponera penzigi. At the slightest movement of a branch these ants will swarm out and deliver painful stings to grazing giraffes and other browsers. Of the four species Crematogaster nigriceps, or the nigriceps ant, is the least war-like.

The tree of choice for the nigriceps ant and its competitors is the [whistling thorn acacia](#) (*Acacia drepanolobium*). Besides having regular thorns, the whistling thorn acacia also has modified thorn pairs which are joined at the base by a hollow, bulbous swelling up to 3cm in diameter. These thorns provide excellent nest sites for the ants. The ants have adapted to living in trees because the soil, known as "black cotton", gets waterlogged and spongy during the rainy season, and dries out and cracks during the dry season. This makes it difficult for ants to build nest underground. The acacia's have special glands called "nectaries" at the tips of their leaves that produce a sweet secretion just to feed the ants.

Savage competition for the whistling thorn exists between the four species of ants. When branches of the trees meet the ants will invade their neighbor and battle violently for control of the tree, until one colony wins. The nigriceps ant comes out very badly in these battles, losing more than any of the other three species.

To defend their trees against invasion, nigriceps ant colonies actively prune their trees. They chew off all axillary shoots (horizontal shoots), causing the tree to grow tall and skinny. In this way the ants avoid contact with other trees which may hold enemy colonies. Pruning also causes the tree to allocate more energy to new shoots, healthier leaves and larger nectaries, which is also good for the nigriceps ants.

The relationship isn't as symbiotic as was first thought and turns out to be more of a parasitic relationship. Unfortunately the ants also prune off all flower buds so the tree can't bear fruit and reproduce, and is therefore sterile. Scientists hypothesize that the whistling thorn acacia has made a trade-off between reproduction and increased vigor plus protection from browsing animals. Whistling thorn acacias bearing colonies of less destructive ants are still able to produce seeds and continue the species.

Like all ants, the nigriceps' body is divided into three main parts; the head, thorax and abdomen. They also have an exoskeleton, meaning that the skeleton is on the outside and isn't covered by skin, muscles, or tissue. *Crematogaster nigriceps* has a black head and thorax and a red abdomen.

The head of an ant consists of its eyes, antennae and jaws. Ants have compound eyes with many small eyes, called ommatidia, connected together. The two jointed antennae allow the ant to pick up the scent of different chemicals, or pheromones that ants use to communicate.

Three pairs of legs are attached to the thorax. Each leg has five main joints. The abdomen is made up of telescopic segments which allows it to be extended or contracted. It also contains the poison sac and the stinger.

The nervous system of an ant consists of a long nerve chord that runs from its head to the end of its abdomen. The heart is also a long tube that pumps a clear liquid back and forth through the ant. The liquid coats the inside of the ant and then is sucked back into the tube again. Ants don't have lungs, instead taking in oxygen through small holes all over their body and letting off carbon dioxide through the same holes. Ants also have two stomachs. One stomach is called the social stomach and is used to carry food back to the nest to feed the larvae. Once the food is mixed with gastric juices of the second stomach it can't be regurgitated.

Ants are social insects and live in large colonies like bees. There are three types of ants in a colony; a queen, sterile female workers, and males whose only duty is to mate with future queens. The queen matures, mates and then lays eggs for the rest of her life. Ants go through four stages of their development: egg, larva, pupa and adult.

2002

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*image is only a representation of *Crematogaster nigriceps*

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Nile Crocodile

Common Names: Kenya crocodile, Madagascar crocodile

Genus: *Crocodylus*

Species: *niloticus*



The Nile Crocodile can grow to be five meters long. They have long snouts that can grab fish and turtles. They are dark olive in color, and young ones have bands around their body. But as they get older, the bands fade. They are the most intelligent reptiles on the earth.

Nile Crocodiles live in freshwater swamps, rivers, lakes, and other watery places. They dig dens to hide in from hot weather or danger. They are only found in Africa and Madagascar.

The crocodiles eat almost anything in the water, such as fish, turtles, or birds. They even eat buffaloes, antelope, big cats, and sometimes people, when given the chance.

The female Nile Crocodile mates around November through December. They dig a hole about 1 1/2 feet deep to lay their eggs in, a few feet from the water. They lay 40-60 eggs. The female protects the nest from danger at all times. It takes about 80-90 days for the eggs to hatch. The mother keeps the hatchlings safe by holding them in her mouth.

Nile Crocodiles are sneaky, and get their food easily. When they sneak up on drinking animals, only their eyes and nose show. The rest of their body is hidden underwater. They are also camouflage in the water, so they are almost impossible to see.

The Nile Crocodile is not endangered. They are almost invincible, and are not prey to any other animal, except humans.

Allison F. 2000.

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African Forest Elephant

Common Names: Pygmy Elephant

Genus: *Loxodonta*

Species: *cyclotis*



It was always thought that there were two species of elephant in the world; the African savanna elephant, (*Loxodonta africana*) and the Asian elephant, (*Elephas maximus*). But now, through DNA testing, it has been discovered that there is a third species; the African forest elephant.

When a DNA identification system was set up to trace where poached ivory was coming from, scientists found that the African elephants consisted of two very different species. They expected slight variations in the genetic makeup of the savanna elephant, but were surprised to discover the two different species.

The new species, the forest elephant, was considered to be a subspecies of the African elephant, and was known as *Loxodonta africana cyclotis*. That means scientists thought that, although the elephants had adapted to their forest habitat, they were still savanna elephants. But DNA evidence shows that about 2.5 million years ago two genetically different strains of elephants evolved in Africa. The forest elephant, now known as *Loxodonta cyclotis*, found its niche in the equatorial forests of central and western Africa. Here they have lived hidden from view and practically forgotten.

Some scientists consider the two species as different as lions are from tigers, or horses are from zebras. Genetically the difference between the two species of elephant is more than half as big as the differences between the African elephant and the Asian elephant, or

58%.

When you think of the African elephant you probably picture the savanna elephant. It is a huge animal, standing almost 12 feet tall at the shoulders. It has large ears that come to a point at the bottom. The tusks are long and slightly curved. They live on large, dry grasslands with a few thorny acacias dotting the plains.

The forest elephants look very different from savanna elephants. For one thing, they are smaller and stockier than savanna elephants. Forest elephant males only get to be about 8 feet in height while large savanna elephants can reach 13 feet. Their ears are rounded and their tusks are straight and thin with a pinkish tinge to the ivory. The lower jaw is longer, giving the forest elephant a long, narrow face. Forest elephants also live in smaller family groups. Forest elephants are also darker than savanna elephants.



Forest elephants are adapted to living in dense forests. Their tusks are straight since curved ones might get caught in the underbrush and vines of the forest. They are smaller so they can move around the dense forests more easily.

Not much was known about the forest elephants because tracking them was very difficult. Scientists have begun tagging forest elephants with tracking devices so they can be more easily followed. It has recently been discovered that forest elephants can have a home range of about 2,000 square kilometers (1,243 square miles).

Seventy years ago three to five million elephants inhabited Africa. Today only about 500,000 elephants remain. One third of these are forest elephants. Because there are now two separate species, there are fewer elephants of each species. Elephants in Africa are now more endangered than previously thought. The hard and pink ivory of the forest elephant is highly prized by poachers who are difficult to catch in the cover of the rainforest. Logging is another threat to the forest elephant.

The African elephant, *Loxodont africana*, is listed as endangered under the Convention on International Trade of Endangered Species (CITES). Conservationists are afraid that declaring the forest elephant as a separate species could open a loophole under the current treaty and open up hunting of forest elephants for their

ivory. A study of the forest elephant's status is under way, sponsored by the National Geographic Society, European Union, National Science Foundation, National Institutes of Health, and U.S. Fish and Wildlife Service.

by E. Benders-Hyde 2002



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Wet-Dry Tropical Climates (Aw)

Savanna Climate

The Savanna biome has a wet/dry climate. Its Köppen climate group is **Aw**. The **A** stands for a tropical climate, and the **w** for a dry season in the winter.

In the savanna climate there is a distinct dry season, which is in the winter. Savannas get all their rain in the summer months. During the distinct dry season of a savanna, most of the plants shrivel up and die. Some rivers and streams dry up. Most of the animals migrate to find food.

In the wet season all of the plants are lush and the rivers flow freely. The animals migrate back to graze. In West Africa the rainy season begins in May.

It is usually cooler during the dry season by a few degrees. Because it is in the tropical latitudes that is still hot enough. The savanna climate has a temperature range of 68° to 86° F (20° - 30° C). In the winter, it is usually about 68° to 78° F (20° - 25° C). In the summer the temperature ranges from 78° to 86° F (25° - 30° C). In a Savanna the temperature does not change a lot. When it does, its very gradual and not drastic.

There is an annual precipitation of 10 to 30 inches (100 to 150 cm) of rain. From December to February hardly any rain falls at all.

by Alex P. 2000

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Australian Tropical Savanna Climate

Wet-Dry Tropical Climates (Aw)

The Australian Savanna is characterized by two very different seasons: the "wet" and the "dry". The dry season lasts 5 to 6 months, usually from May to October. The wet season lasts 5 to 6 months and lasts from December to March. The Australian tropical savanna is found along the north coast of Australia at a latitude range of 10° to 20° South.

Usually only grass grows in the savanna, with some scattered trees. If there was no dry season, trees would populate the savanna. Trees do not densely populate them since they need too much water. Because in the dry season it doesn't rain, trees can only grow in the wet season.

To survive the dry season, plants have grown long roots to suck all the moisture out of the ground. They grow thick bark to protect themselves from annual fires. They also have trunks that can store water, and leaves that drop off during the dry season to preserve water.

There are many kinds of animals, they each have a specific preference for what and when they eat. Certain herbivores eat only some parts of plants during specific times of the season, this way certain foods do not run out, and animals can survive.

The Köppen's Climate Classification of the Australian Savanna is Aw. The Australian Savanna is usually around 75° F to 80° F. The average temperature per year is about 78° F.

The wet season is during the summer. It is warmer in the rainy season than the dry season, because it is humid. The average temperature during the wet is about 85°F. It can get as high as 120° F. further away from the coast. The wet season has a lot of rain which is blown in from the equator to the north, and causes a lot flooding in local areas.

During the dry season, which is in the winter, there are cooler temperatures, clear skies and lower humidity. The average temperature during the dry is about 70°F. Through August and September the temperatures begin to rise as the sun moves more directly overhead.

In between both the wet and the dry, the seasons go through a gradual change from one season to the other.

The average precipitation per year in the Australian Savanna is around 20 to 40 in. In both

the Australian, and the African savanna, the average precipitation in the dry season is about 4 in. The average precipitation in the Australian and the Africa savanna during the wet season is around 15 to 25 inches. Only rain falls in the Australian Savanna, there are no other forms of moisture. Most of the rain falls during the wet season.

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Jarrah

Common Name: jarrah, swan river mahogany
Genus: Eucalyptus
Species: marginata



The jarrah is one of the many species of eucalyptus. The jarrah tree usually grows to about 40-50 meters high, with a trunk diameter of three meters. The trunk of the jarrah is long, straight, and has no branches on it. The jarrah tree has rough grayish brown bark with vertical grooves, which sheds in long strips.

The leaves of the jarrah tree are about 8 to 13 centimeters long. The top of the leaves are dark green and the bottom side is lighter. The species name of the plant "marginata" relates to the light colored vein around the edge of the leaf. The curved leaves are found at the top of the tree amongst the flowers.

The flowers of a jarrah tree are white with a cone shaped bud cap, 5-9 millimeters long. The flowers are found in groups of 7-11.

The flowers have a magnificent scent, while the ball shaped fruits grow to about 9-16 millimeters long. It flowers every other year making it a special event for bees to pollinate it and make honey. The jarrah tree can live as long as 500 years.

The jarrah tree usually grows in gravelly soil, but occasionally it is found in sand or loam. The jarrah tree has widespread distribution in the dry Australian Savannah. It forms its forests or woodlands ranging from Albany to Gingin, and there is one very old tree in Manjimup that is dated 500 years old.

One of the adaptations the jarrah tree has made is called a lignotuber. The lignotuber is a large swelling underground. This swelling can store carbohydrates, and can make it possible for a young jarrah to grow back after a fire. Another adaptation the jarrah tree has made is its long roots. This makes it possible to pull up underground water during a drought. This drought resistance is helpful in its natural dry habitat.

The jarrah tree is mostly used for timber. Jarrah wood makes very durable, strong furniture and building materials, such as wharves, bridges and railroad ties. Before modern asphalt the streets of Berlin and London were paved with blocks of jarrah.

Another use of the jarrah tree is honey. Every other year when the jarrah flowers bloom, beekeepers have their bees pollinate the tree and make wonderful honey.

To some animals the jarrah tree is very useful. Birds and other animals use big holes in the jarrah tree to nest. Feral bees make their hives in holes in the tree. Nectar from the jarrah tree is also a main food source to many insects, marsupials, and birds

The jarrah trees population is decreasing because of heavy timbering. It is also very defenseless against dieback. Die back is a sort of algae that causes root-rot. This organism is related to the one that killed the potato crops of the Irish famine. Researchers are trying to make genetic transfers into the jarrah trees from the dieback resistant Marri gum, but it will take a long time.

by Celeste B. 2001

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Emu

Genus: Dromains

Species: novaehollandiae



The largest bird that inhabits the lush, grassy fields of Australia is the emu. Adults are about 5.7 ft. tall and weigh about 110-120 lbs. It has medium size wings, but it can't fly! The base feathers are white, while the feathers on the top are blackish brown. The feathers act as a "feathery-quilt" because they're so loosely connected. From a distance they look very course.

The weight of the female emu is 90 lbs., while the male weighs 80 lbs. They only have 3 toes, and they are very sharp, making it easy for them to run really fast. Emu's have long, strong necks, very sharp beaks, and bald, bluish heads.

Emu's usually mates during May-August, beginning when they're almost 18 months old! The female lays around 5-20 eggs in a shallow nest made out of mud, leaves, grass, bark, and twigs. The color of the eggs are greenish-black. When the babies are born, they're beige with dark stripes and little dots on their tiny heads. It takes 2 months for the babies to hatch. During those 2 months, the father sits on the nest, drinking little water and usually losing a total of 10 to 20 lbs. When the chicks hatch, the father emu takes care of them for several months.

The emu used to fly at one time, but lost the ability because they had no predators and didn't need to fly anymore. When the Europeans came, they started to hunt them, but by then the emu couldn't fly.

The emu eats mostly fruits, flowers, insects, seeds, and it absolutely adores caterpillars and green vegetation. Emus need to drink water on a regular basis in order to stay alive.

Emu chicks are killed by dingoes, foxes, and feral cats. The adult emu's are killed by humans, for there isn't a large enough animal left in Australia to take it down. There once was, but they've become extinct in Australia.

The emu isn't endangered, but they might be someday. Most of them today are killed by farmers who say that the enormous bird destroy their crops.

Nina B. 2001.



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- [Candelabra Tree](#)
- [Elephant Grass](#)
- [Jackalberry Tree](#)
- [Manketti Tree](#)
- [River Bushwillow](#)
- [Umbrella Thorn Acacia](#)
- [Whistling Thorn](#)

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- [Grant's Zebra](#)
- [Lion](#)
- [Nigriceps Ants](#)
- [Nile Crocodile](#)

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Aardwolf

Genus: Proteles

Species: cristatus



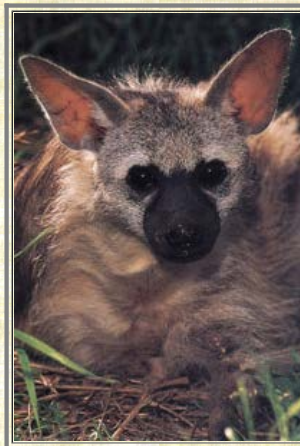
The aardwolf is a furry hyena that looks like a dog, but has long front legs and short hind legs. Aardwolf means "earth wolf" in Afrikaans. Afrikaans is a language spoken in southern Africa. The aardwolf was named like that because they live in underground burrows. The aardwolf can be found from Angola to Zambia and in the Fynbos of South Africa. It also lives in southern Egypt down to Tanzania.

The Fynbos is a Mediterranean biome and is located in the southwest corner of South Africa, from latitude 20° to 33° South, and longitude 17° to 32°

East. The winters are cold and wet and the summers are hot and dry. It has many plants found nowhere else in the world. Most of the plants are scrubby with small, leathery leaves. Except for the [Bontebok](#), animals in this region can be found in other places in Africa.

The terrain is mostly grasslands, plains, rocky areas, bushy areas, semi-desert, savanna, and hills, and occasionally you would find a small mountain, or two. The aardwolf, aardvark, termites, hyenas, lions, and several kinds of reptiles and amphibians are some of the animals that live there. The aardwolf inhabits the open grassland plains in the Fynbos where its main food source, the harvester termite, builds its mounds.

The aardwolf is a very small and shy animal compared to its bigger and more aggressive relatives, the hyenas. It is about 15-20 inches from the shoulder to the ground. Its tail is 8-12 inches. The aardwolf usually weighs between 50 and 60 pounds. It is a light buff color, with an orange tint to it. Five to six thick black stripes run down its sides. Its legs are banded with black, and the part under the knee is completely black. Its fur is long and it has coarse guard hairs. It has a mane going down from the head along the back of its neck towards the tail, which is long and bushy and becomes erect when they are frightened.



The head of the aardwolf looks like a dog's, except it has bigger and more pointed ears. The aardwolf has big ears to hear termites underground when it is hunting. The ears are also large to help the aardwolf lose body heat. Its eyes are black, rather small, and are facing front, for depth perception. Its muzzle is black, broad, and nearly hairless. The aardwolf's teeth are small, blunt (except for the canine teeth, which are rather sharp), and widely spaced. It has a humped back and low hindquarter. The aardwolf moves like a dog. Unlike a hyena, the aardwolf has five toes on its forefoot, while the hyena only has four toes. The aardwolf also has non-retractable claws to scratch in the dirt to dig for termites.

The aardwolf reaches sexual maturity at the age of two years. They mate throughout the year. Its gestation period is 90 to 100 days. The birth interval is one year. The number of young a mother aardwolf can produce is anywhere from one to six, but typically it is between two and four cubs. The cubs are born blind and helpless. Both parents raise the young. The cubs rely on their parents for 16 to 20 weeks. The cubs spend six to eight weeks in the den. After that period, at about three months, the young aardwolves are ready to start foraging with one or both parents. They do that for about a month. At about four months, they start foraging on their own.

The aardwolf is a solitary animal, except when raising young. Several females with cubs may share a burrow. It doesn't have groups because of their sole diet of termites. Animals usually form groups because they need help killing something big, like a lion. Since aardwolves eat termites, they don't need help killing them because they are so small. The aardwolf does not migrate anywhere outside of its territory. There are two distinct populations of aardwolves. One is located in southern Africa in the Mediterranean Fynbos Biome. The other one is located from Angola and Zambia, to South Africa. It marks its territory with a musky fluid from its anal glands (it also does this in defense when it is under attack from dogs, or one of its predators). Its life span is up to 14 years in captivity, and about 10 years in the wild. The aardwolf is a nocturnal animal. It spends the day in abandoned burrows of the aardvark. They pick these burrows because they are usually close to an abundance of termites. Since the aardvark eats termites too, they like to burrow close to a nest of termites.

The aardwolf is a carnivore, but is called an "incomplete carnivore" because it is an insectivore. Its typical diet is Harvester termites (*Trinervi termites*), insect larvae, and occasionally eggs of ground nesting birds. It has weak, small, rounded, and widely spaced teeth for chewing termites and the other small things that it eats. It has good hearing to locate termites underground. It also has a good sense of smell. The aardwolf has a long, sticky tongue that it uses to lap up the termites in their tunnels. Large amounts of soil may be ingested with the termites when it eats them. On an average night, an aardwolf can consume anywhere from 200,000 to 300,000 termites. The termites usually come out in dense columns, so all the aardwolf has to do is lap up as many of them as it wants to eat.

The aardwolf's long sticky tongue helps it survive in the environment. Its tongue is used for lapping up termites. This method enables it to eat a lot of termites at a time. It has blunt teeth because it only eats small things. Therefore, it doesn't need very sharp teeth to kill big animals, and tear flesh, unlike its relatives the hyenas.

The aardwolf's prey is termites, insect larvae, and eggs of ground nesting birds. It usually eats termites, but occasionally, it will find some carrion that the hyenas have killed, or a small rodent to eat. The aardwolf's predators are lions, leopards, poisonous snakes, larger hyenas, and humans. The aardwolf is not considered endangered in general, but in some places it is because of human hunting. Some humans hunt it for its skin and meat, which is considered valuable.

When frightened, the aardwolf erects all its hair, of which the mane is the

highest. When it is under attack from dogs, leopards, or other predators, it emits a musky fluid from its anal glands. This defense is almost as effective as a skunk's spray. When an aardwolf is caught inside another aardwolf's territory, a huge fight can occur. The aardwolves bark, emit a musky fluid from their anal glands, and sometimes use their rather sharp canine teeth to defend their territory.

The aardwolf used to be considered part of the hyena family, but has been placed in a different genus because of major differences in its teeth. Although it looks like a dog, it probably wouldn't be a good pet because it smells like a skunk. Peeeyuuuu!!!!

by Taza V. 2003

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Balsam Fir

Common Name(s): Eastern Fir, Canadian Balsam, Blister Fir

Genus: Abies

Species: balsamea



You can find the Balsam Fir in northeastern North America, from Virginia to Newfoundland and northwest towards Yukon and Labrador. The balsam Fir can be found in many biomes including the Taiga biome.

The Balsam Fir is a small to medium sized native evergreen tree. It can grow to be 40 to 80 feet tall. The Balsam fir has a wide base and a narrow top that ends in a slender, spirelike top. The branches grow from the trunk at right angles, with the lower branches spreading and drooping to the ground when the tree grows in the open. In a dense stands, many of the lower branches are dead. It can grow to be a maximum of 200 years old.

The Balsam Fir's needles are 1 1/2 inches long. They are flat, rounded at the tip, and normally have a strong curve. They are dark green above and whitened below. The balsam fir's bark is smooth thin and have a grayish color. Blisters of resin appear on the bark of old trees, from which it gets one of its common names. Balsam fir has a shallow root system that rarely grows deeper than 30 inches.

The cones stand upright on the 1st year growth of the upper branches. The tree produces its first seeds when it is 20 years old, or 15 feet tall. The seeds are winged and are mostly dispersed by the wind, traveling from 20 to 525 feet from the parent tree.

The Balsam fir is a late successional, or climax growth tree. This means that they grow in old, undisturbed forests. The Balsam fir is the least fire resistant of evergreen in North America, and its seeds are destroyed by fire. Balsam firs first appear 30 to 50 years after a fire.

Balsam fir is one of the major food supplies for moose in the winter. Caribou and white tailed deer leave it alone. Red squirrels will eat the male flower buds. Deer, caribou and moose use Balsam fir stands as cover in the winter because the snow is not as deep under them as in hardwood stands.

The wood of the Balsam Fir is sometimes used as lumber. It is lightweight, low in bending and low in resistance to shock as well. The tree is often used as a Christmas tree, pulpwood, or cabin logs.

Samantha S. 2000.



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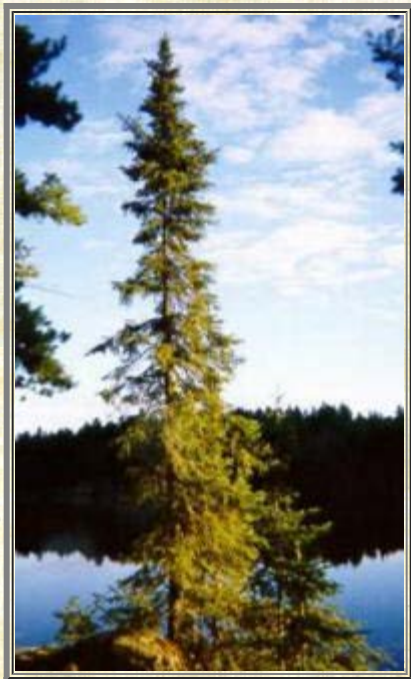
Black Spruce

Common Names: Black Spruce, Bog Spruce, Swamp Spruce, épinette noire

Genus: Picea

Species: mariana

Parts used:



The Black Spruce is a tall tree. It can grow to be twenty-five meters tall. It grows in the taiga biome. As the tree gets older the crown of the tree gets more and more like a spike. The Black Spruce has sharp needles with four sides on them. The needles are blue-green, short, and pointed. They are usually a half an inch long. The bark of the tree is gray-brown. The branches are short and drooping, and are usually layered.

The Black Spruce has pinecones. The pinecones are black and the seeds are usually a purplish-brown. Many animals such as deer, moose and elk do not feed of this plant. The white tailed deer will only eat the saplings under starvation. But many birds eat this plant seeds. The seeds of this tree give the animal's nutrients.

The Black Spruce enjoys colder climates in the northern part of the world. It is all over the taiga forest.

It also enjoys poorly drained soil. The Black Spruce is able to survive in the colder climates because of its layered twigs, waxy pine needles, and rough bark. These survival skills protect the Black Spruce from the cold and predators. Also from forest fires.

The Black Spruce does not have a special root system.

The Black Spruce is used to build house. It is a good type of wood to make houses because of its layered wood. Layered wood is wood that is very thick and has many layers of bark. Some other values this tree has are, Christmas trees, antiscorbutic beverages, and rope. The Black Spruce is not an endangered species. It is plentiful in the wild.

Erinn L. 2001



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Eastern Red Cedar

Common Names: Red Cedar, grave yard tree

Genus: Juniperus

Species: virginiana



The Eastern Red Cedar is a small evergreen that commonly grows to a height of 10-50 feet. Its name is misleading since it is a juniper and not a cedar. Its range is from Nova Scotia to northern Florida, and west to the Dakotas and Texas. They can grow in any type of soil, and will take over abandoned fields and fence rows. Eastern Red Cedars prefer full sun and seedlings don't grow well in forests. When red cedars are found growing in a forest, you can be sure they started growing when it was an open field.

The Eastern Red Cedar grows in a pyramid shape. The top rounds off as it grows older. It has two types of leaves.

The older leaves are flat and scale-like and only 1/16 of an inch long. The younger leaves are sharp-pointed and may be up to 3/4 of an inch long. They have whitish lines on top. In the summer they are a brilliant green, but in the winter they can turn copper yellow to rusty brown.

The wood of the Eastern Red Cedar is very durable and often used as fence posts. It contains an oil that repels moths. The oil is also used in medicines and perfume. The bark is reddish brown and peels off in stringy strips. It can be used to make a reddish dye.

Male and female flowers of the Eastern Red Cedar grow on separate trees. The fruit of the Eastern Red Cedar are a waxy, bluish berry about 1/4 of an inch in diameter, and are covered with a white powder.

The Eastern Red Cedar is a slow growing tree and lives to be very old. It gets its name, grave yard tree, because of an old superstition that says,

when a red cedar you planted grows tall enough to shade your grave, it will be time for you to die.

The tree's fruit provides food for animals such as pheasants, Cedar wax-wings and other song birds. Birds eat the seeds and spread them. Many animals use it as food and shelter in the winter. The wood is used to make fence posts and wooden pencils.

Samantha S. 2000.

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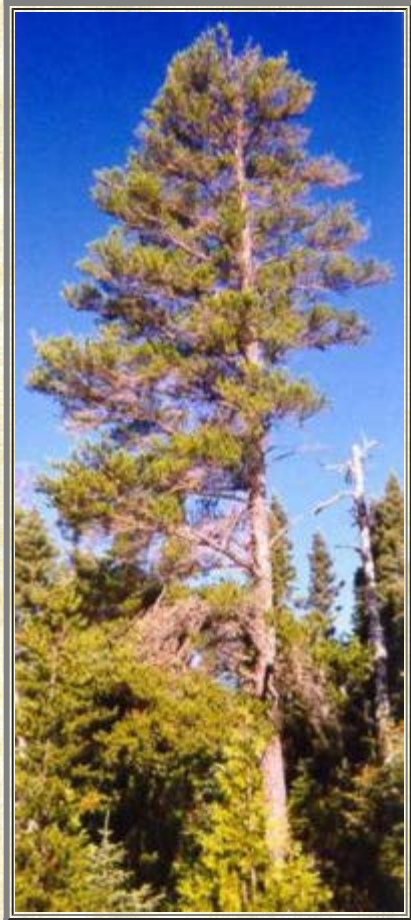
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Jack Pine

Common Names: Eastern jack, Grey, Black, Black jack, Scrub, Prince's pine or Banksiana pine or Pin gris.

Genus: Pinus

Species: banksiana



The Jack pine usually grows to be twenty-seven meters tall and sixteen and thirty-two centimeter diameter around the trunk. As it grows it gets rounder and rounder around the crown area. The bark of the jack pine is a reddish-brown. The bark is also flat. As the tree gets older the bark gets grayer. The jack pine has needles instead of leaves. The jack pine has long and slender twigs. They are a reddish color. The jack pine has pinecones that store and produce its seeds. The seeds are usually four to five millimeters long and are dark brown. The Jack Pine gives most animals their nurturance. The tree gives its nurturance to mostly rodents.

The jack pine lives in the taiga biome, which is a semi cold forest in the northern hemisphere. It is mostly found in the colder states and countries. Some examples are, New Hampshire, Maine, and Vermont. The jack pine is plentiful in the wild.

The jack pine adapts to flat or hilly areas that have sandy soil. The jack pine does not have a special root system. It is possible for the jack pine to grow in the taiga because of its waxy pine needles and rough bark. It

is good to have waxy pine needles and rough bark in the taiga because the

wax on the pine needles protects the needles and so does the rough bark. These things protect the tree from the cold wind in the taiga. These characteristics also protect this tree from the weather in the taiga, which is usually cold. In the taiga, the brush starts forest fires and the waxy pine needles and rough bark protect the tree. The jack pine has long and slender twigs so the snow does not stick onto the twig.

The jack pine has two major uses. The jack pine is used to build houses and it is used to make pulp for paper.

by Erinn L. 2001

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Paper Birch

Common Names: White Birch, Canoe Birch, Silver Birch

Genus: Betula

Species: papyrifera

Parts Used: bark, wood and sap



Paper birch trees have a thin bark that peels in horizontal layers which separates into sheets, almost like paper. Birch trees can grow in pairs or clusters. There are many different types of birch trees and they all grow fairly tall. Both the sweet and paper birch can grow anywhere from sixty to eighty feet high. Some smaller types of birches are yellow birch, which grows anywhere from fifty to seventy-five feet, the river birch which grows anywhere from fifty to sixty feet, and the smallest yet, the gray birch which very rarely grows higher than forty feet. Birch nutlets are fairly small and grow in a cone. Birches produce long catkins (scaly spikes) which hold tiny flowers. The closed male catkins appear in the autumn, whereas the female ones don't appear until the following spring.

Paper birch or white birch was used by Indians to make birchbark canoes; therefore, it received the name, Canoe birch. Indians still make ornaments and small baskets of birchbark. Siberians collect the sap of the weeping birch to make syrup.

Birch is a group of about forty trees and shrubs of North America, Europe, and Northern Asia. Paper birch grows in the [taiga](#), or [boreal forests](#), of Canada as far north as the [tundra](#), and in the [deciduous forests](#) of the northern United States as far south as the Appalachian Mountains. The European white birch grows in northern Europe.

by Leah E. 2000



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Siberian Spruce

Genus: Pecea

Species: ovobata



The *Pecia ovobata*, or Siberian Spruce, is a tall, perennial needle-leaf tree. The Siberian Spruce is a very beautiful tree that can grow up to about 30 meters high. The trunk of this spruce is about 1.5 meters in diameter. It has slightly drooping branches that make it look like a pyramid. It has thin twigs that are yellow - green in color. The twigs are also slightly glossy. The Siberian spruce is a coniferous tree so it grows pine needles and pine cones. The needles are short from 10 - 18 mm. long and they are angular in cross section. They are a dull green color and more appressed to the upper branch. The pine cones are cylindrical and oval shaped. They are 6 - 8 cm. long and grow on either side of the pine needles. When the pine cones are immature they are purple. When the pine cones become mature they turn brown like most pine cones.

You can find the Siberian spruce in the Siberian Taiga or Boreal forests of Siberia. The taiga is the largest biome on the earth, stretching over Eurasia and North America. It is located just below the tundra

biome, near the top of the world. The Siberian Spruce makes up 5.7% of the total area of the Boreal forest.

There are extreme temperatures in the Siberian Taiga. The summers are very hot,

reaching over 100°F . The winters are bitterly cold , dipping down to - 80°F. The winters are cold and lonely because all the animals are hibernating or have flown south. Only a few animals stay for the winter. There are actually only two main seasons in the taiga. They are Summer and Winter. Spring and Autumn are really short so you barely know they exist. The Siberian taiga is not an easy place for humans to live because of the weather. Most of the taiga's area is in the watersheds of the Yenisey and Lena river systems. If you were to go to the Siberian taiga you would find yourself in a cold coniferous forest for miles!

The conical shape of the Pecea ovobata promotes shedding of snow and prevents loss of branches. The narrowness of the needles reduce surface area through which water may be lost. They also have a thick waxy coating that is water proof. This protects the needles from drying winds. The dark green color of the needles helps the foliage absorb maximum heat from the sun and begin photosynthesis sooner.

The Siberian Boreal forest is an important industry for the Russian Federation. Moose eat the twigs of trees in the Siberian taiga. Birds also eat the seeds of trees that grow in that area. The Siberian spruce and other trees in the Boreal forest have been logged since the 1950s. The trees are being logged for money. They are also being logged to build houses.

The Pecea ovobata is not on the endangered list, but the Siberian boreal forest is. Human induced forest fires, clear cutting, air pollution and poaching are all major threats to the Siberian Taiga and the Boreal forest.

by Tessa W. 2002

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White Fir

Common Names: Silver Fir, Colorado Fir

Genus: Abies

Species: concolor

Parts Used: the wood is used for lumber and the whole tree is often used for Christmas trees.



The White Fir is 60-100 feet tall and can live up to 300 years making it a very large forest tree. The leaves are 2 to 3 inches long and slightly flattened. They are silvery blue to silvery green, curve up from the stem and are soft to the touch. The cones are 2-5 inches long colored an olive green to purple color. They grow upright in the top of the tree. The bark is described as being thin. The bark is ashy gray with resin blisters. You can find the White Fir in most of the western regions of North America. It is the only native fir of the North American Taiga.

The most used part of the White fir is the wood, which is used as lumber. The tree is also often used as a Christmas tree. It smells great and has sturdy branches, which hold their shape well. Squirrels enjoy the White Firs seeds.

Porcupines like to gnaw on the White Fir's bark. The tree is also a great home for the grouse. In the winter it makes a great roosting place and they can feed off of the buds and needles.

by Samantha S. 2000

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White Poplar

Common Names: Silver Poplar

Genus: Populus

Species: alba

Parts Used: wood



Poplars do not live very long. It is illegal to plant poplars along streets in some cities because they clog underground drainpipes and sewers. Poplar wood is light whitish/brownish in color. It is soft, light, and fairly weak. The white poplar has leaves that are silvery white, and the bark on the branches is white. They also have three to five lobes, just like a maple leaf. Poplars grow best in moist places.

Poplar trees are often planted as shade trees because they grow so fast. Manufacturers use poplar wood to make boxes and crates.

Papermakers use it for paper pulp. Papermakers also use it to make excelsior,

wood shavings used for stuffing furniture and for packing breakable objects.

Poplar trees are found throughout the Northern Hemisphere. About ten of the 35 species of poplar trees are native to North America. Balsam or tacamahac poplar grows throughout Canada. It can live as far north as trees can go and as far south as Northern United States.

by Leah E. 2000

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Bald Eagle

Common Names: Fish Eagle, Sea Eagle

Genus: Haliaeetus

Species: leucocephalus



The Bald Eagle is the national bird of the United States of America. It is considered a sea eagle that has a white head. It is large and strong and weighs eight to twelve pounds. Their wingspan can be two meters (seven feet) and they can be larger than a meter from head to tail. The Bald Eagle has a curved beak which is large and very strong. It's toes have talons which are very strong claws. They have excellent vision which helps them to hunt.

The Bald Eagle is found over most of the North American taiga but eighty percent of them are in Alaska. They build several kinds of nests that can be very large and can be in trees, on cliffs, and on the ground. They change the shape of their nests to fit different trees.

The Bald Eagle prefers to eat dead animals but will also eat live chickens or fish. They hunt in pairs and will steal food from other Eagles. They do not need to eat every day and will change their diet depending on where they live.

The Bald Eagle is a bird of prey and they will attack for food. Until this year they were called an endangered species but as of July 2000 they will changed to a recovered species.

Jai B. 2000.

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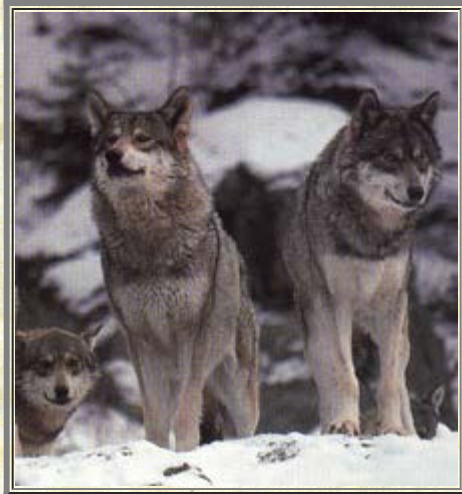
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Gray Wolf

Common Names: Timber Wolf

Genus: Canis

Species: lupus



Gray wolves can survive in many biomes as long as food is plentiful and the climate is relatively cold. The Siberian Taiga, one of the habitats they are best suited to, is a boreal forest with long, cold winters and short summers. It covers part of northern Russia, the place where wolves are most plentiful. All wolf packs defend a territory, which can greatly vary in size.

The gray wolf is the largest wild canine. They are around 3 feet tall at the shoulder and are about 3 to 5 feet in length from nose to tail tip. Their weight ranges from 40 to 176 pounds. Male wolves

are larger than females. Gray wolves have long legs with large paws. Their tails are long and bushy. They have pointed ears and yellow brown eyes. Their rough coats can be varying shades of gray, brown, white, or black, but in Europe can be grayish brown.

The gray wolf has many special adaptations. Their coats are made up of woolly fur to provide insulation and long guard hairs to keep out moisture. The gray wolf's large paws have fleshy pads and claws for traction and can spread to provide better support in snow. Wolves have a sense of hearing twenty times sharper than a human's and have a sense of smell a hundred times keener. The wolf's jaws can deliver a crushing pressure of over 500 pounds per square inch! Wolves' vision is very motion sensitive. They have a reflective retina, called a tapetum that enhances their night vision. They can't see color. Wolves have great stamina. They can cover a

distance of more than eighteen miles at a quick trot. They have a top speed of about 40 miles per hour.

The maximum lifespan of a wolf is 17 years. Wolves reach sexual maturity at 1 year for females and 2 years for males. Wolves typically mate once every year between January and March. They have a gestation period of about 63 days. The average litter size is 5 or 6, born in a den, such as a rock cavity or a hole in the ground. Wolf pups have a birth weight of about 1 pound. They stay with their mother in the den for 8 weeks before they are weaned. During that time the other wolves bring food for the mother. Wolves are very social animals. They live in groups called packs. A typical pack is lead by an alpha male and female wolf, which are a breeding pair. The other members of the group are their current offspring and young wolves who are the previous year's litter. There may also be some lower ranking adults. Packs can have as few wolves as 4 or as many as 30. There are also many lone wolves. The largest wolf pack ever recorded was made up of 36 members!

Wolves are carnivores. They eat animals like moose, caribou, and other deer-like animals. When food is scarce, they will eat rodents. They also scavenge. A wolf can eat 22 pounds of meat at one meal. The pack members will track down a herd and select an old, sick, or young animal. They generally use their stamina to wear down prey in long pursuit, but will also sprint to catch it. The predatory success of wolves is mainly due to the flexibility of their hunting methods. They will flush out their prey, stalk it, or use trickery. No humans have ever been killed by healthy wolves in North America.

The wolf is at the top of the food chain and has no natural enemies. Their only threat is humans. Wolves help keep the ecosystem's population in check by preying on the weak animals so there will be food for the stronger individuals.

In Canada and Alaska, the gray wolf population is stable. In most of North America, however, they are an endangered species. In Europe, Asia, and Africa, the remaining wolf populations are tiny. The largest wolf population in Europe and Asia is found in Russia, which includes the Siberian Taiga.

by Bonnie E. 2002

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Grizzly Bear

Genus: Ursus

Species: arctos horribilus



The Grizzly Bear is a sub-species of the Brown Bear. The only distinctions are that the Grizzly Bear has a silverish shine to its fur, and a strange shoulder hump that all other bears don't have.

Grizzly Bears have omnivore teeth which lack carnassial or shearing teeth. They instead have molars to grind up plants, which make up a great portion of their diet.

Their body is stout and heavy with

very muscular legs, which allows them to reach speeds of up to 35 miles per hour for a short distance. Another interesting thing is that they walk with a "heel toe" pattern like humans. Their heads are large and round with a dished nose, and small round ears.

A Grizzly Bear's coat has many color phases that include the following: black, cinnamon, red, blonde, brown or mixes of these colors. Their coat is very shaggy which helps get it through the winter. The brown bear weighs from 330 pounds to 885 pounds and its common length is 4.9 to 8.3 feet. It is usually 3 to 3.5 feet high. Their normal claw length is 3 _ to 4 _ inches long; it is curved and highly useful in climbing trees.

The Grizzly Bear reaches sexual maturity 2-3 years after birth, and its mating season is in the spring to early summer. It gives birth to usually 1-4 young that weigh 1 pound when born. These cubs suckle until April or May, then they are able to follow their mom on hunting trips. The following spring the mother leaves the cubs to mate again. Only the mother raises the cubs, the father leaves after mating. The Grizzly Bear lives up to 25 years, and mates every 2-3 years.

The sharp claws this bear has helps it to dig for its food, and its coat helps it survive long winters in the mountains. Then, before winter, it fattens itself up, and hibernates in caves until late winter or early spring.

The Grizzly Bear eats 200 different kinds of plants that make up 75% of its diet. The other 25% of their diet is made up of, insects, honey, small rodents, mammals, and carcasses. Like all bears it is an omnivore.

The Grizzly Bear is a predator. It helps the environment by reducing the weak and elderly deer population when there are too many.

The Grizzly Bear is endangered in all the U.S. except in Alaska. The U.S. Fish and Wildlife Service are making bear sanctuaries such as Yellowstone State Park.

by Quinn R. 2001

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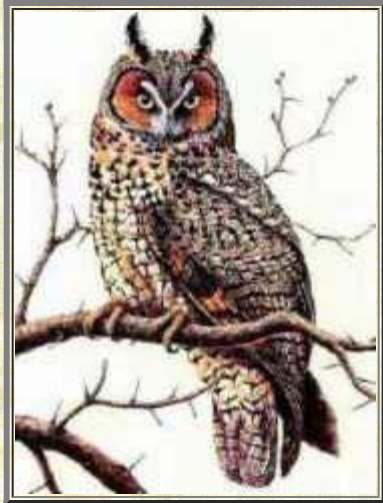
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Long-Eared Owl

Common Names: Cat Owl

Genus: Aiso

Species: otus



The Long-Eared Owl is a medium sized owl which is approximately 35 centimeters long (around 13 inches) and weighs 8-10 ounces. It is called long eared because of the tuft of feather on its head that look like ears. They do have ears, one which is fifty percent larger than the other and is higher up on the head. This helps them to hear in a special three dimensional way, that helps them to be able to hunt better in the dark. They have yellow eyes, black bills, and a very dark colored throat. They have a round face that is flat. Their face always looks very serious. Their wingspan is 37-40 inches long. They have strong talons for hunting. They turn their head from side to side and can even turn them so far that they

can see behind themselves. This turning helps them to hear better when they are looking for food. They feed mostly on voles and other small rodents.

The Long-Eared Owl lives in the Boreal forests, or Taiga, from Southern Canada to the middle part of the United States. It sometimes migrates to Mexico in the winter but some do not. It is also found in many parts of Europe, Asia. It lives mostly in woodlands and fields but they do not often go deep into the forest. The Long Eared Owl will move into a nest which was abandoned by other large birds. It will lay several eggs, up to seven. Once they are hatched, the owl will raise them for up to sixty days before the young are left on their own. They are nocturnal which means they are awake at night and roost, or are asleep in the daytime.

The Long-Eared Owl's special hearing allows it to "see" its prey in the dark which makes night hunting more possible. It flies low to the ground so it is easy to drop on its prey.

The Long-Eared Owl is mainly a predator and they are not at the moment on the endangered species list. But they are on the State of Connecticut's endangered list because of loss of habitat. This happens when houses and roads are built where once the Long-Eared Owl hunted. They are also listed as a species of special concern by the Department of Fish, Wildlife and Parks for the same reason. They rarely come near people except in bad weather when they may come to a garden to hunt mice and small birds. This makes it hard for them to adapt to living together with people.

by Jai B. 2000



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Red Fox

Common Names: Reynard

Genus: Vulpes

Species: vulpes



Another common animal in the Taiga Biome is the red fox. It can grow up to 2 1/2 feet long, 15 to 16 inches tall at the shoulders, and weigh 10 to 12 pounds. It has a rusty-red fur, a white-tipped bushy tail and black legs, ears and nose. The nose is pointed, and the ears are wide and in the shape of a triangle.

The sly, intelligent fox adapts well to different habitats. It specializes in hunting small mammals such as rabbits and hares. The red fox is very elegant, intelligent and a nocturnal

creature. It usually travels and hunts alone. It is a carnivore. The fox eats small animals like rabbits and hares.

The female, or vixen, has from 4 to 10 pups early in the spring. The male, or dog fox, will stay around and feed the vixen while she nurses the pups. He will help with teaching them to hunt for a few weeks until they are independent. If the vixen is killed while the pups are young, the dog fox will raise them himself.

The red fox usually rests in a burrow during the day that was recently abandoned by larger creatures such as a badger. It ranges from northern America, Canada, Alaska, and northern Europe across to the Pacific Ocean. Its habitat is in the woodlands, forests, and open country.

The red fox is classified as a nuisance by some because it attacks and eats farm animals like chickens and ducks. They are often purposely shot and killed by farmers. They are not endangered.

by Dillon B. 2000

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River Otter

Genus: Lutra

Species: canadensis



One of the animals that can be found in the North American Taiga is the river otter. The Taiga is an area that is rocky, a bit icy, and has lots of pine trees. The climate is cold, rainy, and snowy. There isn't much sunshine. In addition, there are many varied species of plants. River otters inhabit areas that have thick woods, lakes, swamps, rocks, and logs near grassy areas, streams, rivers, ponds, and mostly fresh water. River otters can be found from 45° to 66° north latitude and from 120° to 139° west longitude.

The river otter is 25-30 inches long from head to body, and its tail is 16-18 inches long. They weigh about 10-33 pounds. They have a long, slender, and sleek body with a tapered tail. They have a coat that is about 2.5 inches thick. River otters have two different types of fur: they have an outer coat of guard that protect their other set of fur which is an inner coat of short, dense fur. The river otter has a dark brown back and can be either light brown or gray on the stomach. The shape of its head is small, round, and flattened. Their eyes are and are located near the top of the skull to give them the ability to see above water while swimming underwater. The ears are very small. The nose pad is large and the snout (which is the muzzle) is rounded with very long whiskers. The nostrils of a river otter are located at the top of the nose to enable it to breathe while most of its body is submerged. When the river otter dives into the water, their nostrils automatically shut. Its whiskers are very sensitive and pick up the vibrations underwater. The river otter has four webbed feet to give it forward thrust when swimming. Also, they have short, strong legs. When it swims, the river otter moves slowly when above water, but when it's underwater, it twists and turns.

The river otter reaches sexual maturity by age two. They mate between

February and March. The gestation period is 62-63 days. The female usually bears two kits. The kits are about four to five ounces. When a river otter is born, it is blind and toothless which makes it helpless. The abilities that it has are they take their first steps at seven weeks. The birth of a kit is sometime between January and May. Most of the time, the female raises her young. Kits usually have to ride on their mother's back while swimming. Kits are also taught to swim. Soon the young ones will get used to the water and become great swimming hunters (they are able to catch fish at 16 weeks). The birth interval is one year. The river otter is mainly a social animal. It doesn't migrate. A river otter is nocturnal and only hunt in the early morning and evening.

A river otter is an omnivore. Its typical diet is fish, shellfish, crustaceans, snails, beetles, amphibians, and other small mammals. It's known to be hunted by foxes and wolves. The river otter benefits from its environment using different advantages to avoid danger. It has adaptations such as, the guard hairs to keep it from freezing and using permeable scent glands to mark territory, identify or for defense kind of like a skunk.

Today the river otter status is vulnerable. It is endangered in the U.S., but is common in Canada. The river otter can be used as a "symbol of survival for wetlands". Pollution is usually found first in the water, wetlands, and small fish. A river otter can't live where fish aren't healthy and they can't live in polluted waters. If otters are healthy, we can assume there is a safe environment for us as well as them.

by Thomas F. 2003

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Boreal forest Climate (Dfc)

Taiga is in Köppen's Dfc climate category. The *D* is a snow climate, while the *f* means there is enough precipitation in all months. The *c* means that fewer than 4 months have an average temperature over 50° F (10° C).

The taiga climate is for the most part dominated by cold arctic air. Exceptionally cold winds bring bitterly cold air from the Arctic Circle: the temperatures fall even more on clear nights when there is no cloud cover. Because of earth's tilt, the taiga is turned away from the sun in the winter. Less of the sun's radiation reaches the ground to warm it up.

Winter, with its freezing cold temperatures, lasts for six to seven months. Summer is a rainy, hot and short season in the taiga. Fall is the shortest season for taiga. Spring brings flowers, the frozen ponds melt, and the animals come out from hibernation.

The lowest and highest temperatures that occur for taiga are the following:

Winter's LOWEST temperature in taiga is -65° F.

Winter's HIGHEST temperature is 30° F.

Summer's LOWEST temperature is 30° F.

Summer's HIGHEST temperature is 70° F.

The temperature range, as you can see, is -65° F to 70° F (-54 to 21° C). For half of the year, the average temperature is below freezing. In the winter the average air temperature is warmer than it is for tundra, which lies north of the taiga.

The taiga climate has an average annual rainfall of 12 - 33 inches (30 - 84 cm). Most of it falls in the summer as rain.

The corresponding biome would be the Taiga biome. The global range for taiga goes all around the world from

Alaska, to Canada, Scandinavia, Russia and China. Taiga climate is only found in the northern hemisphere, because there isn't enough land mass in the southern hemisphere to create a taiga climate there.

2000

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Taiga Climate (Dfc and Dfb)

The taiga is a moist subarctic forest that begins where the Tundra ends. The winters are long, dark and cold with lots of snow, and the summers are warm and short when the daylight can be up to 20 hours long. The average climate for the taiga each year falls below -32°F (0°C). The taiga can be as low as -76°F (60°C). In the summer the temperature can reach as high as 104°F (40°C). The major type of vegetation in the taiga biome are coniferous evergreens. Needles on evergreen trees of the taiga are thin, wax-covered and they do not fall off in the fall. The conifers of the taiga keep their leaves all year around. Needles are the leaves in the taiga biome. Conifers are adapted to the taiga environment because they lose less water and shed snow more easily because of their conical shape. Some types of adaptations in the animals are migration, heavier coats of fur, and some change color, such as the snow-shoe rabbit. Mice and moles live in

tunnels under the snow. Some animals that live in the taiga are bears, badger, beavers, reindeer, foxes, wolverine and squirrels. Many birds migrate to the taiga during the spring because there are so many insects to feed on after the snow melts. The latitude range is approximately between 50°-60° North latitude.

The taiga climate under Köppen's classification system are Dfb and Dfc. The letters of the climate codes mean the following; D = snow climates, f = sufficient precipitation in all months, b = warmest month average under 71.6°F (22°C) at least 4 months have an average of over 50°F (10°C), and c = Fewer than 4 months with average temperatures over 50°F (10°C).

The average temperature per year is 32°F (0°C) The average temperature for the summer can be over 50°F (10°C). The average winter temperature is under 26.6°F (-3°C). The highest temperature for the taiga biome has been 104°F (-60°C). I guess it would be an uncomfortable place for humans to live in. However, millions of people live there.

The average precipitation per year is about 40 inches. The average precipitation for the summer is between 10-20 inches. The average precipitation for the winter is between 20-40 inches. The type of precipitation that falls in the taiga climate are rain in summer and mostly snow in winter.

Something I find interesting about the climate of this biome is that the temperature can change from one extreme to another. I didn't think that a place farther north from us could have higher temperatures than we do.

By Harold Pilskan, 2001

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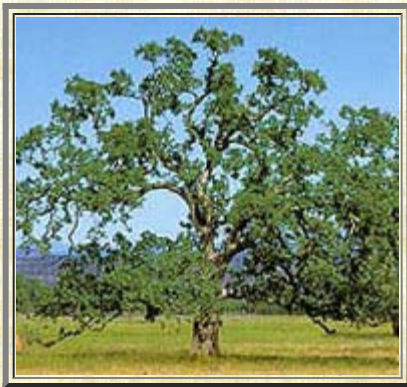
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Blue Oak

Common Name: Californis Blue Oak, Iron Oak, Mountain White Oak, Mountain Oak

Genus: Quercus

Species: douglasii



The blue oak is native to the state of California on the western coast of North America. In its natural habitat it grows in the valleys and lower slopes of the Coast Ranges, the lower western foothills of the Sierra Nevada, and the north slope of the San Gabriel Mountains. Blue oak covers about 3 million acres and is one of the largest ancient forest type in California. The Scottish biologist David Douglas first named the blue oak in 1831 for the bluish color of its leaves.

The habitat of blue oaks is open savanna to open woodlands with shrubby understories. At lower elevation it merges with annual grasslands, and at higher elevations it blends with chaparral, pinyon and juniper woodlands. The blue oak often grows among gray pines and other oaks species such as live oak, black oak and valley oak.

Blue oaks are adapted to drought and dry climates. They can survive temperatures above 100° F for several weeks at a time. Average maximum temperatures in July can range from 70° to 100° F. In January minimum temperatures can range from 10° to 35° F. Annual precipitation averages 20 to 40 inches and mostly falls in the form of rain.

The blue oak is a short tree with an open canopy. The canopy is typically rounded with many crooked branches. The tree grows to average heights of 30 feet. In deep, moist soil it can grow up to 60 feet. It is a winter deciduous tree, but will sometimes shed its leaves during severely hot and dry years and go dormant. The litter of leaves and

twigs decomposes into a soil high in nutrients and organic matter, holding water better than the surrounding areas. This contributes to high species diversity under the canopies.

Leaves of the blue oak are simple and grow alternately on the twig. The leaves are about 1-3 inches long and have wavy, shallow and irregular margins, usually with 7 lobes. They have a blue-green color above, and yellow-green on the lower surface. A waxy coating covers the tough and thick leaves to help conserve water.



Male flowers are yellow-green catkins. Female flowers are small and often solitary. These grow in the axis of the leaves on new twigs. Blue oaks flower from April through May.

The acorns are long, thin, and gently tapering. They are 3/4 to 1 1/2 inches long with shallow caps. The acorns ripen in one year, and can germinate after one month, unlike other oak varieties, which germinate the following spring. From the beginning most growth is in the roots instead of the shoots. This allows it to tap into available water sources right away, and survive dry conditions. The acorns are palatable to livestock and wildlife. It is an important food source for black-tailed deer, game birds and rodents. At least a dozen species of songbirds also eat the acorns.

The blue oak has an extensive root system. It can grow through cracks in rocks to depths of 80 feet to reach ground water. Its root system allows it to survive in fire prone and arid regions. Blue oaks reproduce both through seeds and vegetatively from burnt or cut stumps. The light colored bark is thick and helps reduce fire damage.

The blue oak isn't used in manufacturing because of its crooked growth habit. But it is used as fence posts and fuel wood. Native Americans made meal from blue oak acorns, and used the acorn leachate for dying baskets. The wood was used to make bowls.

Stands of blue oaks are typically 80 to 100 years old. Blue oaks are slow growers, and small plants can be 25 years old. Some blue oaks are as old as 200 to 500 years old. The number of blue oaks has decreased because there has been no natural regeneration. It is not considered endangered, however, because of its wide distribution across the region.

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Coyote Brush

Common Names: Coyote Bush, Chaparral broom, Bush Baccharis, Dwarf Chaparral Broom

Genus: Baccharis

Species: pilularis



Coyote brush is a common chaparral plant in California and Oregon. It can be found all over California from San Diego County to Oregon, coastal sage scrub and chaparral, hillsides and in canyons below 2500 feet. But like the coyote of legends, it has some pretty ingenious tricks up its s(leaves) as far as survival is concerned.

Strangely, Coyote brush is part of the Sunflower Family (Asteraceae), even though it looks nothing like a sunflower.

The name Baccharis comes from the Greek name "Bakkaris", for plants with fragrant roots. Pilularis refers to the sticky globs on its flower buds.

Coyote brush is a wiry and woody perennial evergreen that looks like a bush. One of the tricks Coyote brush uses is to take on a different shape depending on where it lives. Shaped by salt spray and winds, it hugs low to the ground and forms a ground cover on dunes, ridges and plains. In protected places, like moist canyons and northwest slopes, it grows into tall, erect to mounded shrubs.

Its numerous small and stiff grey-green leaves are jagged on the edges. Egg-shaped and from 0.5-1.0 inch long, the leaves have a waxy coating that reduces the amount of moisture lost to evaporation into the air. Best of all, the leaves are fire-retardant, meaning that they have a chemical makeup that reduces their ability to catch on fire. These evergreen leaves tend to crown the upper branches of Coyote brush. The leaves become fragrant and sticky with resinous oils on hot summer days. These oils are unappetizing and may protect the plant from being eaten.

Coyote brush is dioecious, meaning that it produces male and female flowers on different plants. Blooming between August and December, the white fluffy female and yellowish male flowers grow on separate shrubs. The male flowers are stubbier, short, flattish, with a creamy white color. The yellow pollen on the male flowers smells like shaving soap. The female flowers are long, whitish green and glistening. The many flowering heads bloom in clusters on leafy branches. Seeds are small black nuts and hang off a fluffy tuft of hair called a pappus. From October to January the pappus catches the wind and blows away, like dandelions, helping Coyote brush spread its seeds.



Another trick for survival is Coyote shrub's large root system which extends many yards out from the plant to make use of any rain that might fall in its dry habitat. Branches grow from a crown that forms at the ground and spreads out. Because of the dense root crown, Coyote brush is able to survive and regenerates quickly from such things as fire, floods, or clearing.

Coyote shrubs provide shelter for wildlife and nectar for bees, butterflies and other insects. It is a nurse plant for degraded soil. It is called a pioneer species because it is one of the first shrubs to appear after other plants have been removed by cultivation or fire.

Coast Miwok Indians used the heated leaves to reduce swelling, and some Native Indians used the wood from this bush to make arrow shafts and for building houses. Early pioneers called it "fuzzy wuzzy" because of its silky-

haired seeds.

Luckily Coyote brush is very common because of its many tricks for survival, like adapting its growth pattern to the environment, having small wax-covered, drought-resistant, fire-retardant leaves that taste bad, and its large root system.

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Common Sagebrush

Common Name: Sagebrush, Big Sagebrush

Genus: Artemisia

Species: tridentata



The Chaparral biome is one of the environments where sagebrush can be found. Sagebrush can also be found on the dry plains of the western U.S. and the drier southern side of mountains. The Chaparral climate has hot and dry summers with rainy and mild winters. In the coastal parts of the Chaparral temperatures range from 53° to 65° Fahrenheit; and in the mountain areas of southern California it averages 32° to 60° Fahrenheit. The amount of

precipitation ranges from 12 inches to 40 inches a year. Sagebrush grows in dry places where other plants do not, but it prefers well drained soils in sheltered areas.

The sagebrush is a perennial shrub with straight, stiff stems. Sagebrush can grow to be 2 to 12 feet tall. The leaves are 1/2 to 1 1/2 inches long, have a ragged three-toothed edge ("tridentata" means "three-toothed"), grow close together, and are greenish. The actual plant is silvery-grey and roundish. It has small white or yellow flowers that grow close together in groups called florets. The sagebrush produces seeds. This plant is deciduous. The sagebrush has a strong sweet smell and a bitter taste.



The sagebrush survives its dry environment because of some of its adaptations. When rain is scarce its deep tap roots find water, but when it does rain it has shallow roots that are spread out below the surface to absorb the water. When it is very dry sagebrush can still be

living, but look dead. When this happens it can get uprooted and spread its seeds when blown by the wind.

Sagebrush is used by Native Americans as a smudge herb (an herb burnt for the smell). It is picked along with juniper, chaparral, desert tea and other herbs. When its leaves are powdered they can be used for rashes such as diaper rash. Its decoction, which is the water that it has been boiled in, can be used on bitten and irritated skin. The sagebrush's smoke is offensive to many animals and insects and helps keep mosquitoes away. When wrapped around perishable food it will keep insects and rodents away. Some livestock and wildlife animals that eat this plant are: cattle, domestic sheep, horses, pronghorn, elk, mule deer, white-tailed deer, small mammals, small non-game birds, upland game birds, and waterfowl.

Sagebrush is on no endangered species list, but doesn't grow in as many areas it used to. This is because people have been planting other plants that can come back after a fire, which it can't.

by Evan K. 2002

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Fairy Duster

Common Names: Calliandra, False Mesquite, Mesquitilla,
Hairy-leaved Calliandra

Genus: Calliandra

Species: eriophylla

Parts Used: The essence is used by some to become more grounded and balance emotional mood swings.



The Fairy Duster has pink-orange puff balls that can be up to 2 inches in diameter. These can bloom all year round but mostly in February through May.

The Fairy Duster is a low shrub that usually grows 8 to 48 inches tall. The compound leaves are usually made up of four pairs of 1/4 inch leaves.

Also known as False Mesquite, the Fairy Duster is a member of the Pea Family (Fabaceae) which includes Mimosas and Acacias. The seeds of the Fairy Duster look like dry pea pods.

Eaten by many different chaparral and desert animals, the Fairy Duster is also used as decorative shrubs in gardens and landscapes.

The Fairy Duster is found in the sandy washes, slopes and mesas of the Sonoran Desert and the chaparral areas near San Diego County in California, USA.

by Whit H. 2000.

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French Broom

Common Names: Montpellier broom

Genus: Cytisus

Species: monspessulanus

Parts Used: used for erosion control



French broom is found in the Pacific Northwest and Northern Canada on the American continent. It is native to the Mediterranean region and Azores Islands. It probably got its name because of the way the branches grow. They were actually cut and made into brooms at one time. In many places it is considered a weed. It spreads quickly and grows in dense stands that crowd out native plants. French broom is also used as erosion control on dunes, and along highways in the mid 1900s. Soon they escaped gardens and highways and invaded their environment. French broom is considered to be the most aggressive of the Brooms.

A bushy plant, French broom can grow 5 to 8 feet tall, and has many twisted, single, green branches on it. The branches look almost bare because the leaves are very small, only about 1/2 of an inch.

Small pea-like yellow flowers bloom along the stem in twos or threes between April and June. With each small flower are three green leaves which are about the same size as the flower. It grows its seed in hairy green pods, just like peas. French broom actually belongs to the pea family. The seeds and flowers of brooms are slightly toxic and can cause stomach cramps and indigestion.

If you take Scotch broom flowers and soak them in water

overnight, the flowers would lose all their color and the water becomes a yellow dye.

by Ben S. 2000



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King Protea

Common Names: King Sugar Bush

Genus: Protea

Species: cynaroides

Parts Used: flowers



The King protea was originally from the Cape Town area of South Africa. It is actually the national flower of South Africa. Now King proteas can be found all over the world where the atmosphere is dry and the soil has good drainage. It can even be found on Maui.

The flower of the king protea can get to be 12 inches across. On the outside it has many stiff, pointed, narrow bracts, or petals, that give it the appearance of a cup. The bottom half

of the petals starts out cream colored or yellow, which turns into bright pink or velvet red on the top half. Inside the cup is a mass of white stamen about 1-2 inches long which all bend towards the center.

The leaves look like flat spoons, or paddles, which grow alternately along the several stems of the plant. They are thick and stiff and round in appearance. Their petioles (leaf stems) are quite long, about 1-2 inches.

Protea can take moisture in through its leaves. This works well where it grows. There isn't much annual precipitation. Ocean fogs frequently blanket the area of the coastal chaparral and plants have adapted to getting their water through their leaves.

King protea are valued for their decorative qualities. They dry very well and are commonly used as focal pieces in flower arrangements. It is said that protea leaves are also used to make tea.

Proteas live in a fragile environment. Of the 370 protea species, about 120 of them are listed as endangered. There are very few wild proteas anymore, most of them are now cultivated in greenhouses or nurseries.

by Ben S. 2000.

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Olive Tree

Genus: Olea

Species: europaea

Parts used: the fruit



The olive tree is the oldest known cultivated tree in history. Olives were first cultivated in Africa, and then spread to Morocco, Algiers, and Tunisia by the Phoenicians. Olea europaea was first cultivated in Crete and Syria over 5000 years ago. Around 600 BC olive tree cultivation spread to Greece, Italy and other [Mediterranean](#) countries.

The olive tree played a huge role in the civilization of the Mediterranean countries. Athens was named after the goddess Athena who brought the olive

tree to the city. Historically it played a very important role in areas such as religion, diet, and art. It is also known as the symbol for peace, wisdom and victory. In the early Olympic games the winners were crowned with wreaths made of olive branches. Holy people were anointed with olive oil, and Moses exempted men who would grow olives from military service.

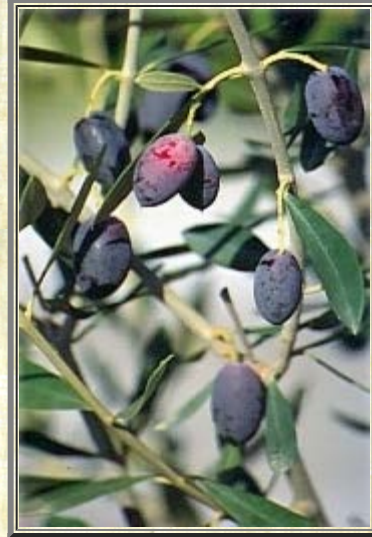
It isn't accurately known what the botanical ancestor of the modern olive tree is, but it is believed to be Oleaster olea sylvestris, which still grows wild in North Africa, Portugal, Southern France, Italy and areas around the Black and Caspian Seas. Some think that it originated from a tree which covered much of the Sahara Desert before the glaciers.

Olea europaea needs just the right climate to grow, hot in the summer, a slight winter chill, and plenty of sun. The Mediterranean area and other places with [Mediterranean climates](#), such as Texas, Arizona, and California are good places to grow olives.

Olive trees can grow in nutrient-poor, but well-drained soils. It needs full sun for fruit production, but also needs a slight winter chill for the fruit to set. Temperatures below 15°F will kill a young tree. In the Mediterranean the olive fruit fly and the Mediterranean fruit fly are its main pests.

The olive tree is an evergreen tree with gray-green leaves, and small white fragrant flowers in the spring which produce a lot of pollen. A young olive tree has smooth gray bark, but as it gets older it gets very gnarled. A mature tree can reach a height of 25 to 30 feet, and live for hundreds of years. Some have even lived to be a thousand years.

To be able to survive in a hot and dry climate, olive trees have small leaves with a protective coating and hairy undersides that slows transpiration. An olive tree tends to grow dense, thin branches. To produce more fruit, the tree is pruned heavily. Olives ripen through the autumn and into the winter. As the oil content increases, the olives change color from green to violet to nearly black. The green olives are harvested first. Olives can be hand picked, gathered with a special wooden rake-like tool, or brought down by hitting the branches with long poles. A net is laid down on the ground to catch the harvest.



Olives are brought to a mill as soon as they are picked to keep down oxidation and acidity. There the dirt and leaves are cleaned from the olives. A mill grinds or hammers the olives and pits into a paste. This paste is extruded onto plates that fit into the press. The press squeezes out the olive juice and oil, leaving behind a fibrous "pomace". The oil is separated from the juice using decanters or centrifugal separators. The oil is then bottled and sold.

2001

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Manzanita

Common Names: Mariposa Manzanita

Genus: Arctostaphylos

Species: manzanita



Mariposa manzanita is a native perennial shrub of the California Sierra chaparral. It is found in the foothills and montane regions of the Sierra Nevada and the northern Coast Ranges at elevations ranging from 250 to 6,500 feet. Growing on open hillsides and along the edges of central oak woodlands and ponderosa pine forests, it likes dry, well-drained, and sunny sites.

Mariposa manzanita grows in Mediterranean climate types with warm, dry summers and rainy winters. They can tolerate a fair amount of water for the first two years of growth, but will die if over-watered as mature plants.

Mariposa manzanita is one of over 60 different species of manzanita. Its long, twisted, and smooth maroon branches stand out strikingly against its grey-green evergreen leaves. The young twigs are a pale green and are covered with downy hairs. The shrub usually ranges from 6 to 12 feet in height, but in favorable conditions, it can become a tree of over 20 feet, and develop a thick trunk. Most of their growth occurs in May and June and stops in mid-July when the weather becomes too hot.

Flowers of the mariposa manzanita are heather-like in shape. They can be white or pink and hang in drooping open clusters, and flower from February to April. Mariposa manzanita regenerate by seeds.





It fruits in early summer and the seeds ripen in the fall. The fruits are berry-like drupes, which stay on the branch all year round. They are white in early summer and turn a deep red in late summer. The seeds have a thick endocarp and will not germinate unless burned by fire. Manzanita produce seeds every year.

Animals that eat the seeds are the main source of dispersing them. The fruits are eaten by coyotes, foxes, and many species of birds. The foliage is not eaten by deer except during hard winters. Young seedlings are eaten however.

Manzanita has been used to treat mild urinary tract infections, kidney inflammations, and water retention. It contains arbutin, which gives it disinfecting qualities.

Natural periodic fires have burned separate portions of the chaparral throughout history. Since people started building houses in the chaparral, these fires have been suppressed. Manzanita cannot regenerate unless the seeds are scarified by fire and the thick endocarp is burned off. Many manzanita have now reached the end of their life cycles without newer generations replacing them, changing the character of the chaparral. Old growth manzanita also poses an even greater risk of giant, out of control fires because of the amount of leaf litter and dead wood on and around them. In trying to prevent fires, many communities have merely increased the risk of even greater fire damage. Some communities have started programs of controlled burns to reduce the dead wood and regenerate the manzanita chaparral.

2003

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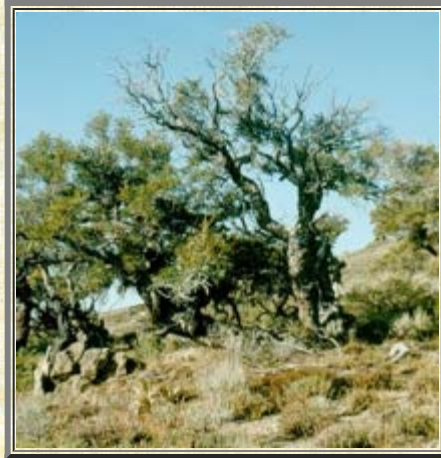
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Mountain Mahogany

Common Name: Birch-leaf Mountain Mahogany

Genus: Cercocarpus

Species: montanus



The California chaparral has hot summers with temperatures commonly above 100 ° F . The winters are about 50 ° to 60 ° F, but can very quickly drop to freezing. Occasionally there is snow in the winter, but it quickly melts off. Most of the rain that falls on the chaparral comes from storms over the Pacific Ocean. Fires are common in the chaparral.

The Mountain Mahogany is a shrub or small deciduous tree that grows in the California chaparral. It can grow to be 12 ft. (4 m.) tall. The bark is grayish, scaly, and

checkered. The twigs of this tree are rigged and the lateral twigs often spur-like, bright red -brown, and at first hairy, finally ashen or reddish gray and smooth. It's crown grows very wide, and it is a skinny wiry tree.

Mahogany has lobed leaves, and single small dry fruits that have a feathery tails on the end. The leaves grow alternately on short stems, and are lobed, leathery, greenish-gray in color with straight veins. Soft fuzzy hairs cover both the top and bottom of the leaves. The flowers are small and grow singly or on fascicles at the end of short spurs. They



flower from March to June.

The main adaptation is dwarfing (getting smaller to survive). It dwarfs because of severe drought, changes of climate, and the poor soil. This tree seems to be invincible because it cannot be killed by an axe (it cannot be killed by taking chops at it), drought or fire, so it has been given the name "hardtack". Fires usually kill the top of the tree but the trees don't burn as quickly as other shrubs in the chaparral. They sprout new growth from their root crown and grow quickly after a fire. The mountain mahogany loses its leaves during the hot, dry season to conserve water.

The Navahos use the twigs with their white flowers as prayer sticks. The handles of Navaho distaffs are made of this wood probably because it does not splinter easily. It is hard so the Navahos make dice from it.

The Mountain Mahogany is not endangered. In fact it covers large areas. It can be found in Oregon, Baja California, the Channel Islands, South Dakota, Utah, Texas, Oklahoma, Arizona, and Mexico.

by Phil Z. 2002

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Saltmarsh Bird's Beak

Genus: Cordylanthus

Species: maritimus

Parts Used: No parts are used.



The Saltmarsh Bird's Beak is an annual and lives for one year and then dies. Its leaves are alternate, narrow and up to 1 inch long. They are pointed at the end, and bluish green and hairy. The Saltmarsh Bird's Beak has white flowers that grow on 4 to 12 inch high stems.

It belongs to the Figwort Family and is related to the snapdragon.

This is a very interesting plant because it is semi-parasitic. It uses pickleweed and salt grass to extend its growing season.

The Saltmarsh Bird's Beak only grows in the saltmarshes, just above the high tide line of the coastal chaparral of the San Diego County area, California. It is considered an endangered plant in California and throughout the USA.

by Whit H. 2000

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Torrey Pine

Genus: Pinus

Species: torreyana

Parts Used: piñon nuts



The Torrey pine has a century lifespan and grows very slowly. Wild Torrey Pines are usually 40-60' high and 25-40' wide. They grow much faster if they are cultivated or transplanted.

The Torrey pine is one of the rarest pine in the U.S. It is special because it has piñon nuts and five needles in a bunch. Most pines that have piñon nuts only have two needles in a bunch. The piñon nut is very large and edible, but it is very hard.

The Torrey pine, like some other plants in the pinus family, has cones. They usually weigh about a pound each and measure 4-6" long. The piñon nuts are inside the cones.

It blooms mostly in February. The female flowers are in the top of the tree. They look like little red pine cones. The male flowers grow on the bottom branches of the tree. The Torrey pine cones take three years to mature, and drop off the tree in the autumn. It has a very large seed with tiny wings which don't let them float very far in the wind.

A very small Torrey pine seedling can have a tap root two feet long. By the time it is 40 feet high, its roots can be 200 feet long. This makes it possible for the Torrey pine to grow on cliffs and other places where there is very little dirt.

The wood of the Torrey Pine does not burn very well and its shade is very thin. For the most part, the Torrey pine is very beautiful to look at, clinging to the face of a cliff or rocks on the beach.

The Torrey pine is only located in the coastal chaparral of San

Diego County, California.

by Whit H. 2000.



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Aardwolf

Genus: Proteles

Species: cristatus



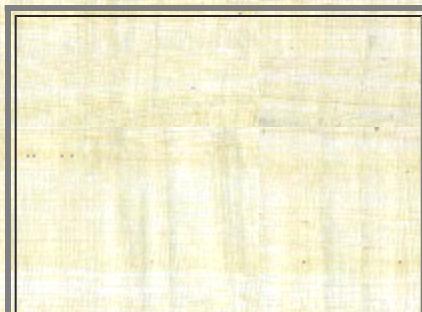
The aardwolf is a furry hyena that looks like a dog, but has long front legs and short hind legs. Aardwolf means "earth wolf" in Afrikaans. Afrikaans is a language spoken in southern Africa. The aardwolf was named like that because they live in underground burrows. The aardwolf can be found from Angola to Zambia and in the Fynbos of South Africa. It also lives in southern Egypt down to Tanzania.

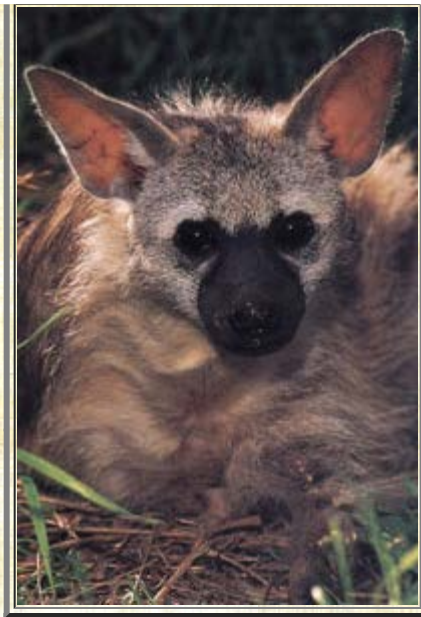
The Fynbos is a Mediterranean biome and is located in the southwest corner of South Africa, from latitude 20° to 33° South, and longitude 17° to 32°

East. The winters are cold and wet and the summers are hot and dry. It has many plants found nowhere else in the world. Most of the plants are scrubby with small, leathery leaves. Except for the [Bontebok](#), animals in this region can be found in other places in Africa.

The terrain is mostly grasslands, plains, rocky areas, bushy areas, semi-desert, savanna, and hills, and occasionally you would find a small mountain, or two. The aardwolf, aardvark, termites, hyenas, lions, and several kinds of reptiles and amphibians are some of the animals that live there. The aardwolf inhabits the open grassland plains in the Fynbos where its main food source, the harvester termite, builds its mounds.

The aardwolf is a very small and shy animal compared to its bigger and more aggressive relatives, the hyenas. It is about 15-20 inches from the shoulder to the ground. Its tail is 8-12 inches. The aardwolf usually weighs between 50 and





60 pounds. It is a light buff color, with an orange tint to it. Five to six thick black stripes run down its sides. Its legs are banded with black, and the part under the knee is completely black. Its fur is long and it has coarse guard hairs. It has a mane going down from the head along the back of its neck towards the tail, which is long and bushy and becomes erect when they are frightened. The head of the aardwolf looks like a dog's, except it has bigger and more pointed ears. The aardwolf has big ears to hear termites underground when it is hunting. The ears are also large to help the aardwolf lose body heat. Its eyes are black, rather small, and are facing front, for depth perception. Its muzzle is black, broad, and nearly hairless. The aardwolf's teeth are small, blunt (except for the canine teeth, which are rather sharp), and widely spaced. It has a humped back and low hindquarter. The aardwolf moves like a dog. Unlike a hyena, the aardwolf has five toes on its forefoot, while the hyena only has four toes. The aardwolf also has non-retractable claws to scratch in the dirt to dig for termites.

The aardwolf reaches sexual maturity at the age of two years. They mate throughout the year. Its gestation period is 90 to 100 days. The birth interval is one year. The number of young a mother aardwolf can produce is anywhere from one to six, but typically it is between two and four cubs. The cubs are born blind and helpless. Both parents raise the young. The cubs rely on their parents for 16 to 20 weeks. The cubs spend six to eight weeks in the den. After that period, at about three months, the young aardwolves are ready to start foraging with one or both parents. They do that for about a month. At about four months, they start foraging on their own.

The aardwolf is a solitary animal, except when raising young. Several

females with cubs may share a burrow. It doesn't have groups because of their sole diet of termites. Animals usually form groups because they need help killing something big, like a lion. Since aardwolves eat termites, they don't need help killing them because they are so small. The aardwolf does not migrate anywhere outside of its territory. There are two distinct populations of aardwolves. One is located in southern Africa in the Mediterranean Fynbos Biome. The other one is located from Angola and Zambia, to South Africa. It marks its territory with a musky fluid from its anal glands (it also does this in defense when it is under attack from dogs, or one of its predators). Its life span is up to 14 years in captivity, and about 10 years in the wild. The aardwolf is a nocturnal animal. It spends the day in abandoned burrows of the armadillo. They pick these burrows because they are usually close to an abundance of termites. Since the armadillo eats termites too, they like to burrow close to a nest of termites.

The aardwolf is a carnivore, but is called an "incomplete carnivore" because it is an insectivore. Its typical diet is Harvester termites (Termitomyces termites), insect larvae, and occasionally eggs of ground nesting birds. It has weak, small, rounded, and widely spaced teeth for chewing termites and the other small things that it eats. It has good hearing to locate termites underground. It also has a good sense of smell. The aardwolf has a long, sticky tongue that it uses to lap up the termites in their tunnels. Large amounts of soil may be ingested with the termites when it eats them. On an average night, an aardwolf can consume anywhere from 200,000 to 300,000 termites. The termites usually come out in dense columns, so all the aardwolf has to do is lap up as many of them as it wants to eat.

The aardwolf's long sticky tongue helps it survive in the environment. Its tongue is used for lapping up termites. This method enables it to eat a lot of termites at a time. It has blunt teeth because it only eats small things. Therefore, it doesn't need very sharp teeth to kill big animals, and tear flesh, unlike its relatives the hyenas.

The aardwolf's prey is termites, insect larvae, and eggs of ground nesting birds. It usually eats termites, but occasionally, it will find some carrion that the hyenas have killed, or a small rodent to eat. The aardwolf's predators are lions, leopards, poisonous snakes, larger hyenas, and humans. The aardwolf is not considered endangered in general, but in some places it is because of human hunting. Some humans hunt it for its skin and meat, which is considered valuable.

When frightened, the aardwolf erects all its hair, of which the mane is the highest. When it is under attack from dogs, leopards, or other predators, it emits a musky fluid from its anal glands. This defense is almost as effective as a skunk's spray. When an aardwolf is caught inside another aardwolf's territory, a huge fight can occur. The aardwolves bark, emit a musky fluid from their anal glands, and sometimes use their rather sharp canine teeth to defend their territory.

The aardwolf used to be considered part of the hyena family, but has been placed in a different genus because of major differences in its teeth. Although it looks like a dog, it probably wouldn't be a good pet because it

smells like a skunk. Peeeyuuuu!!!!

by Taza V. 2003



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Black-tailed Jackrabbit

Genus: *Lepus*

Species: *californicus*



Although it is called a rabbit, the black-tailed jackrabbit is really a hare. Hares are different from rabbits because their babies, called leverets, are born with all their fur, and their eyes open. Jackrabbits live in the extreme environments of the desert and chaparral, where temperatures are hot during the day and cold at night, and there isn't a lot of rain.

Jackrabbits have huge ears. It can regulate its body heat by increasing or decreasing the blood flow through its ears. This helps the jackrabbit absorb heat or cool off. They prefer to live in

open areas where they can see predators coming. With its long, rangy legs it can run in bursts of up to 36 mph. Their incredible speed helps them outrun many of their enemies. The soles of a jackrabbit's feet are covered with fur. This cushions their feet on hard ground and insulates them from the scorching heat of the desert sand. Their fur is a silver and tan color that blends in well with the desert and chaparral habitat that it lives in.

Male jackrabbits can weigh from 9-11 pounds, and females 11-13 pounds. As you can see from their weight, female jackrabbits are larger than males. They can be anywhere from 16-28 inches, with a 2-5 inch tail. They reach sexual maturity in 1 year. After mating, the female, or doe, will have a litter of 1-6 leverets every 3-4 months. The mother will leave the leverets in separate hiding places, and come back in the evening to nurse each one. After one month they are on their own.

Jackrabbits aren't picky eaters and can eat tough grasses, leaves, and twigs. They will also eat sagebrush and cacti. They only come out at night to feed. They conserve water by eating their food twice. This is

kind of gross, but when they poop out their food the first time, they will eat the poop and digest it again, getting even more of the moisture out. Jackrabbits rarely have to drink and get most of their water from the plants they eat. Fifteen jackrabbits can eat as much as one full-grown cow in one day.

The jackrabbit is common in the western United States and northern Mexico, and in many places is considered a pest. People put up fences and poison to try to control them.

2001



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Cactus Wren

Genus: Campylorhynchus

Species: brunneicapillus



The Cactus Wren lives in the arid and semi-arid deserts of southwestern United States and the chaparral of southern California and northern Mexico. The Cactus Wren is usually found below 4,000 feet. The [California chaparral](#) has hot and dry summers and humid and cold winters. It normally gets about 6 inches of rain per year.

At 7-9 inches (18-22 cm) long, the Cactus Wren is the largest wren in the United States. Both sexes look alike. Both are brown and have a white stripe running over each

eye. Their throats are white, and their beaks are dark, long and slightly curved. White and black streaks cover their backs. Their belly and sides are white to buff with dense spotting on the breast. The short and rounded wings have black and white banding. Legs and feet are tan colored.

They are very active and curious birds. They quickly investigate anything new in their territory. If you leave your car windows down or the garage doors open they are sure to enter and check it out thoroughly.

Cactus Wrens like to breed in successional chaparral scrub (chaparral that has recently come back from a burn). The female will select a nesting site in low, thorny trees or shrubs. In the Sonoran desert they prefer the well protected branches of the chain fruit cholla. Both male and female help build a football-shaped nest of dry grasses lined with feathers or other soft materials. A small side entrance protects the nest from predators. Cactus Wrens will first breed from February to early March and continue to have more broods through June if conditions are right. Four or five buff colored eggs speckled with brown are laid at one time. The size of the clutch

(amount of eggs laid) is determined by the food supply. This is an adaptation Cactus Wrens have made to the changing food availability in their desert and chaparral habitats. The female incubates the eggs for 16 days while the male builds several more nests throughout his territory for roosting and future nesting sites. After the eggs hatch both parents will feed the hatchlings. The young fledge, or leave the nest, in 19 to 23 days. The fledglings stay with their parents for about a month.

Cactus Wrens don't migrate and are considered permanent residents of the region they live in. Males will vigorously defend their territory throughout the breeding season. They sing territorial songs, although the songs are not very musical. The song consists of a one-pitched monotone of chuh, chuh, chuh, chuh, gaining speed towards the end.

The Cactus Wren mainly eats insects like ants, beetles, grasshoppers, wasps, fruits, seeds, and sometimes a treefrog or lizard. It will sometimes eat seeds and fruit. It has adapted to its hot habitat by shifting its foraging behavior according to the temperature. It begins to forage on the ground, and in the branches of shrubs in the late morning. As the temperature rises it will shift its foraging to shady, cooler areas. They stop foraging during the hot afternoon and rest in a shady area. They get almost all of their water from the food they eat.

The California chaparral, home to the Cactus Wren on the west coast, is quickly disappearing because of development and urbanization. Only small patches of true chaparral are left. Most of the remaining chaparral isn't large enough to sustain a Cactus Wren population. Cactus Wrens prefer the low, thorny bushes and scrub of the chaparral to build their nests because it protects their broods from predators such as snakes. The Cactus Wren is very adaptable to changing environments, as long as native chaparral plants are provided to build its rather large nests in.

The Cactus Wren is not considered endangered or threatened throughout its range. However, like all songbirds, it is protected by the Migratory Bird Treaty Act.

2002

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Golden Jackal

Genus: Canis

Species: aureus



The Jackal is much like a small wolf. It has long hair with a long and fluffy tail. It stands as tall as a moderately tall dog and has a bone structure common to the Canis family. It has long pointed ears and a medium sized pointed snout. The body length of a Jackal is 70 to 80 cm. and its tail is about 25 cm. When standing, it is about 40 cm. high. The color of the Jackals fur is yellow to pale gold. The fur on a jackal is smooth. The claws of a Jackal are about a inch long. It weighs about 8 to 10 kg.

Golden Jackals find a mate for life. The two Jackals have pups together for about 8 years. The young Jackals are born in a den which is in the parents territory. Each litter can contain up to nine pups but 2 to 4 is the usual number. The pups are nursed for up to 8 weeks, then they are weaned, and start eating regurgitated food. They eat solid food at three months and are sexually mature at eleven months. Male and female mates live together for their entire lives and raise the young together. Jackals do not live in packs. Jackals survive in the wild for at the most 15 years.

In the winter it gets colder and the Jackal grows a thick coat of hair in preparation to this season. The Jackal has also adapted to eating insects.

Jackals are omnivores. They eat 54% meat and 46% plants and have a very varied diet. The foods they consume are young gazelles, rodents, hares, ground birds and their eggs, reptiles, frogs, fish, insects, and fruits.

The Jackal is a predator and it helps the environment by keeping the rodent, gazelle, bird, and frog population down.

The Golden Jackal is abundant in the Mediterranean chaparral. It is

currently not on the endangered species list.

by Julius L. 2001

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Grey Fox

Common Names: Tree Fox

Genus: Urocyon

Species: cinereoargenteus



The grey fox can be found from Ontario, Canada, throughout the central and southwestern United States down to Venezuela. It also lives in the chaparral of California and Mexico. It prefers wooded and brushy areas of the southwestern, central and eastern United States where most of the rainfall is in the winter, while the summers are hot and dry. It is not found in the Rocky Mountains, the Great Plains or eastern central America. It disappeared from Canada in the late 17th century, but lately they have been found in southern Ontario, Manitoba and Quebec.

They don't like agricultural areas like the [red fox](#). Its den sites are made in rock formations, hollow logs and trees, burrows and brush piles. The dens are often lined with grass and leaves.

The grey fox looks a lot like a small dog with a bushy tail. The fox's back is whitish-grey in color. The sides of its neck, the base of its tail, back and legs, and the underside of its tail are bright rusty-red. A black stripe runs along the top of its bushy tail, which ends in a black tip. Its muzzle is black and a black stripe goes from its eyes towards its neck. The grey fox is 21 to 30 inches long, and its tail is another 11 to 16 inches long. It stands about 15 inches at the shoulder. The adult grey Fox weighs 7 to 11 pounds.

The grey fox has short legs that are very powerful. These legs are designed to give the fox tremendous ability to balance itself while it climbs. Strong, hooked claws allow them to pull

themselves up tree trunks and branches. The color of its fur hides it from predators.

The grey fox is the only member of the dog family that can climb trees. It will climb a tree to escape its enemies. It climbs by grabbing the trunk with its forepaws and scrambling up with the long claws on its hind feet. It can make its way through the tree tops by jumping from branch to branch or shimmying down backwards. It will also sit in the trees and ambush prey. It is not a fast runner, but can reach speeds of 42 mph. for short distances.



Grey foxes are crepuscular animals meaning that they can be out at any time during the day although they tend to hunt at night. They are very territorial and mark their boundaries with urine. Females reach maturity at one year and breed from February to March. The father, or dog fox, stays with the female and he is responsible for bringing back the food to the den. Her responsibility is to watch over the pups, to groom them, to teach them the ways of the grey fox.

Usually 3 to 4 pups are born after 50 to 55 days. They are dark brown and blind at birth and weigh 3.5 oz. They open their eyes after 10 days. The mother stops nursing the pups after 10 weeks. During this time the father provides the whole family with food. The family begins to disperse during the fall. Grey foxes are usually solitary during the winter.

The grey fox lives for 6 years in the wild and 12 years in captivity. Grey foxes do not migrate but they do travel many miles during their lifetime.

The grey fox is a solitary hunter, and eats a lot of different things such as berries, nuts, birds, insects, rabbits and other rodents. The grey fox is an omnivore. If it has more food than it can eat, the fox will bury it and go back later. It will mark the spot with urine so that it can find it when it gets hungry. In the arid regions of the chaparral it will eat more insects and plants than foxes living farther east.

The grey fox has few predators besides man. Hawks, eagles, owls, bobcats and dogs will kill and eat the pups. Its ability to climb trees allows it to eat food not eaten by the red fox. By climbing into the tops of a tree, the grey fox often ambushes

its prey.

The grey fox is plentiful in the wild. It often helps the farmer by eating rodents.

by Brant S. 2002

Editor's Note:

One of our readers wrote:

"No one should shoot or trap a fox; these animals should be protected. The farmers should protect their chickens with a fence and realize they have to share their crops with the other wonderful creatures we share this earth with. Regards, Mary".

I agree completely. We should all become more sensitive to the creatures we share our world with. To say that the grey fox is plentiful in the wild does not mean that it will be there forever if we don't take actions to make sure of that.

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Island Grey Fox

Common Names: Coast Fox, Short-tailed Fox, Channel Island Fox, Insular Gray Fox, Dwarf Fox

Genus: *Urocyon*

Species: *littoralis*



About 16,000 to 18,000 years ago the world experienced its last major ice age. Much of the ocean's water had turned to ice and the level of the remaining seas were lower than they are today. The Santa Barbara channel off the coast of southern California in North America was narrow enough for animals to cross over. One of these animals was a relative of the [grey fox](#). When the ice age ended, and the ice began to melt, the sea levels rose. Over time the foxes found themselves cut off from the mainland on a string of islands. Today the island grey fox can still be found on six of the largest of the Channel Islands 19 to 60 miles off

the coast of southern California. These are the islands of Santa Catalina, San Clemente, San Nicholas, San Miguel, Santa Cruz, and Santa Rosa.

The Channel Islands have a Mediterranean climate which is hot and dry in the summer, and cool and wet in the winter. In America it is known as chaparral. There are many different types of habitats on the Channel Islands. There are valleys and foothill grasslands, coastal sage/scrub, sand dunes, coastal oak and pine forests, and marshes. The island grey fox lives in all of them.

Many people don't even know the island grey fox exists. Its not hard to overlook these distant cousins of the mainland grey fox, they are tiny. They became smaller by a type of evolution

called natural selection. Because there is a limited supply of food, water and territory on an island, large foxes had a hard time surviving. But when a small runt of a fox was born, it didn't need as much food or territory. This would enable it to survive to a breeding age and pass its small genes along to the next generation. Over time the foxes became smaller and smaller.

It is actually the smallest fox species in the United States and is almost as small as Africa's fennec fox. It only stand 5 to 6 inches tall at the shoulders and weighs 3 to 4 pounds. Females weigh a little less than males. Its head and body lengths range from 19 to 20 inches, and the tail is about 4 to 12 inches long. The tail actually has two less vertebrae than the mainland grey fox.

The island grey fox looks very much like its larger cousin, the mainland grey fox. Its coat can range from cinnamon, light grey or red, but is mostly a combination of all these colors. The chin, lips, nose, and the areas around the eyes are outlined in black. Its ears, neck and the sides of its legs are usually cinnamon. The tail has a thin black stripe on the top side while the bottom side is cinnamon. Young foxes usually have a paler and thicker fur coat and their ears are a darker color compared to the adults. From August to November the island grey fox molts, or gets a new coat of fur. Their old fur coats fade in color and the tips of the hairs curl at the ends.

Although it is only as large as a house cat, the Island grey fox belongs to the Canidae family, the same family wolves, coyotes and domestic dogs belong to. The island grey fox is also the only carnivore found nowhere else except in California.

Island grey foxes mate for life, but they only stay together to mate and raise their pups. Then they are off by themselves until the next breeding season. They only breed once a year between January and April. The female, or vixen, will give birth to a litter of kits 50 to 63 days after mating. Litters usually have 2 to 3 kits, but can have as few as 1 or as many as 5 kits. The kits are born in dens in ground holes, hollow trees, rock piles, shrubs, and caves. The parents find these and don't



actually make the dens themselves. They are born blind and helpless with short dark brown hair and only weigh about 5 ounces. The mother nurses them during the first 7 to 9 weeks. The kits then emerge from their dens around May to June to begin foraging for food with their parents. They stay with their parents until September. At this time the kits remain near the den while the parents leave to find new territories. These territories are about 1 square mile and usually overlap each other. The island grey fox reaches maturity at about 10 months and will begin to breed at about one year of age. The average life span is 4 to 6 years, but some foxes have been known to live to be 15 years.

The island grey fox is solitary and diurnal, being active mostly in the early morning and in the evening. They hunt mostly during the day, but are known to move around at night. Island grey foxes are called omnivorous because they eat both plants and animals. Depending on where they live their diets can consist of mostly insects and fruit like manzanita, toyon, saltbush, prickly pear, and the fruit of sea-figs. They will also eat deer mice, birds, lizards, land snails and any garbage people leave out.

They communicate with each other through sight, sound and smell. They use their body postures and facial expressions to show dominance, and bark and growl at each other. They mark their territories by leaving a few drops of urine around the borders and leaving their scat in obvious places like trails. This tiny fox is described as being docile, playful and affectionate. When first approached by humans it will growl, but soon it tolerates the human and becomes curious. Not that you should try to pick one up, if you ever see one. That wouldn't be safe for you or the fox.

The island grey fox has been dying at an alarming rate during the last decade. The main causes were discovered to be diseases from domestic pets humans have brought to the islands, and the golden eagle. Because they have been isolated on the islands for thousands of years they haven't built up an immunity to the diseases and parasites brought over by animals from the mainland. Thousand of years of breeding within a small gene pool has also created a small genetic variation, which makes them susceptible to diseases. By 2000 there was a 95% decrease in the population on the northern three Channel Islands over a span of only four years. The [National Park Service](#), which owns some of the islands, won't allow you to bring your dogs or cats into the Channel Island National Park.

Golden eagles are also a major threat to the island grey fox. These beautiful birds haven't always lived on the Channel Islands. They were attracted to the islands by the wild pig population and settled permanently around 1995 when the larger, fish-eating bald eagles died out in the area from DDT, hunting and egg collecting. Their arrival on San Miguel island that year coincided with the first decline in the island grey fox population. At that time there used to be about 450 grey foxes living there, but only 40 survive today. In 1999 the golden eagles began to nest on Santa Cruz and the population there went down from 2,000 in 1994 to only 60 today.

The island grey fox is protected by California state law, and is listed as threatened. In 1996 the IUCN listed *Urocyon littoralis* as Lower Risk/Conservation Dependent. This means that the island grey fox can't survive unless humans intervene on its behalf. Island grey foxes are dependent on captive breeding programs on San Miguel, Santa Rosa and Santa Cruz for their survival. They are bred in captivity and then taken to other areas to try to raise their population.

In 1999 the National Park Service together with [The Nature Conservancy](#) established an [Island Fox Recovery Team](#) to look into the problem of the population decline. They recommended that the following things be done:

- sanctuaries be built to protect the foxes from the golden eagle
- a captive breeding program be started
- the golden eagles on the northern islands be captured and relocated to a habitat on the mainland
- the bald eagle be restored to the islands to displace the golden eagle
- an effort be made to place the island grey fox on an endangered list.

The Park Service and The Nature Conservancy are also working on restoring the natural ecosystem and elimination the feral pigs off Santa Cruz Island.

So far the Park Service has set up sanctuaries and captive breeding programs on San Miguel and Santa Rosa Island. Thirteen of the golden eagles have been captured from the Santa Cruz Island and relocated by the [Santa Cruz Predatory Bird Research Group](#). Only a few golden eagles remain to be moved. By the year 2004 a dozen American bald eagles were released on Santa Cruz Island, and ten more bald eagles from Alaska will be joining them. On March 5, 2004, the U.S. Fish and Wildlife Service listed the subspecies Santa Cruz Island Fox as endangered.

In the spring of 2004 the first two wild kits were born on

Santa Rosa. Since the year 2000 no wild foxes had existed on the island. They join 9 other kits and 7 adults who were all raised in captivity.

The National Park Service needs our help to save the island grey fox. Their populations have declined so rapidly on all six Channel Islands that it needs help in raising funds for their recovery program. The National Park Foundation has set up an Island Fox Fund and hope to raise money and spread awareness about this critically endangered species

What happened to the island grey fox is a good lesson on how ecosystems and their inhabitant rely on each other. Change one element in the system and a species could become extinct. Until about 1995 the island grey fox had a strong population able to take care of itself. Then something happened to the bald eagle with which they had no contact. This created an opening for the golden eagle, which had avoided the larger bald eagle up till then. This changed everything for the island grey fox as they became easy prey for the golden eagle. Within 7 short years the island grey fox is teetering on extinction because one species was removed from their ecosystem.



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Puma

Common Names: cougar, mountain lion, catamount, panther

Genus: Puma

Species: concolor



The puma is all one color. It can vary from silver gray, to tawny to reddish. It is lighter colored around the face area, with white around its whiskers and mouth. The males can weigh up to 200 pounds. They have large feet and their hind legs are longer than most of the cat family. A puma can't roar like a lion or jaguar. Instead it makes a screaming sort of sound.

The puma is incredibly adaptable to

its environment. Although the preferred prey of the puma is deer, it will also eat insects, birds and mice. It will kill and eat any small to medium sized animal. It has a habit of scraping leaves over its kill to hide it. It will stay in the area and feed off the kill for several days. The puma won't eat anything another animal has already killed however.

The geographic range of the puma is very large. It can live in the cold needle leaf forests of North America and the rainforests of South America. It has been found in the chaparral of the California coast, the Sonoran Desert, and as high as the Andes Mountains. It no longer inhabits eastern North America because its habitat and deer population became too small. Pumas tend to be larger farther away from the equator. Tropical puma are much smaller than the puma in the western United States.

Pumas mate usually in late winter and early spring. Most litters in the United States are born between April and September. Both males and females become sexually mature by the age of two years. Males and females only come together to mate. Two to three kittens are born after a 3 month period. The mother raises them on her own, and teaches them how to hunt. They leave the mother when they get to be 1 1/2 years old. Pumas live to be 15

years in the wild, but captive puma have lived to be 20 years

In the west the puma is only fully protected in South Dakota and California. They are not legally protected in Texas at all. Many states have partial protection, which means hunting the puma is regulated.

2002



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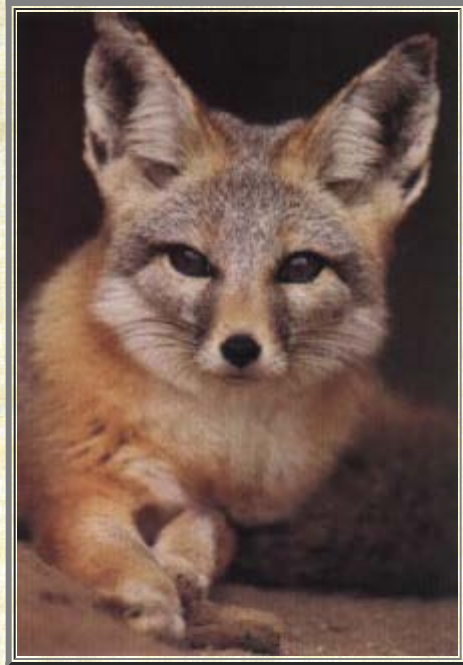
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San Joachim Kit Fox

Common Names: Desert Fox

Genus: *Vulpes*

Species: *macrotis mutica*



The San Joachin kit fox inhabits the chaparral, grasslands, and scrublands of the San Joaquin Valley of California, USA. Kit foxes live in dens. They also live in man made structures such as irrigation pipes, drainage culverts, spaces under buildings and storm drains.

Kit foxes have large ears set close together, a slender body, long legs, and a black-tipped bushy tail, which sticks straight out behind them. The pads of their paws are hairy which gives them better traction in the sandy soil of their habitat. Their underparts are light colored and their upper parts are pale grey in the winter and tan in the summer. Their ears are dark colored on the back side.

The San Joaquin kit fox is the largest of the 8 subspecies of kit foxes. An adult kit fox stands 22-30 cm (9-12 in.) at the shoulder and averages about 51 cm (20 in.) in body length. Its tail adds another 30 cm (12 in.). Fully grown, the kit fox weighs about 2.3 kg. (5 lbs.).

The San Joachin kit fox is a nocturnal animal, but can sometimes be seen during the day in spring and early summer. A pair of San Joachin kit foxes stay together year round, but may not share a den. They can have as many as 24 different dens. They reach sexual maturity at 22 months and mate from December to March. The female is pregnant for 48 to 52 days. There can be 3-5 pups born at a time in a litter. They dig special pupping dens with several rooms. While the female is nursing the pups, the male hunts for both of them. After 1 month the pups are weaned and leave the den. After 4-5 months the pups can find their own food and leave the family. Sometimes female pups will stay longer and leave the mother after a year. Kit foxes are known to live for 7 years in the wild and can live as long as 10 years in captivity. They are solitary animals, preferring to live alone or in a small family group rather than in packs.

San Joachin kit foxes eat ground squirrels, gophers, birds, and lizards and nocturnal rodents. They also eat kangaroo rats, mice, black-tailed hares, antelope squirrels, cottontails, ground nesting birds, insects, vegetation, and grasses. As they eat both animals and vegetation, they are omnivores.



The San Joachin kit fox's predators are coyotes and red foxes. Man is also a predator because he sometimes shoots or poisons the San Joachin kit fox.

The San Joachin kit fox is able to adapt to hot temperatures of the chaparral summers and cold temperatures of the winter nights. They are nocturnal and so are active during the cooler time of night.

Another adaptation for the heat of the desert is the size of their ears. The ears of the kit fox are big and they act like radiators, cooling the fox. Digging dens is another way they adapt to coping with the heat of the desert. The den is cool under the tree roots and out of the heat. The kit fox's fur changes color from grey in the winter to tan in the summer to camouflage it. Another adaptation is the fur/hair on the pads of their paws, which gives them better traction and protects the paws from the heat of the chaparral sand.

The kit fox is threatened by the red fox and the coyote, who are predators. The kit fox is also threatened by man through hunting, electrocution, traffic, trapping and poisoning. The farmer might do this because the kit fox is bothering his chickens and other farm animals. Much of the San Joaquin Valley has been turned into farmland and developments. Grazing animals have destroyed the chaparral that protected the kit fox's prey. The Fish and Wildlife Service of California has put the San Joachim kit fox on the threatened wildlife list.

by Vaughn R. 2002

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Spotted Skunk

Common Names: Western Spotted Skunk

Genus: Spilogale

Species: gracilis



The western spotted skunk is an animal that lives in the chaparral biome of southwestern California and in areas in between Costa Rica and British Columbia, Canada. It prefers the desert, woods, brush land, and rocky terrain. It avoids the dense forests and wetlands. This animal can live in a variety of temperatures. The western spotted skunk builds a den out of a hole in the ground and lines it with leaves. Occasionally a spotted skunk will live in a hollow tree.

The spotted skunk is an animal that looks like a cat, only wider and not as high above the ground. It is black with many white spots, and has a triangular white mark on its forehead. All skunks have a different pattern from each other. This is used to tell the difference between skunks. The spotted skunk is the smallest type of skunk. Its size ranges from 21 to 25 inches long, including the tail. This type of skunk is taller than most skunks with long legs, although it is not very long. It moves like an animal related to a cat. A spotted skunk has larger carnassial teeth than other skunks. These are used to slice through an animal's flesh. Also, the spotted skunk has sharp claws for climbing trees and digging for larva.

All skunks can spray their predators. They have 2 anal glands that are filled with musk. When a skunk sprays, it squeezes the anal glands together and the musk comes out an anal opening. However, there is a process the skunk goes through before spraying its enemy. The skunk first gives a warning by stamping its front paws. If the intruder pays no heed, the spotted skunk then stands stiff and struts around. It then stands on its front paws and waves its rear end in the air. After that, the skunk

sprays its enemy. The musk can linger on the same spot for days. Most animals take the hint and stay away from the skunk after they've been sprayed once. Also, skunks can swim, but they swim only when their life is threatened.

The western spotted skunk mates in October and gives birth in March or April the following year. However, both sets of birth times vary due to the fact that female skunks can delay the birth date until the food is plentiful. Mother skunks give birth to about 6 pups at a time. A skunk's gestation period is 50-65 days, longer with implantation. They reach sexual maturity at 4-5 months. Their birth interval is 2 years. For the first 8 weeks baby skunks feed off their mother's milk. After they have been weaned, the mother brings her young live prey, and eventually teaches them to hunt for themselves. A pup's father does not play a huge role in its life cycle, staying solitary in the summer, and occasionally sleeping with the mother and pups in the winter. Skunks do not truly hibernate. The pups have musk glands when they are 1 month old. They reach full size at 4 months. Skunks live up to 10 years in captivity.

A normal spotted skunk's diet in the winter consists of mainly rats and other rodents. However, in the summer, the skunk's diet changes to more vegetation and insects. The skunks normally eat small mammals along with these. In the autumn, a skunk adds fruit and berries to its diet. In the winter, the skunk goes back to its original favorite prey, small mammals.

The spotted skunk's prey is mainly small mammals such as rats and mice. The spotted skunk has no normal predators as it shoots its musk to defend itself. However, great horned owls and bobcats have been known to attack them. Skunks are especially helpful to humans by catching rodents quite frequently.

Spotted skunks are common animals and are not considered endangered. Spotted skunks are plentiful, occupying most of their habitat pretty densely.

by Will O. 2002

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Bezoar Goat

Common Names: wild goat

Genus: Capra

Species: aegagrus



Capra aegagrus, or Bezoar goats, are found on Creta, and other Greek islands, in Turkey, Iran, Turkmenia, Pakistan.

The domestic goat is descended from the Paaang or Bezoar goat.

Bezoar goats vary in size from about 130 to 300 pounds and can get to four feet tall. Their whole body is covered in a coarse wool except for their legs. The wool can be one color or a combination of colors.

Common colors are black, brown, gray, red, and white. Goats have cloven hooves which means that they are split into two toes. Most wild goats have horns, some curve backwards but others have horns that curve into a corkscrew. Both male and female goats have short beards the same color as their hair. A special feature of the bezoar goat is its scimitar shaped horns with a sharp inside edge.

Wild female and baby goats live together in a pack of about 50, and the males either live by themselves or in an all male pack. During the mating season males give off a oily substance from their skin and this attracts a female. Males often have terrific fights over female. and the winning goat gets to mate.

When females give birth it is to one or two babies, or kids. The kids drink their mothers milk until they are a week old, then they are weaned and start eating the normal foods of a goat.

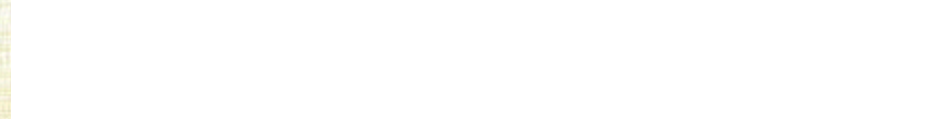
A special adaptation of a goat is its wool which helps it survive the harsh mountain climate. Another adaptation is its horns, which it uses to defend itself and fight for females.

The Bezoar goat is a herbivore, and its diet consist of grass, twigs, leaves, berries and bark. The goat is prey to a couple different

animals, such as wild cats, and Jackals.

Wild goats are listed as vulnerable in the 1996 IUCN Red List of Threatened Animals. An animal is listed as vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild. The Bezoar goats are losing more and more land to development in their native countries.

by Julius L. 2001



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Chaparral Climate Mediterranean Climate (Cs)

In the winter the Chaparral climate, also known as the Mediterranean climate, is mild and moist, but not rainy. During the summer it is very hot and dry. The temperature is usually mild but it can get very hot or nearly freezing. The temperature range is between 30° and 100° F.

This biome only gets about 10-17 inches of rain all year, and most of it comes in the winter. Because of the long period of dryness in the summer, only plants with hard leaves can survive, such as scrub oaks, chamiso shrubs, pines, cork and olive trees. Many leaves are also hairy so they can collect the moisture out of the air and use it.

There are many fires in the chaparral because of the heat and dryness. Some plants have adapted even to the fires. Their seeds will lie dormant until there is a fire. Their seed casings will crack and the seed will sprout only then.

Chaparrals exist in a mid-latitude climate and lie in a belt of prevailing westerly winds. This is why chaparrals tend to be on the west sides of continents. It is classified under Köppen's climate classification system as **Cs**. The **C** stands for warm temperature climates, where the average temperature of the coldest months is 64° F. The **s** stands for a dry season in the summer of the hemisphere it is in.

Chaparrals can be found from 30° to 50° N and 30° to 40° S latitudes. The chaparral climate occurs in central and southern coast of California; the coast areas of the Mediterranean Sea; coastal western and southern Australia; the Chilean coast in South America, and the Cape Town region of South Africa.

2000

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Mediterranean Chaparral Mediterranean Climate (Cs)

The Mediterranean chaparral has a very interesting climate. It has four seasons. These are spring, summer, fall, and winter. The chaparral has significantly hot and dry summers. Fog off the ocean is the only source of moisture during the summer. It has cool and moist winters with tropical storms bringing lots of rain. Spring and fall are usually a mix between both summer and winter, with a moderate amount of rain and heat.

The vegetation is mostly made up of shrubs. These include evergreen shrubs and most deciduous forms of shrub. Some of the adaptations of the vegetation are that the yucca rosette shape defends the growth in the inside of the bulbs from ruin except from extremely hot fires. Another adaptation of the vegetation is that the pinecone resin, which coats the closed-cone pines melts and allows the cones to open and spread their seeds. Also, the small, leathery leaves of thyme, oregano, and rosemary keep the moisture in the leaves. Leaves and branches are usually hairy to trap moisture from fog and rain, and to insulate them from the high heat in the summer.

The fauna is very interesting. Some of the adaptations of the Mediterranean chaparral fauna are that they don't need a lot of water. They have learned to live in their biome by being nocturnal, and are usually small.

What I find interesting about my biome's climate is its natural forest fires. These are caused by two things. One is the shortage of rain in the chaparral during the summer. Another is that many types of shrubs and flora are aromatic, like sage, thyme, rosemary, and oregano. These hold highly flammable oils. Did you know that the chaparral burns out every 30-40 years?

There is very little precipitation in the Mediterranean chaparral. The average annual precipitation is 10-20 inches in the form of rain. The average rainfall for the entire winter is 6.8 inches. The average rainfall for spring is 2.2 inches. The average rainfall for summer is .2 inches. The average rainfall for fall is 4.2 inches.

The average annual temperature is 59 ° F. The highest temperatures can reach 91°F, and the lowest temperature 37°F. The average temperature for winter is 46°F, while the average temperature for summer is 71°F. Average temperature for spring is 56°F, and the average temperature for fall is 65°F. Summers are dry and hot while the winters are somewhat cool and moist.

The latitude range for the Mediterranean chaparral climate is between 30° and 40° North. Köppen's climate-classification letter code for the chaparral is **Csa. Cs**

stands for a mild, humid climate with a dry season in the summer of the respective hemisphere. The **a** means the summers are hot with the warmest month over 72°F.

by Sarah Nelson, 2001

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California Chaparral Climate

Mediterranean Climate (Cs)

The word Chaparral comes from the Spanish word, "chaparro" meaning scrub oak. It is found in the coastal areas in California. Chaparral climate/ Mediterranean climate, or scrub climate, is a hot, dry, and mild climate in summer with rainy and cool winters. The summers are so hot that there are frequent fires and dry spells. Consequently, these regions are dominated by fire-adapted shrubs, the most important being manzanita and chamise. Tall shrubs with leathery leaves or needles such as red shank, sage, mountain mahogany, Christmasberry, California scrub oak, and many different kinds of ceanothus are common in these areas. Coniferous forests, and chaparral often alternate near the shore and on mountains. Chaparral occurs on slopes facing south, and in drier areas.

The animals that live in this environment have also adapted to the frequent fires and long dry spells, because they learned how to find water, and conserve it. These include invertebrates, birds, reptiles, and mammals such as Bewick's wren, California quail California striped racer snake, northern red diamond rattle snake, orange-throated whiptail lizard, pocket mouse, deer mouse, kangaroo rats, chipmunk, rabbit, fox, deer, coyote, lynx, and mountain lion.

Chaparral is found also in the mountains, and the average mountain temperature in Southern California is from 32-60 °F , getting colder the higher up you go. Along the coast, temperatures average 53-65 °F. Freezing weather may sometimes occur in the winter, but only for a little while.

Most of the 12-40 inches per year of precipitation is in the form of rain: fall, winter, and spring receiving equal amounts. Any snow that may fall in the winter melts very quickly. The precipitation also increases in elevation. During the summer, places along the coastline usually get more moderate weather and more moisture from fog than interior regions.

Geographers, and climatologists identify different biomes by their Köppen symbol. The biomes are identified by both big and small lettering. The larger letters, stand for the group that the biome belongs to. The Köppen symbol for Chaparral/hot grasslands is **Csa**. **Cs** stands for a mild humid climate with a dry summer. Precipitation in the driest month is less than 1 inch. The wettest month of winter gets 3-4 inches of rain. 70% of the average annual precipitation falls in the six months of winter. **a** stands for hot summers with the hottest month over 72°F

The California Chaparral climate is found at latitude 35-40° North, and longitude is 118-123° West.

by Marina S. 2002



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Golden Jackal

Genus: Canis

Species: aureus



The Jackal is much like a small wolf. It has long hair with a long and fluffy tail. It stands as tall as a moderately tall dog and has a bone structure common to the Canis family. It has long pointed ears and a medium sized pointed snout. The body length of a Jackal is 70 to 80 cm. and its tail is about 25 cm. When standing, it is about 40 cm. high. The color of the Jackals fur is yellow to pale gold. The fur on a jackal is smooth. The claws of a Jackal are about an inch long. It weighs about 8 to 10 kg.

Golden Jackals find a mate for life. The two Jackals have pups together for about 8 years. The young Jackals are born in a den which is in the parents territory. Each litter can contain up to nine pups but 2 to 4 is the usual number. The pups are nursed for up to 8 weeks, then they are weaned, and start eating regurgitated food. They eat solid food at three months and are sexually mature at eleven months. Male and female mates live together for their entire lives and raise the young together. Jackals do not live in packs. Jackals survive in the wild for at the most 15 years.

In the winter it gets colder and the Jackal grows a thick coat of hair in preparation to this season. The Jackal has also adapted to eating insects.

Jackals are omnivores. They eat 54% meat and 46% plants and have a very varied diet. The foods they consume are young gazelles, rodents, hares, ground birds and their eggs, reptiles, frogs, fish, insects, and fruits.

The Jackal is a predator and it helps the environment by keeping the rodent, gazelle, bird, and frog population down.

The Golden Jackal is abundant in the Mediterranean chaparral. It is currently not on the endangered species list.

by Julius L. 2001

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Mediterranean Chaparral Climate [Mediterranean Climate \(Cs\)](#)

The Mediterranean Chaparral has a very interesting climate. It has four seasons. These are spring, summer, fall, and winter. The chaparral has significantly hot and dry summers. It has cool and moist winters. Spring and fall are usually a mix between both summer and winter. There are moderate amounts of rain, and mild temperatures.

The vegetation is mostly made up of shrubs and small trees. These include evergreen shrubs and most deciduous forms of shrub. The trees, like cork oak, live oak, stone pine, and olive, usually have low branches, are very gnarled and have thick bark.

Some of the adaptations of the vegetation are that the yucca rosette shape defends the growth in the inside of the bulbs from ruin except from extremely hot fires. Another adaptation of the vegetation is that the pinecone resin, which coats the closed-cone pines melts and allows the cones to open and spread their seeds. Also, the small leaves of thyme, oregano, and rosemary keep the moisture from the precipitation in the leaves.

The fauna is very interesting. Some of the adaptations of the Mediterranean chaparral fauna are that they don't need a lot of water and they have learned to live in their biome.

What I find interesting about my biome's climate is its natural forest fires. These are caused by two things. One is the shortage of rain in the chaparral in the summer. Another is that many types of shrubs and flora are aromatic, like sage, thyme, rosemary, and oregano. These hold highly flammable oils. Did you know that the chaparral burns out every 30-40 years?

There is very little precipitation in the Mediterranean chaparral. The average annual precipitation is 10-20 inches. The kind of precipitation is rain. The average rainfall for the entire winter is 6.8 inches. The average rainfall for the entire spring is 2.2 inches. The average rainfall for summer is .2 inches. The average rainfall for fall is 4.2 inches.

The average annual temperature is 59 ° F. The highest temperature is 91.5 °F. The lowest temperature is 37°F. The average temperature for winter is 46°F. The average temperature for spring is 56°F. The average temperature for summer is 71.7°F. The average temperature for fall is 64.75°F. These readings are for the entire months and seasons. In the summer it feels dry and hot. In the winter it feels somewhat cool and moist.

The latitude range for the climate that you are reading about is between 30 to 50 degrees north and south latitude.

Köppen's climate classification letter code for the chaparral is Cs. This means a hot grassland, like the chaparral. Also this letter code describes an area with little rain.

2001

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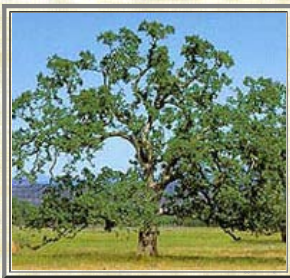
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Blue Oak

Common Name: Californis Blue Oak, Iron Oak, Mountain White Oak, Mountain Oak

Genus: Quercus

Species: douglasii



The blue oak is native to the state of California on the western coast of North America. In its natural habitat it grows in the valleys and lower slopes of the Coast Ranges, the lower western foothills of the Sierra Nevada, and the north slope of the San Gabriel Mountains. Blue oak covers about 3 million acres and is one of the largest ancient forest type in California. The Scottish biologist David Douglas first named the blue oak in 1831 for the bluish color of its leaves.

The habitat of blue oaks is open savanna to open woodlands with shrubby understories. At lower elevation it merges with annual grasslands, and at higher elevations it blends with chaparral, pinyon and juniper woodlands. The blue oak often grows among gray pines and other oaks species such as live oak, black oak and valley oak.

Blue oaks are adapted to drought and dry climates. They can survive temperatures above 100° F for several weeks at a time. Average maximum temperatures in July can range from 70° to 100° F. In January minimum temperatures can range from 10° to 35° F. Annual precipitation averages 20 to 40 inches and mostly falls in the form of rain.

The blue oak is a short tree with an open canopy. The canopy is typically rounded with many crooked branches. The tree grows to average heights of 30 feet. In deep, moist soil it can grow up to 60 feet. It is a winter deciduous tree, but will sometimes shed its leaves during severely hot and dry years and go dormant. The litter of leaves and twigs decomposes into a soil high in nutrients and organic matter, holding water better than the surrounding areas. This contributes to high species diversity under the canopies.

Leaves of the blue oak are simple and grow alternately on the twig. The leaves are about 1-3 inches long and have wavy, shallow and irregular margins, usually with 7 lobes. They have a blue-green color above, and yellow-green on the lower surface. A waxy



coating covers the tough and thick leaves to help conserve water.

Male flowers are yellow-green catkins. Female flowers are small and often solitary. These grow in the axis of the leaves on new twigs. Blue oaks flower from April through May.

The acorns are long, thin, and gently tapering. They are 3/4 to 1 1/2 inches long with shallow caps. The acorns ripen in one year, and can germinate after one month, unlike other oak varieties, which germinate the following spring. From the beginning most growth is in the roots instead of the shoots. This allows it to tap into available water sources right away, and survive dry conditions. The acorns are palatable to livestock and wildlife. It is an important food source for black-tailed deer, game birds and rodents. At least a dozen species of songbirds also eat the acorns.

The blue oak has an extensive root system. It can grow through cracks in rocks to depths of 80 feet to reach ground water. Its root system allows it to survive in fire prone and arid regions. Blue oaks reproduce both through seeds and vegetatively from burnt or cut stumps. The light colored bark is thick and helps reduce fire damage.

The blue oak isn't used in manufacturing because of its crooked growth habit. But it is used as fence posts and fuel wood. Native Americans made meal from blue oak acorns, and used the acorn leachate for dying baskets. The wood was used to make bowls.

Stands of blue oaks are typically 80 to 100 years old. Blue oaks are slow growers, and small plants can be 25 years old. Some blue oaks are as old as 200 to 500 years old. The number of blue oaks has decreased because there has been no natural regeneration. It is not considered endangered, however, because of its wide distribution across the region.

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Cactus Wren

Genus: Campylorhynchus

Species: brunneicapillus



The Cactus Wren lives in the arid and semi-arid deserts of southwestern United States and the chaparral of southern California and northern Mexico. The Cactus Wren is usually found below 4,000 feet. The [California chaparral](#) has hot and dry summers and humid and cold winters. It normally gets about 6 inches of rain per year.

At 7-9 inches (18-22 cm) long, the Cactus Wren is the largest wren in the United States. Both sexes look alike. Both are brown and have a white stripe running over each

eye. Their throats are white, and their beaks are dark, long and slightly curved. White and black streaks cover their backs. Their belly and sides are white to buff with dense spotting on the breast. The short and rounded wings have black and white banding. Legs and feet are tan colored.

They are very active and curious birds. They quickly investigate anything new in their territory. If you leave your car windows down or the garage doors open they are sure to enter and check it out thoroughly.

Cactus Wrens like to breed in successional chaparral scrub (chaparral that has recently come back from a burn). The female will select a nesting site in low, thorny trees or shrubs. In the Sonoran desert they prefer the well protected branches of the chain fruit cholla. Both male and female help build a football-shaped nest of dry grasses lined with feathers or other soft materials. A small side entrance protects the nest from predators. Cactus Wrens will first breed from February to early March and continue to have more broods through June if conditions are right. Four or five buff colored eggs speckled with brown are laid at one time. The size of the clutch (amount of eggs laid) is determined by the food supply. This is an adaptation Cactus Wrens have made to the changing food availability in their desert and chaparral habitats. The female incubates the eggs for 16 days while the male builds several more nest throughout his territory for roosting and future nesting sites. After the eggs hatch both parents will feed the hatchlings. The young fledge, or leave the nest, in 19 to 23 days. The fledglings stay with their parents for about a month.

Cactus Wrens don't migrate and are considered permanent residents of the region they live in. Males will vigorously defend their territory throughout the breeding season. They sing territorial songs, although the songs are not very musical.

The song consist of a one-pitched monotone of chuh, chuh, chuh, chuh, gaining speed towards the end.

The Cactus Wren mainly eats insects like ants, beetles, grasshoppers, wasps, fruits, seeds, and sometimes a treefrog or lizard. It will sometimes eat seeds and fruit. It has adapted to its hot habitat by shifting its foraging behavior according to the temperature. It begins to forage on the ground, and in the branches of shrubs in the late morning. As the temperature rises it will shift its foraging to shady, cooler areas. They stop foraging during the hot afternoon and rest in a shady area. They get almost all of their water from the food they eat.

The California chaparral, home to the Cactus Wren on the west coast, is quickly disappearing because of development and urbanization. Only small patches of true chaparral are left. Most of the remaining chaparral isn't large enough to sustain a Cactus Wren population. Cactus Wrens prefer the low, thorny bushes and scrub of the chaparral to build their nests because it protects their broods from predators such as snakes. The Cactus Wren is very adaptable to changing environments, as long as native chaparral plants are provided to build its rather large nests in.

The Cactus Wren is not considered endangered or threatened throughout its range. However, like all songbirds, it is protected by the Migratory Bird Treaty Act.

2002

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California Chaparral Climate

Mediterranean Climate (Cs)

The word Chaparral comes from the Spanish word, "chaparro" meaning scrub oak. It is found in the coastal areas in California. Chaparral climate/ Mediterranean climate, or scrub climate, is a hot, dry, and mild climate in summer with rainy and cool winters. The summers are so hot that there are frequent fires and dry spells. Consequently, these regions are dominated by fire-adapted shrubs, the most important being manzanita and chamise. Tall shrubs with leathery leaves or needles such as red shank, sage, mountain mahogany, Christmasberry, California scrub oak, and many different kinds of ceanothus are common in these areas. Coniferous forests, and chaparral often alternate near the shore and on mountains. Chaparral occurs on slopes facing south, and in drier areas.

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by Marina S. 2002

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Bengal Bamboo

Common Names: Spineless Indian Bamboo, Calcutta Cane

Genus: Bambusa

Species: tulda



The *Bambusa tulda* can be found in the biome of the Southeast Asian rainforest. It often grows as an undergrowth scattered or in patches in the forest. It does very well in a moist environment with a lot of rainfall. It likes temperatures between 40 degrees Fahrenheit and 100 degrees Fahrenheit. Rainforests get around 100 inches of rain per year. Rainforests are found mainly around the equator. They hold many varieties of plants and animals. The vegetation in rainforests grows in layers. Some of the layers get sunlight, but the bottom layers get little or no sunlight.

This particular bamboo can grow anywhere between 40 feet and 80 feet in height. It is approximately 3 inches in diameter at maturity. This bamboo has dark green straight stalky culms,

which are the stems. The leaves are long and narrow and green in color. They grow alternately on opposing sides of the stem, in two rows. Usually the blades fall off when the leaves have matured. This leaves a sheath like base. Bamboo is a perennial plant. Believe it or not, bamboo is not a tree or a shrub, it is a grass. It is the largest grass. It is very fast growing. In two to three months it is full grown. The culms or stems never get thicker after they are full grown. They only flower once in their lifetime and die after they bloom. No matter where they grow, different plants of the same species flower at the same time. New plants grow from the seeds that resemble rice kernels. This species life span is 25 to 40 years.

Bambusa tulda is important to its environment. It can reduce soil erosion. It sucks up water from heavy rains that might cause flooding. It also provides shelter for many animals. A rainforest has plenty of water for this plant to grow. It physically adapts to its environment by growing tall fast so it gets a lot of rain and sunlight.

Bambusa tulda is mainly used by the Indian paper pulping industry. It is also used for furniture, making baskets and reinforcing concrete. This type of bamboo is used to make a sacred flute called the "Eloo". It is also used for fishing rods. It is one of the most useful species of bambusa.

Rainforests are disappearing at the rate of 80 acres per minute, which is a little over 1 acre per second. Bambusa tulda is not on the endangered species list. It is native to India, Burma, Bangladesh, Myanmar and Thailand. Although there is no formal conservation plan, some of the local people are trying to conserve it in their area. They do this in their homestead and settled forest areas by planting it and being cautious about how much they harvest.

By Zachary C. 2002

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Photo Credit: © Hans Erken

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Bougainvillea

Genus: Bougainvillea

Species: spectabilis



The bougainvillea plant grows in the biome of the Amazon rainforest in South America. The Longitudes of the biome are 35° West to 65° West and the Latitude, 15° South to 5° North. The countries that lie in this biome are Brazil (mostly), Bolivia, Peru, Ecuador, Colombia, and Venezuela. The rainforest has thousands of plant species and is the home for many animals, too.

Bougainvillea's habitat could not be greener. It has lush vegetation with thick forests. It is a tropical rainforest. There are two seasons in the Amazon, wet season and dry season, both have very high temperatures. The temperatures of the Amazon rainforest are, at night 68° F (20° C) and in the day 85°-90° F (30°-32° C). The rainforest gets an average of eighty inches of rain a year, as opposed to the desert, which gets just ten inches, average per year. Bougainvillea likes a climate from subtropical to tropical, but prefers a tropical climate, growing in dense forests where it can cling and grab onto other plants to reach the sunlight. It can tolerate semi-shaded areas and it can also tolerate full sun, but when vine-like it tends to climb upward towards the sun. Bougainvilleas do not like swampy areas because of the lack of soil drainage. It can live with a lot of water it just doesn't like to hold the water for long.

The plant can reach over thirty feet. It can either be vines, trees, or shrubs with sharp thorns. The leaves of the bougainvillea are shaped like little hearts with drip tips at the ends. They are dark rich green and look almost like ivy leaves. On the underside of the leaves there are little hairs. The flowers of the bougainvillea can be several different colors, from pink, to red, to orange, to white and



yellow. They are small tubes with three papery bracts around them. The flowers grow all over the canes and vines. The root system of the bougainvillea is very fragile and doesn't form a good firm root ball.

Bougainvillea has many adaptations to its climate and environment. It has many hooks so it can cling and hold onto other plants for support. Also, it can grow in full sunlight to semi-shade. It also has become a houseplant so it can survive house climates, and the Amazon's warm wet climate. The leaves have drip tips so it can get rid of the rushing water fast and not get weighed down by the water.

The plant of bougainvillea is very abundant in the wild and is not endangered at all. It is not endangered because when it is vine like it spreads very quickly even though it does not have seeds and also it is almost insect-free. Great thorns protect it.

In conclusion, the bougainvillea is a very wonderful plant and has its own unique way of life. Its leaves and flowers are very unusual also. It can grow in many different ways from shrubs to vines to trees. It also lives in a very interesting place.

by Shelby I. 2003

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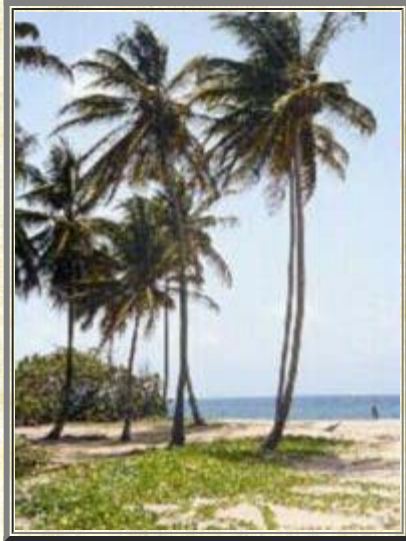
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Coconut Tree

Genus: Cocos

Species: nucifera

Parts used: the nut and leaves



Some people believe that this coconut palm is the symbol of romance in the tropics. People associate the coconut palm with relaxation and shade looking out over the sea to the horizon. Similar tall trees grow to be 50-80 feet. There are many varieties of coconut trees. The smallest is called the Dwarf palm. They all have a tall graceful trunk topped by a crown of light feathery leaves that are 15-17 feet long. The leaves are a yellow greenish color. The trunks are light gray.

The coconut grows in rainforests and other tropical climates. The coconut fruit has a hard outside and white meat beneath with a hollow center in which there is coconut milk. After the clusters of flowers bloom they develop into

coconuts. It may take a year or so for the coconut tree to mature. One tree can produce 50 nuts. Men harvest the coconuts by climbing the tree and cutting down the bunch of coconuts.

The coconut palm tree grows in hot areas. It likes frost free areas, and grows in Africa, Asia, Latin America, and the Pacific region. The tree grows near seas in these areas so the roots can find moisture. In the United States it is found only in Hawaii, the Southern tip of Florida, Puerto Rico, and the Virgin Islands.

Coconuts have supplied some families from the Pacific with shelter, food, drinks, and many of their other needs. The roots supply a dye and the trunks are used to stabilize buildings.

The hard outside is cut into slices of wood called Porcupine wood. The white meat of the coconut is eaten. They get coconut cream by sifting the white meat till it turns soft and creamy. They use the liquid for a nice refreshing drink. The sap from unopened clusters of flowers is used to make sugar, vinegar, and the alcoholic beverage called

arrack. Mats, baskets, and hats are all made out of the leaves, midrib, and Coir. Coir is the fiber from the husk. To make matting they export Coir to other countries.

The dried meat of the coconut is called Copra. Oil is pressed from Copra. After pressing out all the edible oil the leftover meat and cake makes good cattle feed. It's good because it contains protein, sugar, and vitamins.

The major uses for the oil of the coconut is soaps and margarine. The dried meat can be used in candies, cake, cookies, and pies.

The coconut palm likes to live in full sun and frost free areas. It likes water but it has to be well drained areas. It has shallow roots.

by Jessica F. 2001

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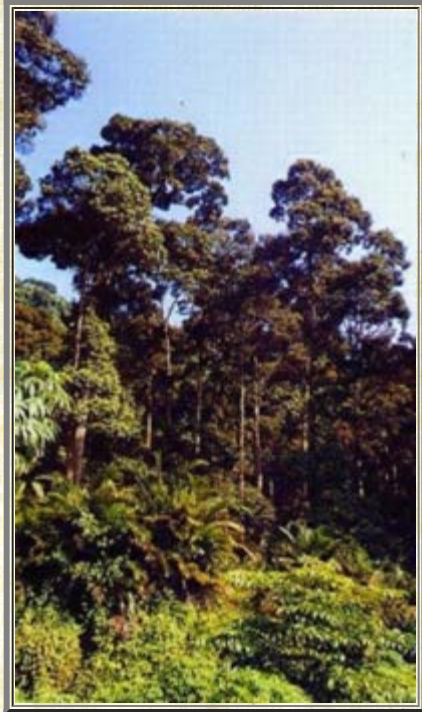
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Durian

Common Names: Civet Fruit, Stinkvrucht

Genus: Durio

Species: zibethinus



The durian is thought to be one of Southeast Asia's most ancient and primitive trees. It grows in lowland rainforests, and is native to Borneo, Indonesia and Malaysia. It bears large, odoriferous fruits directly from its trunk and main branches. Scientists think it is one of the first plants to rely on animals to disperse its seed. It does this by bribing them with a nutritious and smelly food surrounding its seed. After eating the durian an animal would wander around looking for more food and deposit the seed far from the parent tree, encased in its own package of fertilizer.

The durian has a lifespan of 80 to 150 years, but can live longer than that. It is believed that durians only die when they are blown down in a storm or cut down by man.

In the rainforest wild durians can grow to heights of 90 to 130 feet and are considered a sub-canopy tree.

These trees do not bear fruit every year. The trunks are straight and about 4 feet in diameter and can form buttresses. The bark is dark brown, rough with many vertical splits. It peels off irregularly, an adaptation to prevent epiphytes, lianas and parasitic vines from growing on it. The branches can be

straight or curved and are covered with coppery or gray scales when they are young. There are at least 15 different species of wild durians. *D. testudinarum* is very rare and is on the IUCN Red List of endangered species. More common are *D. lowianus*, *D. lanceolatus*, *D. oxyleyanus* and *D. dulcis*.



The durian's drooping leaves are evergreen and grow alternately on a branch. They are 2 to 10 in long and 1 to 3 in wide, oblong and rounded at the base and pointed at the end. They have a leathery texture and are dark-green and glossy above and covered with golden, hairy scales underneath. When they first appear they are folded at their mid-rib and stretch out as they mature. Seen from a distance they have a shimmering golden sheen to them.

The flowers have a strong odor which attracts its principle pollinator, a small bat called a [Dawn Bat](#) (*Eonycteris spelea*). They grow in clusters of 1 to 45 flowers directly from the trunk or main branch. The large flowers are creamy white to golden-brown in color. The outer part of the flower is fleshy and has 5 fused sepals and 5 petals. Long stamens hang down from the center of the petals. The flowers are hermaphrodites, meaning they have a stamen and a pistil in the same flower. However, the flowers can't pollinate themselves because the stamens and pistils from the same tree come out at different times. The flowers are nocturnal bloomers and open from around 3 pm to midnight. The pistils with its female stigma come out first and get pollinated



by flowers from other trees. By the time the anthers of the stamen emerge, the pistils on the same tree are no longer active. By midnight all the flower parts except the pistil fall to the ground.

The most notorious part of a durian tree is its fruit. The fruit is ovoid, almost round in shape, and about 5 to 6 in. wide and 12 in long. It can weigh up to 18 lbs. Walking under a durian tree when the fruit is ripe could be hazardous to your health because the tough, yellowish rind is covered with densely set and pointed 3 to 7-sided spines. The durian gets its name from the Malay word *duri*, which means thorn. Large fruits like the durian tend to grow directly from the trunk in what is called a **cauliflorous** growth habit. The rind is scored with 5 natural lines of weakness. When the fruit ripens and falls to the ground it splits open along these lines.

Inside are 5 seeds, each about 2 in in diameter. The seed is surrounded by a custard-like **aril** which smells to high heaven. An aril is part the seed's own fleshy outer covering. Arils are rare in rainforest plants. Only 1% of rainforest plants have arils. The incredibly strong odor of the durian aril is an advertisement to all kinds of animals that a great meal is waiting for them. Because the seeds are so big the durian tree depends on large animals like elephants and rhinoceros to eat and disperse the seeds. The seeds are tough enough not to be damaged by chewing or digestive juices. Other animals, like monkeys, gibbons, fruit doves, tapirs, orangutans and man enjoy the fruit of the durian.

The durian fruit has a powerful odor reminiscent of decayed onions, Limburger cheese and sherry wine. But the texture is like a smooth, creamy custard and it has a rich, sweet, faintly almond flavor. Many people are hesitant at first to eat the fruit because of its odor, but once they do, they find it delicious and irresistible.

The durian is dependent on a small nocturnal bat, called the Dawn Bat, for its pollination. Without the bat the durian cannot fruit. Not until a few years ago was the importance of the Dawn Bat completely understood. Today the bat's limestone roosting caves are being mined for the production of cement and bats are being driven out or killed. The mangrove swamps that provide the bat with its other main source of food, the Mangrove Apple, are being filled in and built on. The numbers of Dawn Bats have been declining rapidly, as has the durian crop.

Durian is one of the favorite fruits in Southeast Asia where it is known as the "King of Fruit". Most of the durians sold in the market are grown on plantations and one durian can cost \$7 American dollars. Without the bats there will be no durian, which to many people in Southeast Asia is unthinkable.

E. Benders-Hyde, 2002

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Jambu

Common Names: Jambu Ayer, Djamboe Aer, Watery Rose Apple

Genus: Syzygium

Species: aqueum



Growing up as a child in Indonesia one of my favorite fruits to eat was jambu. Biting into the small, crisp and mildly sweet, watery fruit was thirst quenching and delicious.

Jambu grows naturally from southern India to eastern Malaya. A member of the myrtle family, this fruit is the smallest in a group of similar fruits of the Syzygium genus.

Jambu is a small tree or large shrub which grows on the average

of 10 to 20 feet in height. Branches grow close to the ground from a short, crooked trunk. The crown is open and non-symmetrical. It likes plenty of rain evenly spaced throughout the year.

The leathery leaves grow opposite each other on short, thick stems that clasp the twig. They are oblong in shape, narrower at the stem end. They are 2 to 10 inches long, 1 to 6 inches wide. They are pink when young and become dull, light-green above and yellowish-green beneath when mature. The flowers have a faint fragrance and grow in loose clusters of 3 to 7 at the end of branches. The petals are pale yellow, yellow-white or pink and the stamens are uni-colored. In Indonesia the tree blooms twice a year, in July and again in September. The fruits ripen in August and November.

The jambu fruit has a shiny, thin skin which varies from white to light red. About 1 inch long and 1-1.5 inches wide, they are

shaped somewhat like a pear with a narrow neck and a wide apex. The fruit curves in and forms a concave indentation from which stiff sepals and the style protrude. The flesh is white or pink, slightly fragrant, crisp and juicy with a faint sweet flavor. The fruit has about 1-3 seeds which, together with the roots, are considered poisonous. Red and white jambu are found in Indonesia. The red jambus are the smallest fruit, sweet and juicy, with the white ones being very acidic. In Malasia there is a wide variety of color, ranging from palest green, delicate blush pink to deep crimson and a sort of brownish red. Green jambu are very crunchy but not as juicy.

Southeast Asian rainforest animals, like monkeys, [gibbons](#) and [jambu fruit doves](#) rely on jambu as part of their diet. Growing wild, the jambu is also cultivated throughout Southeast Asia and is not endangered.

Elisabeth Benders-Hyde

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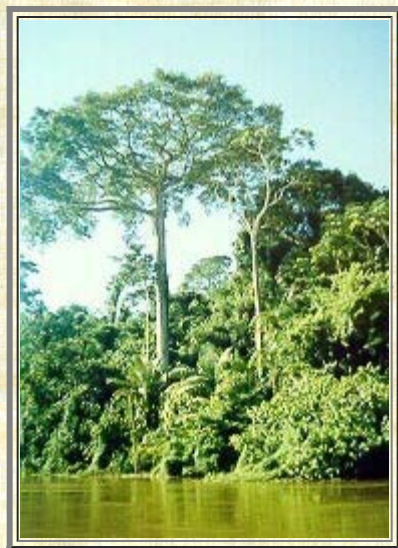
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Kapok Tree

Common Names: Kapok, Ceiba, Silk-cotton tree

Genus: Ceiba

Species: pentandra



The Kapok tree is an emergent tree of the tropical rainforests, and is often described as majestic. It can grow to a height of 150 feet or more, towering over other trees in the rainforest. Originally a native to South America it now has spread to the primary rainforests of West Africa, and the Southeast Asian rainforests of the Malay Peninsula, and the Indonesian archipelago.

The straight trunks are cylindrical, smooth and gray in color, and can reach a diameter of 9 feet. Large spines protrude from the trunk to discourage damage to the trunk. Thin, plank type buttresses stabilize the giant and can extend to 30 feet. The wood is a pinkish white to ashy brown in color, with a

straight grain. The branches grow in horizontal tiers, and spread widely.

The crown has an open umbrella shape. Many plants and animals grow and live in the branches of the kapok tree. Birds nest in it, and mammals use the huge branches as highways. Frogs breed in the pools of water that collect in the bromeliads.

Kapoks are drought deciduous. This means they shed most or all of their leaves during the tropical dry season. The dry season occurs during the northern hemisphere winter. The leaves are palmate and compound. The 5-9 leaflets are 7-8 cm long and 1-3.5 cm wide. Flowers usually open before the leaves appear, and are clustered on small, new branches. The 5 petals of a flower are

about 2.5 cm long and are a creamy white or pale pink in color. Their odor is unpleasan, but is probably meant to attract the bats that pollinate them. The brown seeds are round like peas and are found in pods. The pods are woody, smooth and pendulous, with a light green color. They will burst open while still on the tree after the leaves have fallen. Inside a whitish cotton like fiber surrounds the brown seeds. These are born away on the wind. Most emergent trees will have wind borne seeds because they rise above the stagnant air of the rainforest and can take advantage of the breezes which blow there. Fruit bearing plants close to the forest floor rely on animals to eat and disperse their seeds, which will fall to the ground when ripe, and which are normally covered with a thick, appetizing pulp.

In many places the straight trunks of the kapok tree are used to make dugout canoes. The white, fluffy seed covering is used in pillows and mattresses. Since it is buoyant and water resistant it is often used in flotation devices and padding. The seeds, leaves, bark and resin have been used to treat dysentery, fever, asthma, and kidney disease. In Mayan myths the kapok tree was sacred. They believed that the souls of the dead would climb up into the branches which reached into heaven.

The kapok tree is widely spread around the world and occupies an important niche in the ecosystem of a rainforest. Emergent trees like the kapok rise above the canopy of the rainforest and provide a home for plants dependent on sunlight. Their branches provide a habitat for countless epiphytes, which provide food and shelter for many types or animals. They allow animals to move around the rainforest without coming down to the ground. Monkeys who venture out to the tops of emergent trees are easy prey for eagles.

There is no status on the kapok tree. Its timber is desirable because of the great length of its trunks, the beautiful color of its wood, and its straight grain. People of the rainforest have many uses for the kapok tree. As with many desirable things, too many people may want to exploit the kapok tree and put its future in jeopardy.

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Mangrove Forests



Mangroves are woody, specialized types of trees of the tropics that can live on the edge, where rainforests meet oceans. Found on sheltered coastlines and river deltas, they grow in brackish wetlands between land and sea where other plants can't grow. They protect the coastline and prevent erosion by collecting sediment from the rivers and streams and slowing down the flow of water. There are about

39.3 million acres of mangrove forests in the warm coastlines of tropical oceans all over the world. More than 10.5 million acres, or 27% of mangrove forests are found in [Southeast Asia](#).

Mangrove trees look as if they grow on stilts. The stilts are their specialized aerial roots which hold the trunk and leaves above the water line. Mangrove forests are affected by the rising and falling of the ocean's tides. The aerial roots and tap roots can filter out the salt in the brackish water they grow in. Support roots grow directly into the mud to anchor the tree. Other roots snake up and down with the upward loops rising above the salt water level. Salt crystals taken up by the roots are stored in the leaves. The mangrove rids itself of the salt by shedding its leaves after a while.

It is believed that the earliest species of mangroves came from the Southeast Asian region. There are more mangrove species in this region than anywhere else in the world. It is thought that seeds of the mangrove moved westward to India, East Africa and finally to Central and South America on ocean currents 23 to 66 million years ago. Mangroves of the Americas have similar but fewer species than those in Africa and far less than Southeast Asia. The specialized seeds of the mangroves are tough and float, and can travel great distances in salt water and take root far from

its parent tree. The seeds germinate and grow into seedlings right on the parent tree. During this time they acquire the carbohydrates they need later to grow on their own. The tree eventually drops its seedlings, where they may take root in the mud below, or are swept out by the tide.

One of the most biologically diverse forests, mangrove forests are known as the "rainforests by the sea". The forests are the breeding grounds for fish, shrimp, prawns, crabs, shellfish and snails. Mud skippers are found in mangrove forests. The mudskipper has made adaptations so it can skim across the mud during low tide when the ground is uncovered in many places, traveling from puddle to puddle. Mangrove forests are also nesting sites for many shore birds and home to crab eating monkeys and [proboscis monkeys](#), fishing cats, lizards, sea turtles, and many more animals. For many species of fruit bats, like the [dawn bat](#), mangrove blossoms and fruit make up a large part of their diet.

Mangroves have a very specialised adaptations that enable them to live in salty waters. Breathing roots allow them to survive in anaerobic sediments. Buttresses and above-ground roots enable them to grow in unstable mud flats. Their foliage removes excess salt from the sap, and they conserve water to cope with periods of high salinity. Their seeds are bouyant to allow them to disperse and establish themselves in new areas.

Today mangrove forests are one of the most threatened habitats in the world. Mangrove roots are very susceptible to pollutants like crude oil clogging their lenticels, and continual flooding from artificial dikes and sea walls. Mangroves act as sinks which concentrate pollutants like sewage, toxic minerals and pesticides and herbicides. Over time the stress of the pollutants and reduced light kill large areas of mangroves forests. Mangrove wood also makes a superior kind of charcoal and many trees are being cut down to sustain local charcoal industries. Mangrove forests are also being filled in for developments and as a form of mosquito control.

Public awareness and education about the mangrove forests may help protect them. It is necessary to involve local communities in managing and protecting their mangroves. Designated conservation areas may also save some of the forests. However, national governments have not been able to enforce laws and regulate development and industry to save the wetlands. Adequate provisions for conservation and restoration have not been included in development of the mangrove wetlands.

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Strangler Figs

Common Names: Banyan Tree

Genus: Ficus

Species: ssp.



Figs are one of the most important plant species of a rainforest ecosystem. There are close to 1,000 different species of Ficus, which can be found in every major rainforest, tropical continent and islands around the world. Hundreds of animals like [pigeons](#), parrots, hornbills, [toucans](#), monkeys, [gibbons](#), and fruit-eating bats, feed on the sweet fruit of the fig tree.

Figs are considered a "keystone" species because they are so important to the animals of the rainforest. This is so because figs bear fruit several times a year. Different species of figs fruit at different times so that there is always a supply of food for animals that depend on fruit as a major part of their diet. A large variety of herbivores and omnivores eat figs. In some forests up to 70% of its animal's diets depend on figs,

and the number of fruit-eaters determines the number of predators of fruit-eaters.

Some of Southeast Asia's Ficus species are *Ficus benjamina*, *F. religiosa*, *F. microcarpa*, *F. rubiginosa* and *F. macrophylla* and the notorious strangler figs.

Strangler figs are tall canopy trees which can grow to 148 feet in height. The manner in which they reach the canopy is a strange story. The forest floor of a rainforest is a difficult place for seedlings to grow. There is little light and a lot of competition for water and nutrients. Strangler figs have made an adaptation to avoid these difficulties. Unlike most plants, strangler figs start out their lives as epiphytes in the crook of a tree or on its branches. Tiny, sticky seeds are deposited high in a tree by animal droppings. The seeds are not affected by the animal's digestive tract and soon germinate.

The strangler fig has an aggressive growth habit that insures its survival in the rainforest. The seedlings grows slowly at first, getting their nutrients from the sun, rain and leaf litter that has collected on the host. The stranglers send out many thin roots that snake down the trunk of the host tree or dangle as aerial roots from its branches. When the roots reach the ground they dig in and put on a growth spurt, competing with the host tree for water and nutrients. They also send out a network of roots that encircle the host tree and fuse together. As the roots grow thicker they squeeze the trunk of its host and cut off its flow of nutrients.

In the canopy the strangler fig puts out lots of leaves that soon grow thicker than the host tree and rob it of sun light. Eventually the host dies from strangulation, insufficient sunlight and root competition, and the strangler fig stands on its own. A hollow center is all that remains of the host.

Some figs grow root systems that develop into thin buttresses that can spread out to a distance of about 30 feet. Other figs grow aerial roots from their branches that, when they reach the ground, root themselves and become another trunk on the same tree. Strangler figs have light colored bark and umbrella shaped canopies. Green above and lighter below, the leaves are simple, ovoid and usually between 1.5 - 3 inches long. Waxy leaves protect the strangler fig from drying winds and sunlight that it is exposed to high in the canopy.

Perhaps the most amazing part of this extraordinary tree is its flower. What we think of as the fruit is really a hollow, flower-bearing structure called a cyconia. The inside it is lined with hundreds of male and female flowers. The males carry pollen and the females bear seeds. There are two different types of female flowers; one with a short style and one with a long style.



Now, if that isn't weird enough, each species of fig has a symbiotic relationship with its own species of tiny pollinator wasp (*Agaoninae spp*). These wasps are about 2 millimeters long, and enter the cyconia through an opening at the bottom of the fruit. Once inside, they pollinate the long-

styled female flowers in the process of laying their eggs in the ovaries of short-style flowers.

Without these special wasps carrying pollen from one cyconium to another there would be no seeds.

When the eggs hatch, two kinds of wasps emerge; a female and male. When the male hatches it finds a short-style flower and bites a small hole in the ovary wall. He then inseminates the female through the hole and repeats the process with every female it finds. The female will then crawl out of the hole made by the male. As a last act in its short life the male will chew through the cyconium wall to the outside. The females are then able to leave and repeat the process of pollination and egg laying in other figs.

Some figs even have two different kinds of trees in the same species; one tree only bear cyconia with short-styled flowers for the wasps to lay eggs in called caprifig. The other tree sets seeds and are delicious so animals will eat them and disperse their seeds. The caprifigs are hard and unappetizing and the wasps can develop without the danger of being eaten.

Scientists call this type of symbiotic relationship "species packing". They believe that it allows different species of Ficus to grow side by side without cross pollinating. The diversity of the fig trees stays intact and ensures that each species fruits at its own time. This gives them a greater chance of being eaten by animals and having their seeds dispersed.

Strangler figs are also known as banyan trees. The Hindus regard them as sacred because it is said that Buddha once meditated beneath one. *Ficus religiosa* is the sacred tree of Burma, Ceylon and India. One particular tree of the species of *Ficus bengalensis* in India is listed in the Guinness Book of World Records (1985) as the world's largest tree, with 1,000 prop roots and covering an area of four acres.

Although strangler figs are still abundant, old forests with mature fig trees are being lost every year through logging and fires. New growth trees which replace the Ficus are usually of a single species and fruit at the same time. Animals that relied on the plentiful, year-round fruit of the fig trees either starve or move away. Most will not return to the area.

E. Benders-Hyde 2002

Photo credit: Tim Laman

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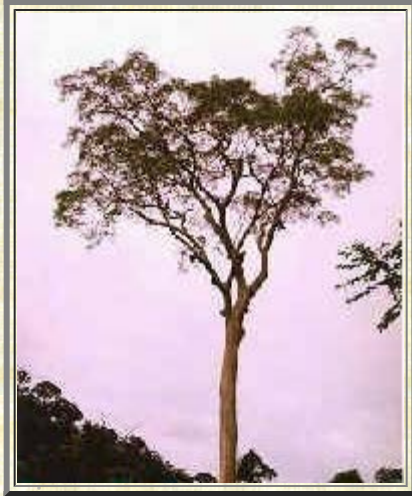
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Tualang

Common Names: Mengaris, Honey Bee Tree, Dëoh

Genus: Koompassia

Species: excelsa



The tualang tree is a majestic emergent tree of the Southeast Asia rainforests best known for the disk-shaped honeycombs which hang from its horizontal branches. Towering above the canopy the tualang can reach 250 feet, or the 30 stories in height. These trees can be found growing in the lowland forests of southern Thailand, peninsular Malaysia, northeastern Sumatra, Borneo, and Palawan. Their habitat is the primary tropical rainforest. They prefer damp locations along rivers, in valleys, and the lower slopes of hills.

Tualangs are a member of the legume family, and are related to peas. Their leaves are pinnate with 4-5 leaflets

growing alternately along a central rib. They create a bright green, feathery crown. Their seeds are contained within large pods. The trunks have a smooth, silvery bark. The slippery surface discourages sun bears (*Helarctos malayanus*) from climbing up into the tree to reach the honeycombs of the Asian rock bees (*Apis dorsata*). The bees prefer the tualang because it doesn't branch until almost 100 feet up. Huge buttresses support the tree at its base and keep the giants from toppling over. The sap is irritating to the skin and produces a rash.

The tualang tree is common locally but is not an abundant tree. There are no great forests of tualangs to be found. Instead solitary trees are often



found standing alone in open areas because the wood is hard to cut and local people value the tualang for its honey. A standing tualang is more valuable for its honey than felled for its timber. The wood is brittle and often splinters when it is cut down. The wood is also incredibly hard and



contains silica, making cutting it down a difficult process. With the decline of more accessible hard woods however, tualangs are being cut down for timber, and are being sold under the name of Mangaris wood. The tualang is protected under Sarawak's Wildlife Protection Bill of 1990.



Perhaps the tualang trees are best known for the immense parabolic honey combs which hang from the bottom of their branches. The combs can be 6 feet across and can contain as many as 30,000 bees. One tualang tree can contain more than 100 nests. The world's largest honey bees, Asian rock bees are 1 inch long and the tualangs are their preferred tree species

because their tremendous height provides them safety from marauders. Except for the human kind.

Local people perform a ritual honey harvest with mixed Islamic and Hindu symbolism. Singers chant ancient prayers to cajole, charm and calm the bees. On moonless nights in February and March, honey hunters climb the tualang trees with smoldering torches, banging them on the branches above the nests. This creates a rain of fire, and as the sparks fall to the ground the awakened and enraged bees take off in pursuit of the embers. The bees become disoriented and remain on the ground until

dawn, leaving the nests unprotected for the honey hunters to finish their harvest. About 1,000 pounds of honey can be gathered from one tree.

A Hindu myth connected to the harvest of the honey tells of a handmaiden called Hitam Manis, or "Dark Sweetness", who fell in love with the son of the reigning Sultan. Although he returned her love, they could not get married because she was a commoner. When the Sultan discovered their love he set out to kill her. As she and some other maidens fled the palace in fear, her heart was pierced by a metal spear. Hitam Manis and her friends turned into bees and flew away into the forest.

Some years later the prince went into the forest and saw giant honey combs high in a tualang tree. He climbed up the tree, discovering the sweet honey, and called down to his servants for a knife and a bucket. But when they lowered the bucket, they found the body of the prince hacked to pieces. A voice called out from the tree that he had committed a sacrilege by using a metal implement to cut the comb like that which had killed Hitam Manis. Later a "golden shower" made by the bees restored the prince back to life. To this day no metal is used in harvesting the honey as a sign of respect to Hitam Manis. At dusk the bees fly from their nests and defecate en masse, showering the surrounding ground and foliage with a golden rain. The nitrogen-rich bee feces fertilizes the tualang that hosts the bees, giving it life as it did for the prince.

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Bengal Tiger

Genus: Panthera

Species: tigris tigris



The Bengal Tiger is a beautiful animal. The base color is orange/brown, and white on the cheeks, mouth, eyebrows, and stomach. The tiger also has long black stripes on it. The weight of the tiger can be up to 575 pounds. The Bengal tiger is not the biggest tiger in the world, Its cousin the Siberian tiger is the largest tiger. The body of the Bengal tiger is broad with legs that are slender. The fur of the tiger is very fine in texture. The Bengal tiger is very sneaky

and quiet. The cubs look the same. The Bengal tiger can get up to ten feet long and three feet tall.

The Bengal tiger lives in the Sundarban regions of India, Bangladesh, China, Siberia, and Indonesia. The tiger reaches maturity at the age of five, and the life span of the tiger is about 15 years. The Bengal tiger mates about any time of year. The Bengal tiger can have a litter of up to four cubs. The cubs don't hunt for themselves until they are at least 18 months old. Then they go hunting with their mother. The gestation period is about three months and ten days.

The Bengal tiger is a carnivore. It eats boars, wild oxen, monkeys, and other animals. The Bengal tiger can catch big animals, but prefers killing either young or old animals because they don't run as fast. The Bengal tiger is a nocturnal and greatly feared predator. It eats wild oxen and other animals, which eat plants , which are part of the food web. So it helps balance the web.

In the year 1900 there were 50,000 tigers on the earth, but now there is only 4,000 left in the world. So you can see that the population has decreased because of poachers and other cruel and selfish people. The Bengal tiger is protected in many places such as: The Nagarahole National Park 250 guards, and The Ranthambhore National Park 60 guards. The guards in the national parks are important because they know the kind of tools and weapons poachers use, so the guards can identify poachers. In India the Indian government made an effort to save the tigers. It was called "Project Tiger", and it was thought up in 1972 from Prime Minister

Indira Gandhi. Under this protection from the government, hunting and trading tiger parts were banned. A sad thing happened 8 years ago when 850 pounds of tiger bones, which adds up to about 42 tigers were found in New Delhi, India hunted by poachers. The reason why poachers and other people hunt beautiful animals like tigers is because the eyes, bones, and even whiskers are very valuable to researchers who are making medicine to treat or cure human ailment, and to give people a longer life.

Babette B. 2001

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Chimpanzee

Common Name: Chimp

Genus: Pan

Species: troglodytes



Chimpanzees are about 3 to 5 feet tall and weigh from 99 to 176 pounds. They have black hair. Adults are very often bald, usually a triangle on the forehead of the male, and more complete baldness in females. Their faces are hairless. Infants have pink faces which turn darker with age. Although chimpanzees have no tail, infants have a white tail tuft.

The favorite food of chimpanzees are fruits and young leaves, but they like many different types of food. In the dry season they will eat buds and blossoms, soft pitch, stems, galls, honey, bark and resin, seeds

and nuts. Insects, like ants and termites are also in their diet. On rare occasions they will hunt small game like monkeys, pigs, and antelopes.

For the most part, chimps forage on the ground. While searching for food, troops will move around their territory, never staying long in one place. This allows the vegetation to recover before the chimps return to the area again. They do not compete for food with monkeys, who forage mostly in the canopy.

Chimpanzees reach puberty at about seven years. Females mature three to four years later. Females will not breed for three to four years after giving birth. They are capable of reproducing until the age of 40. The maximum life span in the wild is about 60 years.

The newborns are helpless at birth. After a few days it holds on to the mother's hair and at 5 to 7 months rides jockey style on

the her back. By four years, the infant usually walks, but stays close to the mother for about five to seven years.

Chimp communities are made up of 15 to 100 members. Males tend to stay in the community they are born into, but females move between different communities during their adolescent years.

Chimps have developed several behavioral adaptations. At night chimps construct nests of leaves and branches 18-29 feet high in a tree. Males will hunt cooperatively for baby monkeys or bush pigs. Some groups have been observed to use thin twigs or blades of grass to extract termites from their nests. Some chimps in western Africa use wood and stone tools as hammers to open nuts.

Chimps are on the endangered species list. There may be as many as 35,000 chimps in the wild, but destruction of their habitats, hunting and commercial trapping for the animal trade had reduced their population.

2000

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Common Palm Civet

Common Names: Musang, Toddy Cat

Genus: Paradoxurus

Species: hermaphroditus



While growing up in Indonesia, I would sometimes wake up to a terrible racket in the ceiling, occasionally followed by a sickly-sweet odor reminiscent of a striped skunk. It was the musangs, or common palm civets, having some sort of spat. Once one fell through the ceiling, almost hitting my father, who had gone to investigate. Like pesky squirrels they would sometimes invade our attic.

The common palm civet is found from the Himalayas and southern China, to the Philippines, the Malay peninsula, and the Indonesian islands. It is a highly adaptive animal and can live

in dense forests, agricultural areas, and even alongside humans.

Weighing from 4 to 11 pounds, the palm civet's head and body length is 17 to 28 inches (43.2-71 cm), with a tail length of 16 to 26 inches (40.6-66 cm). Its ears are small and faintly pointed, as is its nose. It has a long and slender body with short legs. They have a coarse grayish to brown coat with black-tipped guard hairs over all. Three rows of black spots run along each side of its body. The hair around its eyes, cheeks and muzzle is black, with spots of white under each eye and on each side of its nose. The ears, feet and last end of its tail are also black.

Both sexes have well-developed anal scent glands looking somewhat like testes, which gives the musang its species name.

A nocturnal omnivore, the palm civet hunts alone. They are expert climbers and spend most of their lives in trees. They eat small vertebrates, insects, ripe fruits and seeds. They are very fond of palm sap, therefore their common name. The sap is used by natives to make a sweet liquor called "toddy", which gives the palm civet its other common name. The palm civet is also fond of coffee cherries. They eat the outer fruit and the coffee beans pass through their digestive tract. An expensive coffee called kopi luwak is supposedly made from these coffee beans. Kopi luwak is said to have a gamy flavor and sells for more than \$100 per pound.

Palm civets stake out territories which often overlap during times of adequate food supply. When spending time in one area, musangs will use the same tree to sleep in during the day. Palm civets reproduce throughout the year although it has been recorded that kittens are most often seen from October to December. Kittens are born in a litter of 2 to 5 young. Palm civets become sexually mature at 11 to 12 months. In captivity the common palm civet can live up to 22 years.

The common palm civet disperses seeds of the trees on which it feeds by eating the seed pulp and passing the seeds well away from its parent tree. Although not much is known about the palm civet, it is believed that its nocturnal habit was developed to avoid predators. It is plentiful in its natural range and is not endangered.

2002

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Dawn Bat

Common Names: Lesser Dawn Bat, Dobson's Long-Tongued Fruit Bat, Cave Fruit Bat, Cave-dwelling Blossom Bat

Genus: Eonycteris

Species: spelaea



The Dawn Bat is a small Southeast Asian rainforest bat which lives in the mangrove and lowland forests of Malaysia, Indonesia and Borneo. Its unique and special place in the rainforest ecosystem has only been recently discovered.

Dawn Bats have long and slender snouts which give them a dog-like appearance. Their ears are small and pointed and their eyes are round and small. The fur on the dawn bat's back is dark brown and lighter on their underside. Males have a ruff, or fur collar around their neck, which is a little darker in color than their head

and chest hair. Females only have sparse hairs around their necks. The tongue of a Dawn Bat is long and can be thrust forward into flowers, while brush-like projections allow it to pick up pollen and nectar.

The male dawn bat is larger than the female. They weigh from 55 to 82 grams while females weigh 35 to 78 grams. Dawn Bats are 8.5 to 12.5 cm long from head to tail. They either have a very small tail or none at all. Their forearm length is 6 to 8 cm long. The genus Eonycteris doesn't have a claw on their index finger like most other bats.

Female Dawn Bats reach sexual maturity after one year while males become sexually mature in two years. Females can have

babies at any time of the year. Gestation is a little longer than 6 months, sometimes as long as 200 days. Usually one pup is born at a time. It attaches itself to a nipple and holds on for 4 to 6 weeks. After that time it starts to take little practice flights of its own. They aren't completely weaned until after 3 months.

Dawn Bats roost in limestone caves found in Malaysia and the Indonesian archipelago. Small groups of several dozen will roost in small shelters, while tens of thousands can inhabit larger caves. Dawn Bats are nocturnal and emerge from their caves at dusk to feed on pollen and nectar of night blooming plants. Their favorite flowers are from the Mangrove Apple (*Sonneratia alba*) and the [Durian \(*Durio zibethinus*\)](#). The flowers of the durian tree are large and waxy and only bloom at night. As the Dawn Bat hangs onto the flower and pushes its nose deep inside to lick the nectar, pollen covers its face and chest. They are the main pollinators of these two trees and very important to their survival.

Peaches, bananas, avocados, kapok, hemp and latex are some other plants which depend on bats for pollination. In Southeast Asia some of the largest caves with bat colonies are being destroyed by limestone quarrying. Mangrove swamps, home to the Mangrove Apple, are being filled in for development, destroying one of the Dawn Bat's main food supplies. Bats have been accused of spreading disease and destroying commercial fruit crops. However, Dawn Bats prefer ripe and strong-smelling fruit. Commercial fruit is picked green for shipping and is therefore rarely damaged by these bats.

Very little is known about the importance of bats and how forests depend on them for their survival. But it is known that they are one of the main pollinators and seed dispersers for many tropical plants. Bats often make up more than half of the mammal species in a rainforest ecosystem and most species of bats have not been studied.

Although Dawn Bats are being killed by the thousands, they are not on the CITES or IUCN list as a vulnerable or protected species. Malaysia has a Wildlife Protection Ordinance (Amendment 76). However, Dawn Bats can be killed if they pose a threat to crops or property. Since many still think they are fruit pests, the ordinance does little to protect them. People need to become more educated about the Dawn Bat to understand how important they and other bats are to the forests and crops.

2002



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Golden Lion Tamarin

Genus: Leontopithecus

Species: rosalia



The Golden Lion Tamarin is one of the most endangered mammals in the world. This Tamarin monkey is nearly extinct primarily because of its magnificent mane. Poachers desire this monkey's hide as they can sell for as much as twenty thousand dollars on the black market! This species of tamarin's hair is the color most people call strawberry blond, but redder. The thick coat of fur is longer around this monkey's bare, grayish face compared to its medium to long length body hair. The texture of the fur is silky, almost like a young cat or kittens. The mane around the face looks like a lions, and that's how it got its name, Golden, describing it

has golden reddish mane, Lion because the fur around its face looks similar to a lions, and Tamarin as that is what species of monkey they are.

The Golden Lion Tamarin's eye's are quite large, and are hazel to dark brown colored. The nostrils on the face of this tamarin have very wide spacing. Looking at its entire face it is bare, flat, and the head, throat, ears, cheeks and shoulders are decorated with golden fur. The shape of this Tamarin's head is round and small, but the mane gives it a larger appearance. Their body types are slender, due to the fact that they weigh one to two pounds (14-29 oz). The Golden Lion Tamarins body has the shape of a small cat, and a squirrel combined. As easy as we lift a finger these acrobatic creatures are able to jump like a cat a space of fifteen feet between two trees; and their squirrel features are evident looking at their bodies: a tail (12.5-16 in.) longer than their head and bodies put together (8-14 in.): and little paws with sharp little claws. Their hands are like ours with five fingers, are long and thin, and unlike

human hands their hands are webbed slightly and instead of flat fingernails Golden Lion Tamarin's have long claws.

Golden Lion Tamarin live in the coastal lowland Amazon rainforest of Brazil. The exact latitude and longitude would be Latitude: 5 degrees N - 15 degrees S Longitude: 35 degrees W - 65 degrees W. This monkey's habitat of lush rainforest is usually in the canopy layer, which holds plants such as grasping vines, thorn clung trees and dangling mosses, ferns, cacti, orchids, vines, and bromeliads. In fact ninety percent of the worlds vines are in the rain forest.

Golden Lion Tamarin have very strong legs which allow them to be very good

climbers. They use their amazingly strong legs to climb into their nests up in trees, where a family of Golden Lion Tamarins would normally sleep huddled together in a tree hole or thick nest of vines. In order to have protection against predators Golden Lion Tamarins share their homes with other Tamarin families. Another characteristic which adapts Golden Lion Tamarin to its environment is its long, sharp claws, that help them pick out bugs from dead logs, small tree holes, and wherever else bugs live.

Out of all of the arthropods (insects, spiders etc.) that Golden Lion Tamarins eat, one of their favorites is crickets. These Tamarins are diurnal hunters, and since they are Omnivore's they eat other varieties of food, such as the fruit of the rainforest and very small birds. They obviously have many predators, observing how endangered they are. Their predators consist of poachers, snakes, ocelots, bamboo rats, wild dogs, and owls. Since they are social and family loving, to protect themselves from predators they mob their predators. They are usually with groups of two to eight family members. Also when they are alone in a tree and an owl comes swooping over, as a survival strategy they flatten themselves against the tree, and grip the tree as hard as they can.

The Golden Lion Tamarin's gestation period is 125-132 days, and usually one or two offspring are born. If two are born they are most often non-identical twins. When these Tamarins are born they are covered all around with fur and their eyes are unusually open. For the first few weeks of these little babies lives they will cling to their mothers fur. After about four weeks these tiny babies are ready to eat solid food, and at three to five months old they can be on their own, but separated from their family for too long, they can die of loneliness. Golden Lion Tamarin fathers play a dominant roles in raising young. The young stay with the father until they're ready to nurse with the mother, and then, when they're finished they go back with the father again. The older siblings of the young Golden Lion Tamarins help teach and raise them also. At about fifteen months the mother sends the daughter away to find her own family to live with, in order for incest not to happen. The father does the same thing to a son who's sexually matured. Golden Lion Tamarins can live approximately ten to twelve years, and approximately twenty-three years in captivity.

For many happy years the Golden Lion Tamarin was classified as the most common of Tamarins in captivity. Now their status is extremely endangered and they are not the most common tamarin in captivity. In fact only about four-hundred Golden Lion Tamarin remain in their wild rainforest habitat! Their endangered lifestyle can be explained by a few different reasons. The pet trades poachers are ravaging this tamarin's numbers and will try and sell one for twenty thousand dollars, risking two years in jail. Also, Golden Lion Tamarins live in an endangered ecosystem, have predators hunting them every way they look, are harassed with parasites, and have few dependable food sources. This Tamarin is protected by the Washington National Zoo Reintroduction Program (headed by Ben Beck), because the National Zoo helps breed these creatures. When they have enough of them, they hold their little hands, and walk them back out into their wild habitat. Sadly, only 30% survive. Golden Lion Tamarins are also protected by the Chicago Brookfield Zoo, and a pair of Golden Lion Tamarins have been released into the Amazon Rain forest by the Oregon Zoo. Beautiful, furry, little creatures like the Golden Lion Tamarin should be kept alive and we should put in every effort to protect them from harmful references.

by Emma Lee I. 2003



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Harpy Eagle

Common Names: Aguila Harpía, Harpía

Genus: Harpia

Species: harpyja



An alarm screech goes out through the rainforest. Monkeys of all types throw themselves off high branches and out of trees to freeze in terror. Overhead a giant eagle with a seven foot wing span easily twists and turns through the treetops, hunting for any animal caught out in the open. With a single dive it tears the unlucky creature from its branch with five inch long claws on powerful legs.

The harpy eagle is one of the world's largest and most powerful of the fifty species of eagles. It lives in the tropical lowland rainforests of Central and South America, from southern Mexico southward to eastern Bolivia, southern Brazil and the northernmost parts of Argentina. It likes large areas of uninterrupted forest but will also hunt in the open areas next to patches of forest.

The harpy eagle's name comes from

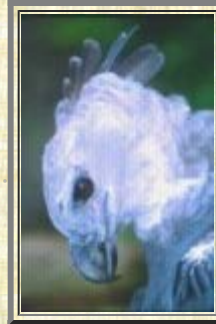
the harpies of Greek mythology which were ferocious winged creatures with sharp claws, a woman's face and a vulture's body.

The average weight of a harpy eagle is 18.4 lbs (8.2 kg).

Female harpy eagles are larger than the males. A female can weigh from 14 to 18 lbs (7-9 kg), while the males weigh 10 to 16 lbs (5-8 kg). Their body length is between 36 and 40 inches (1 meter).

Their feathers are slate-black above and white to light gray underneath. A black band runs across the chest up to the neck. The tail has long, dark gray feathers with horizontal bars. Their legs are covered with light gray feathers ending in yellow feet as big as a human hand, and 5 inch long talons.

The heads of both male and female are covered with a double crest of large, pale gray feathers. They raise this crest when alerted or showing hostility. A facial disk like that of an owl is thought to focus sound. Their eyes are dark brown and close-set, allowing them to judge distances. They have a powerful, hooked gray bill



Their dark gray, large, rounded, broad wings have a span of 7 feet. These wings are relatively short compared to other eagles. They are designed for speed and maneuverability necessary for flying through a forest.

The harpy eagle is monogamous, meaning it mates for life. They nest high in the canopy of emergent trees about 100 to 200 feet (40 meters) above the ground. The nests are built loosely of sticks and fresh leaves in the crutch of the first branches of ceiba or kapok trees. Usually two eggs are laid, but after the first egg hatches, the other one is ignored and fails to hatch. The incubation period lasts for 52 to 56 days.



The harpy eagle has the longest breeding period of any raptor. They raise only one chick every two to three years. Both

parents care for the chick, feeding it for up to 10 months or more. A young harpy eagle will fledge, or leave the nest at about 4 1/2 to 6 months. It will stay in its parents' territory for at least one year.

The estimated life span in the wild, although difficult to assess, is thought to be between 25 and 35 years.

Harpy eagles are carnivores and diurnal, or daytime hunters. They hunt about 19 species of medium sized and large mammals that live in trees, like monkeys, sloths, opossums, large reptiles like iguanas, large rodents and other birds. They hunt by sitting quietly and listening for prey for long periods of time in the canopy of the forest, then pouncing on their prey in short bursts of speed. They can reach speeds of up to 50 mph (80 kph). The faster and more agile males hunt smaller animals than the larger females. Like other birds of prey, they can only fly with prey weighing less than one half their body weight.

The harpy eagle is an endangered species. The major threat is loss of habitat from clear cutting, destruction of nesting sites and shooting. Harpy eagles need large tracts of forest to hunt in. Most forests have only one nest every 10 or 15 miles. Each nesting pair has a single chick every two to three years. With such a low density of harpy eagles and their low rate of reproduction, even the smallest pressure on their hunting abilities eliminates them from an area.

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Jambu Fruit Dove

Genus: Ptilinopus

Species: jambu



The Jambu fruit dove is a forest dove that inhabits the second growth forests of mangrove swamps and rainforests on the Indonesian islands of Sumatra and western Java, and the countries of Thailand and Malaya. They are easily recognized in the forest by their soft cooing.

The Jambu fruit dove is a plump dove with a small head and a small yellow or orange beak. Its eyes are located on the sides of its head, colored red or brown. It is medium sized for a dove, about 9 inches long, and weighs about 1.5 ounces. Its

wingspan is between 3 to 6 inches. Its feathers are downy soft and very colorful. The feathers come out easily, which makes them hard to catch.

The male's face and forehead are crimson to pink. The upper part of their throat and chin are black. Their underparts are white with a pink breast patch. Their upper parts are a forest green. The outer parts of their tails are a darker green than the body, and the underside is a chestnut color. The feet of the Jambu fruit dove are a dark red. The female isn't as colorful. She is mostly a darkish green with a purple head, and a white to cream belly. The underside of her tail is a brown color.

They are a shy and inconspicuous bird, their green feathers acting as perfect camouflage. They spend most of their time roosting, nesting and feeding. They are mostly seen alone or in pairs, but will gather into a large flock when feeding at a fruit tree. They eat fruit directly from the trees, or that which has been dropped to the ground by monkeys and hornbills. Their nostril

are raised high on their upper bill like most doves. The Jambu fruit dove can put its entire bill in the water and drink by sucking it in. Most birds can only dip part of their bill in water, so as not to submerge their nostrils, and then have to tip their heads up to let the water trickle down their throats.

Jambu fruit doves have a breeding territory, which they announce by raising their wings, and cooing while moving their heads forward and bobbing the body up and down. They also aggressively defend their territory with a quick peck if their threat display doesn't work.

A pair of Jambu fruit doves will build a flimsy-looking nest of twigs, roots and grasses interwoven with branches of the tree. The male provides the material and the female builds the nest. They usually lay 1 egg, sometimes 2. The egg is incubated by both the male and female for 2-3 weeks. The nest is never left alone during incubation.

Both parents help in raising the hatchling. Within an hour of its birth, the helpless hatchling will be fed dove's milk, a nutritious secretion that both parents make in their crops. The chick's early development concentrates on growing feathers and becoming coordinated instead of growth. Around the 10th day its eyes open for the first time, but its wings will already be functional. Shortly after that it leaves the nest with its parents, who stay very close. The chick is then weaned at 8-10 weeks. The young male will look a lot like a female in coloring, but by 9 months it will have its full coloring.

Although the Jambu fruit dove isn't endangered, they are listed as threatened. They can still be found in Borneo and Sumatra, but are now rare on West Java. Their habitat, the rainforests of Southeast Asia, are rapidly being lost.

Elisabeth Benders-Hyde 2001

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King Cobra

Genus: Ophiophagus

Species: hannah



The King Cobra's biome is the Southeast Asian rainforest. Its habitat are the clearings, bamboo stands, and edges of the forest and it is also commonly found near rivers and swampy areas. The climate that the King Cobra lives in is rainy and humid. The average temperature is usually 95°F.

The King Cobra can grow up to 12-18 feet. Adults weigh 12-20 pounds. Their fangs can grow a 1/2 inch. Their color is olive, brown, or black. The underbelly is creamy or pale yellow. The King Cobra's generic name means "snake eater."

When the King Cobra is born, its venom is as strong as the adult's venom. The King Cobra mates in January and builds its nest in April. The Cobra starts to mate when it is about four years old. They mate once a year. They lay 18-50 eggs. When the eggs are laid, it takes 70 to 77 days for the eggs to hatch. When the eggs hatch the young are 12-25 inches in length. Its average life span is about 20 years. Cobras are solitary and the male does not help to raise the young.

The King Cobra forms a hood when it feels threatened. When threatened, it also raises up one third of its length and may sway toward you. It will also sometimes expectorate (spit) in its prey's eyes which stings and will kill rapidly if it gets into the blood stream. The poison is also a special adaptation that paralyzes the nervous system of its prey, which is often larger than itself. The King Cobra is the only snake that builds a nest and guards it until

the eggs hatch.

The King Cobra is a carnivore that eats mainly other snakes, but will eat lizards, some frogs, and sometimes small mammals.

Some of the main predators of the King Cobra are humans, the mongoose, and birds of prey. The cobra mainly preys on the other snakes, even venomous ones.

Since the rainforest is being cut down, the King Cobra is put at risk. Wildlife sanctuaries could be created to help preserve the habitat.

by Sean S. 2002



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Kinkajou

Genus: Potos

Species: flavus



Fifty degrees North to fifteen degrees South, and thirty-five degrees to sixty-five degrees in the Amazon Rainforest lives a mammal called the kinkajou. The kinkajou mostly sleeps in the upper canopy, hiding in the holes of the trees during the day napping. It's a cute little animal with the body grows from 16 to 30 inches; its tail grows from 15 to 33 inches. Its shoulder height is up to 10 inches and it weights 3 to 10 pounds. The Kinkajou

has a nice slim body with a full coat of golden-brown fur. Its face is so cute; it has a round head with big eyes, its small ears stick out of their heads and their muzzle looks like a bears snout. The soles of the kinkajou's hind feet provide a firm grip while it climbs. The way it moves is mostly by climbing and jumping.

The sexual maturity for the male is 1.5 years and the female is 2.25 years. The mating season is year round. The gestation period is 112 to 118 days. The number of youths a female has is 1, rarely 2 babies. When a baby is born it weighs 5 to 7 ounces. The color of their fur is silver-gray and they have dark tips on their ears. Their ears open up after 5 days and their eyes are closed for two weeks. They don't do anything except griping trees with their tails, but they're very weak. They depend on their parents for a month to a month and a half. The baby is carried on the mother's belly and their mother protects her baby(s). The birth interval is 1 year.

The kinkajou is a solitary animal, which mostly travels alone. They don't travel in groups. Their lifespan is over 23 years. It's an omnivore and its typical diet is fruit, nectar, honey and insects. The kinkajou name came from the Indians, meaning " Honey Bear " because they love honey so much. Their prey is insects, birds, and small mammals. Predators to the kinkajou are people, big cats and birds of prey.

The adaptation, sharp claws help them to climb trees and their long tail to hang from tree to tree for their grip. Kinkajous' teeth are good for eating big food and ripping apart its food. They also hide in the upper branches from the birds of prey. It benefits from its environment by feeding on insects such as termites.

They are not endangered because people rarely see them. They sleep during the day and only come out at night. They don't travel in packs, they travel alone therefore it's hard to find one kinkajou at a time. Living in the thick vine tree and not coming out until night protects it.

The Amazon is a tropical rainforest. Each year the Amazon Rainforest gets about 9 feet of rain. During the months of maximum precipitation, broad areas traversed by the Amazon are subject to severe floods. The Amazon contains more species of fauna and flora than any other ecosystem in the world. Also, the Amazon basin covers more than 2.5 million square miles more than any other rainforest.

It's related to the raccoon family and the mountain coati. Where the kinkajou lives in the Amazon rainforest is very beautiful, but the Amazon is being cleared at an alarming rate for timber and agricultural purposes.

By Danielle Fogg, 2003

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Linne's Sloth

Common Name: Two-toed sloth

Genus: Choloepus

Species: didactylus



The Linn's sloth is a very gentle animal. It has a white/tan face and the fur is black/dark brown. The fur is a little different than other animals. The fur flows from the front to the back of the animal. The fur is very fine. On the back feet of the sloth there are five claws, three visible, two not visible. The Linn's sloth is about 28 to 29 inches and weighs about 9 to 19 pounds when fully grown. The Linn's sloth moves very slowly. The Linn's sloth is a good size weight but looks fatter than it really is because they have extra skin. The arms of the sloth are long which have two very small claws at the end of their hands so that's why they call it the two-toed sloth. The

hind feet are similar but are a little shorter. The head of the sloth is 70 centimeters wide, and the eyes are small.

The Linn's sloth has a life span of 27 to 32 years. The female reaches maturity at the age of three and a half, and the male reaches maturity at the age of four or five. The Linn's sloth mates about any time of year, and only has one baby at a time. The pregnancy period is about ten months, and the interval period is 14 to 16 months between births. The baby sloth stays with its mother for about 5 months then spends time alone. The male sloth plays no part in raising their young. The Linn's sloth does not live in-groups.

The Linn's sloth has two claws on each front-foot that helps it to defend itself and aids in climbing trees. The coloring of the sloth

is very helpful. The sloth has an algae that grows in the grooves of the fur that gives the sloth nutrients and which they get by licking themselves. The greenish color helps camouflage it also. The sloth has a big, pouched stomach that can help it digest the tough cellulose in leaves.

The Linn's sloth is an omnivore. It eats leaves, bark, buds, fruit, and sometimes small animals such as: mice, squirrel, and even kangaroo rats. Usually certain types of sloth like certain types of leaves. This particular type of sloth loves Cecropia tree leaves. But usually the sloth favors its mother's choice of vegetation.

The Linn's sloth is a prey animal. The Linn's sloth is not on the endangered species list. The only real danger that they face is deforestation.

by Babette B. 2001

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photo credit: Jack Simmons

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Orangutan

Genus: Pongo

Species: pygmaeus



Orangutans live in the tree tops of the Southeast Asian tropical rainforests of Sumatra and Borneo. They spend most of their lives in trees and descend from the trees very rarely. The rainforest has an average monthly temperature of 20 to 28° Celsius. It has an annual rainfall of between 1.5 and 10 meters. It receives steady rainfall throughout the year with little seasonal variation.

The name Orangutan means "man of the forest" in Malay. The Orangutan is the largest of the tree dwelling apes of Southeast Asia. Orangutans can grow up to five feet tall, but males are usually 4 feet tall and females are 3 feet. They have an arm span of 8 feet when full grown. The adult male orangutan can weigh up to 220 lbs. and an adult female can weigh up to 110 lbs. They are heavily built and their arms are very long and lanky, but their legs are short and weak. Orangutans have long, thin reddish brown hair. They

have a high and sloping forehead and a rounded snout. Males have cheek pads made up of fat which keep on growing as they get older. The big toe on each foot can rotate and touch the ends of the other toes, like our hands. So Orangutans have four "hands". When on the ground, Orangutans walk on all four limbs. Their knees are bent inward and their arms are placed either flat or clenched on the ground. Their calls are

whining and squeaking sounds. The adult male makes a long roar- like call.

Orangutans are diurnal and feed during the day. At night they build a platform style nest out of branches about 40 to 50 feet above the ground.

There are many special adaptations for Orangutan in the rainforest, such as long, strong arms for traveling among the trees, curved feet for extra balance when standing on branches and opposable thumbs for grabbing branches.

The Orangutan mates year round, usually beginning at the age of 8 - 10. The female is pregnant for 260 to 270 days before the baby is born. A newborn orangutan usually weighs 3.4 - 4.5 pounds. They usually have one baby at a time. The baby nurses every 3 to 4 hours. At around 4 months they begin to take soft food that their mother has chewed for them. The young cling to their mother when traveling until they are about a year old. They aren't weaned until they are about 3 1/2 years old. For the first 3 to 4 years of a young Orangutan's life it will not leave its mother's side. The infant is usually carried on the back or side of the mother. A young Orangutan spends a total of 6 or 7 years close to its mother. During this time the juvenile learns what is needed to survive, such as how to gather food and how to swing from tree to tree. Birth intervals are usually 4 years unless conditions are bad. Females are sexually mature at about 8 years, but males don't become sexually mature until they are about 14 years old. Young Orangutans sometimes hang out in groups (but not too far from their mothers) before gaining enough courage to go off on their own. The young are usually 5-6 years when they move out on their own. At age twelve to fifteen the Orangutan is sexually mature.



The Orangutan is a very solitary animal. Sometimes they live in a small group of 2 females. The males have a territory which overlaps the territories of other females. They are aggressive towards other males and their territories don't overlap. They can live up to 45 years in the wild and 50 in captivity.

The Orangutan is an omnivore but it mainly eats fruits, especially figs. Other food includes nuts, leaves, bark, insects and occasionally birds. Orangutans find most of this food up in the trees where they live. They

even find their water up in the trees, in hollows, on leaves, and on their own hair after a rain. Most of the Orangutan's day is spent foraging for food and resting.

Humans are the only predators to the Orangutan. Orangutans prey upon insects and birds. The Orangutan is currently a seriously endangered animal. Experts say estimate that there are only between 15 and 20,000 Orangutans left in the world today.

Trees play an essential role in an Orangutans life. The deforestation of the tropical rain forests is the main reason why they are endangered. It's biggest natural enemies are humans because they poach, trap, and sell them for pets. The governments of Singapore and Hong Kong have prohibited the import and export of Orangutans. Their habitat needs to be more secure.

by Stuart R. 2002

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Proboscis Monkey

Common Name: Monyet Belanda

Genus: Nasalis

Species: larvatus



The proboscis monkey is found only on the island of Borneo in Southeast Asia. It prefers to live in the mixed dipterocarp-kerangas forests, mangrove forests and lowland forests near fresh water and rivers. They live almost exclusively in mangrove forests, but can also be found in lowland rainforests. It depends on the mangroves near river edges for resting and sleeping. They avoid deforested areas and avoid human settlements.

This elusive monkey belongs to the Asian langurs. They are the only member of the Nasalis genus.

The proboscis monkey gets its name from its large, fleshy nose. Both males and females have the large noses. Female noses are not as large, although larger than most monkeys, and juveniles have small upturned noses. The male's are so large that they hang down over their mouths, reminding one of the old comic, Jimmy Durante. Sometimes they have to push it out of the way before putting something in their mouth. Their noses swell and turn red when they become excited or angry. They also make loud honking sounds as a warning when they sense danger, which make their noses stand out straight. The nose acts as a resonator when the monkey vocalizes.

Another obvious characteristic of proboscis monkeys are their large pot bellies. Proboscis monkeys are colobine monkeys and they have a unique digestive system that allows them to use leaves as their main food supply. Twice as large as any other colobine monkey, their stomachs are divided into compartments and filled with cellulose digesting bacteria. The bacteria help digest the leaves and neutralize toxins in the certain leaves. Their stomach contents

make up one quarter of their body weight, and make them look permanently pregnant.

Their ability to eat mainly leaves gives them a niche where they are the only medium sized mammal living in the canopy of the forest.

They have reddish-brown fur on their back and shoulders, which ends at midsection . Their chests are creamy, with a creamy collar running around their neck and around their waist to their buttocks and tail. Their arms and legs have long, gray gloves and stockings. Orange fur covers their shoulders and a cap of darker red fur covers their head. Their faces are flesh colored with small, intelligent brown eyes. Their ears are small and lie flat against their heads.

The male proboscis monkey is much larger and heavier than the female. A male is 2 to 2.5 feet (66-72 cm) long, and weighs 35-51 lbs. (16-23 kgs), while a female is 1.7 to 2 feet (53-61 cm) long and weighs only (15-24 lbs.) 7-11 kgs. Their tails are as long as their body.

Troops of proboscis monkey average in size from 12 to 27 individuals but can be as big as 60 to 80 males and females. The groups don't appear to have a lot of structure. Both males and females will move out of their natal group Their social system has two levels. One is the all-male groups. These are made up of juveniles, adolescents and adult males. Juvenile males will leave the group they were born to at about 18 months, and join an all-male group. There is very little aggression between the males when they join together to form troops. The second level is made up of several groups which are led by separate males. Each male will have his own harem and several of these harems will come together to form a troop. Females may transfer from one harem to another when young, but the harems are mostly stable. Proboscis monkeys are not a territorial species and a group's range will overlap that of many other groups.

Adult females tend to coordinate troop movement and lead groups when feeding. One of the dominant males will keep a look out in a tall tree while the group feeds.

Proboscis monkeys are dependent on habitats that adjoin rivers, and usually don't move farther than 1,969 feet (600 m) from a river or stream. They sleep in trees, preferring thick branches growing over water, to protect themselves from predators. Proboscis monkeys are excellent swimmers, but only swim only when necessary, as when crossing rivers. They will cross at its narrowest point doing the dog paddle. Many will cross at the same time for protection from predators like crocodiles. They will quietly slip into the water and swim silently without splashing so as not to attract attention to themselves. In times of danger, the whole troop may jump into the water as a means of escape. Partially webbed

feet help the proboscis monkey swim and distribute its weight when walking on the soft mangrove mud.

Proboscis monkeys swing through the trees and leap from branch to branch using all four limbs, moving slowly because of their weight. Usually feeding in the early morning, they will rest the whole day. Then will feed again just before nightfall. The greatest times of activity is from late afternoon until dark. Ninety five percent of their diet is leaves of the mangrove and pedada trees. They prefer immature leaves over older ones They will also eat fruits and seeds

Proboscis monkeys give birth to one baby at a time. Their gestation period is about 166 days. They will usually give birth at night The newborn has a deep blue face and sparse, almost black fur. The color changes to its adult colors at about 3-4 months. Females will help look after each others infants and sometimes eve suckle other babies. The young will stay close to their mother for about one year, or until she has another infant. Males will reach sexual maturity in about 4-5 years and females in 4 years. Their life span is about 20 years.

The proboscis monkey's main predators are man and the clouded leopard. The proboscis monkeys were once protected by its mangrove habitat, which was uninhabitable for people. Now technology has made it possible to clear-cut the mangroves and fill them in. Logging has caused loss of the proboscis monkey's habitat and their population is going down. In 1977 it was estimated that 6,400 proboscis monkeys remained in the wild in the province of Sarawak. It is now estimated that only 1,000 remain. About 2,000 remain in the province of Sabah and 4,000 in Kalimantan. It is listed as endangered by the USDI and Appendix 1 of CITES. Appendix I lists species that are the most endangered among CITES-listed animals and plants. These are threatened with extinction, and commercial international trade of these species is generally prohibited. Attempts to keep proboscis monkeys in captivity have not been successful. The only place to see these monkeys are in their natural habitat, the rapidly disappearing mangrove forests of Borneo.

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Red-shanked Douc Langur

Genus: Pygathrix

Species: nemaeus nemaeus



Douc langurs are found in Southeast Asian countries of Cambodia, Laos and Vietnam. The beautiful red-shanked douc langur is only found in north and central Vietnam and Laos. Its habitat is in the lowland to montane primary and secondary rainforest where it lives in the mid to upper levels of the canopy.

The colorful red-shanked douc langur looks like a potbellied little man wearing a gray shirt and black pants. Over the pants it wears deep maroon leg warmers from knees to ankles, and on its arms are elbow length white gloves. Black feet and hands stick out from under the costume. Its face is a beautiful reddish yellow with powder blue eyelids over humorous dark eyes. Framing its face is a long, white ruff of hair. Its tail is white with two white rump patches for the males. Females have

similar colors, but are missing the white rump patches. It is sometimes called the "costumed ape". The name douc is an ancient name of Vietnamese origin.

Like all langurs, the red-shanked douc langur is a long slender monkey. It is part of the colobine monkey family, but surprisingly is more closely related to proboscis monkeys than langurs. Its overall size is 61-76 cm, with males slightly larger than females.

Males weigh approximately 7 kg, and females 5 kg. Their tails are about 56-76 cm long.

Mating takes place from August to December. The pregnancy lasts 180 to 190 days resulting in the birth of a single offspring just before fruiting season of some favorite foods. The young are born with their eyes wide open and they cling to their mothers instinctively. Their body color is lighter than those of the adults, with short downy gray hair and a dark stripe down their back. Their faces are black with two light stripes under the eyes. They get their adult colors at about 10 months. Females reach sexual maturity at about 4 years, while the males reach it at 4-5 years. They have a life span of about 25 years.

Red-shanked douc langurs are diurnal and eat, sleep and feed in the trees of the forest. They use their arms and legs to move through the forest along established routes. They will often jump from branch to branch, holding their arms out over their heads and pushing off with their legs, landing feet first on the next branch. The troop is led by adult males, with females and infants in the center, while the juvenile males bring up the rear. When they are relaxed, they will move noiselessly through the forest. They can move quickly and soundlessly through the trees if alarmed. But when startled, they give loud barks and rush around the trees slapping branches with their hands. Much of their time is spent digesting food, grooming and dozing.

The diet of the red-shanked douc langur consists mostly of leaves high in fibers. One of the many species of colobine monkeys, or leaf-eating monkeys, they have large stomachs which are divided into sacs containing bacteria that break down the cellulose in leaves, which give them their pot-bellied look. This also makes them burp a lot from the resulting gas. They prefer to eat small, young and tender leaves, but will also eat fruit like figs, buds, flowers and bamboo shoots. They get all the liquid they need from the food they eat, and don't need to descend to the ground to drink. They are messy and chaotic feeders, dropping much of their food onto the forest floor. They eat peacefully together, not quarreling over their food, and have been known to share it with others.

The main predator of the red-shanked douc langur are humans. They are threatened throughout their limited range by habitat destruction and hunting. Native people hunt them for food and body parts, which are used in traditional medicine. There is also a very lucrative and illegal wildlife trade for the red-shanked douc langur. During the Vietnam War the douc habitat was heavily bombed and sprayed with defoliants like Agent Orange. Soldiers also used them for target practice, it is said.

The red-shanked douc langur is on the IUCN Red List of endangered species, and CITES I prohibits international trade.

However, Vietnamese laws protecting the douc langurs have been difficult to enforce.



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Silvery Gibbon

Common Names: Javan or Moloch Gibbon, Owa, Wauwau

Genus: Hylobates

Species: moloch



High in the treetops of the scattered remains of the island of Java's rainforests, a silvery gibbon female sings a morning song before she and her family move off to spend the day foraging for fruit. Her hauntingly plaintive song can be heard over a distance of almost one mile (1500 m).

Her "great call" starts with a soft, short note, then a series of eight short notes, followed by two longer notes which change to two soaring notes. The song comes to an end with two shorter notes, a series of eight short notes and a soft, single note of an almost constant pitch.

The great call has a specific sequence, with short notes at the beginning and end, and longer notes in the middle. She may only sing the great call, or break off the call in different places, or stretch out parts of the sequence. Runs of pure notes are contained in all songs and many calls. A song bout will last about seven minutes. Although the great call is

similar throughout the silvery gibbon's region, variations occur with different individuals, allowing females and their territories to be recognized. Only the female silvery gibbon sings.

(<http://www.gibbons.de> is a great site to hear gibbons sing.)

Silvery gibbons have small, stable territories of about 42 acres (17 ha) and the female will sing her song about several times during the day to declare their territory. She will climb to the top of one of several singing trees to give her great call. The male of the mated pair will sit quietly, scanning the surrounding forest for intruders, while a sub-adult female may join her mother in a softer, high-pitched voice. Strangers, hearing the great call of the resident female, hurry off in the opposite direction. If spotted, it is the resident male's duty to chase them off with a great show of crashing branches and incessant loud single screams.

The silvery gibbons are small apes, weighing 13 pounds (6 kg), have no tail, and are known as Lesser Apes. They have long arms and fingers, and lean bodies which are specially adapted to swing below the branches suspended by their arms. They hook their fingers over a branch, not grabbing it, and sometimes make long swings and let go of the branches entirely. Their dense, silver-grey fur is quite long, giving them a fluffy look. Both males and females have the same coloring. A white or light grey fringe surrounds their rather dark face, and both have a dark gray to black cap.

Hylobates means "dweller in the trees". Silvery gibbons spend most of their lives in the tree tops. They prefer the dense and close canopy of undisturbed primary forest. Their diet consists mainly of fruit, although it will also eat flowers and young leaves. They need a wide variety of tree species which will fruit at different times of the year to support them. They spend their day on the move, foraging through their territory, sometimes stopping to eat at a tree with fruit. They move quietly through the canopy, the only sign that they are there is a moving branch or a piece of falling fruit.

Silvery gibbons, like most gibbon species, are monogamous. They live in small family groups of mated pairs and several sub-adult offspring. Of all the apes, only singing primates are monogamous. Territories of neighboring groups overlap at their borders and are defended by the great calls of the females and the aggressive charges of the male. Groups will not contest the common zone unless both groups arrive at a fruiting tree at the same time. The offspring will not join in, but will watch intently as their parents call and scream, and crash through the tree tops.

There is no breeding season and a female will come into estrus at any time of the year. The gestation period is 7 - 8 months after which a single young is usually born. The infant is hairless with only some fluff on its head. It is kept close to its mother for warmth and nursed for about a year. There are 2 - 3 years between births. Several juveniles are usually part of a family. The mature offspring will leave the family to find its own territory, or be driven away by its parents.

The silvery gibbons only live in the scattered remains of rainforest on the western side of the Indonesian island of Java. They are listed on the IUCN "Red List of Threatened Animals" as critically endangered, and have a 50% or better chance of going extinct in the next 10 years. Habitat loss, hunting and capture of infants for the pet trade have

contributed heavily to the silvery gibbon's decline.

The silvery gibbon occupies a specialized niche in the forest canopy. They need the continuous canopy of a primary forest to move around in since they don't travel on the forest floor. The foliage needs to be thick, with horizontal growth to allow for the gibbon's brachiated form of movement. The silvery gibbons also need a wide variety of tree species which bear fruit at different times of the year, since its diet consists mainly of fruit. Secondary forests, or new growth forests have gaps in the canopy, and the growth is sparse, which restricts the gibbon's ability to move around. There is also less of a variety of fruiting trees in new growth forest, which can't support the dietary needs of the silvery gibbon. Silvery gibbons are not found in mangrove rainforest, or above 4,800 feet (1600 m) above sea level.

Java is one of the most heavily human populated islands of Indonesia and primary rainforest are rapidly disappearing. Only 4% of the silvery gibbon's habitat remains. Except for Gunung Halimun National Park, which can support a population of 1,000 gibbons or more, the remaining population is discontinuous and exists in small isolated remnants which can't support a viable gene pool. Fewer than 2,000 wild silvery gibbons remain. Of the 33 silvery gibbons held in zoos around the world, only 6 breeding pairs are having offspring. It has been recommended that the Indonesian zoos become more involved in breeding programs to ensure a long-term survival of the silvery gibbon.

Although Indonesia has laws protecting the silvery gibbon, they are not strictly enforced, and silvery gibbons continue to be killed for meat, sport and the pet trade. Logging and farming are claiming the last of the primal rainforest which are the silvery gibbon's last hold out. Money is being raised to build a Javan Gibbon Rescue and Rehabilitation Center. The project would place donated or confiscated silvery gibbons in a program that would rescue, rehabilitate, breed and possibly reintroduce them to the wild.

E. Benders-Hyde 2002

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Slender Loris

Common Names: vangu

Genus: *Loris*

Species: *tardigradus malabaricus*



The slender loris is a small, nocturnal primate found only in the tropical rainforests of Southern India and Sri Lanka. They are able to live in wet and dry forests, as well as lowland and highland forests. They prefer thick, thorny vegetation wherein they can easily escape predators and find the large assortment of insects that is the mainstay of their diet.

Loris tardigradus malabaricus is a subspecies of the slender loris which is only found in India. The greatest concentrations of these slender lorises are found in the southeastern Ghats of India. The Ghats are a narrow strip of rainforest that runs down the length of western India.

The slender loris is about the size of a chipmunk, with long, pencil-thin arms and legs. It is between 6-10 in. (15-25cm) long and has a small, vestigial tail. It weighs about 10.5-12 oz. (275-348g). The slender loris' round head is dominated by two large, closely set, saucer-like brown eyes. They flank a long nose which ends in a heart-shaped knob. The eyes are surrounded by dark-brown to black circles of fur, while the bridge of the nose is white. It has a small, narrow lower jaw. The ears are large and round. Its coat is light red-brown or gray-brown on its back and dirty white on its chest and belly. The fur on its forearms, hands and feet is short. The slender loris has small finger nails on its digits. The second digit on the hand and foot are very short. They move on the same plane as the thumb, which helps them grasp branches and twigs.

The slender loris is an arboreal animal and spends most of its life in trees. Their movements are slow and precise. They like to travel along the top of branches. For the most part they hunt by themselves or in pairs at night, although they will come together and share a food supply. They live alone or with a mate and an infant. They will sleep with up to seven other lorises in a hollow tree or sitting up in the angles of branches. They are very social at dusk and dawn, playing, wrestling and grooming each other.

Mating occurs twice a year; in April-May and October-November. Gestation is 166-169 days, after which one, and occasionally two infants are born. During the first few weeks mothers carry their infants constantly. The infant will grasp its mother around the waist with both its front and hind legs. After a few weeks the mother "parks" the infant on a branch at night while she forages. The babies move around carefully at first but by two months they are maneuvering around quite well. More mature lorises who sleep in the same tree may visit them at night to play and eat with them. Females will reach sexual maturity in 10 months and 18 months for males. The slender loris has a life span of 12 to 15 years.

The slender loris is for the most part insectivorous. This means they eat insects, but they will also eat slugs, young leaves, flowers, shoots, and occasionally eggs and nestlings. They can stretch and twist their long arms and legs through the branches without alerting their prey. The slender loris eats a lot of noxious and bad smelling insects. They particularly like the acacia ant whose bite can numb a human arm. They also like toxic beetles and roaches. The slender loris will engage in *urine washing*, or rubbing urine over their hands, feet and face. This is thought to soothe or defend against the sting of these toxic insects.

Native people have always believed that all parts of the slender loris have some medicinal or magical powers. This has contributed greatly to the decline of the slender loris. Destruction of their habitat is another reason for their decline.

It is not clear how many slender lorises survive in the wild. Because of their small size and nocturnal habits, it has been difficult to do an accurate count. Until recently not much attention has been paid to the plight of the slender loris, but new interest has been shown in their species and studies are under way. The Indian government has laws protecting the slender loris, but its effect is difficult to gauge.

by Elisabeth Benders-Hyde 2002

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Sumatran Rhinoceros

Common Names: Hairy rhinoceros, Asian two-horned rhinoceros

Genus: Dicerorhinus

Species: sumatrensis



The Sumatran rhinoceros is a small, hairy rhinoceros which survives in limited numbers in pockets of Indonesian and Malaysian rain forests. In the early 1900s it ranged over most of Southeast Asia from the Himalayas in Bhutan, eastern India through Malaysia, Sumatra and Borneo. Now they are only found in little forest pockets on the Indonesian island of Sumatra and the Malay peninsula.

The smallest living rhinoceros, the

Sumatran rhinoceros has a gray-brown leathery hide. Its deep folds around the neck, behind the front legs, and before the hind legs give the rhinoceros an armor-plated appearance. It has a short, stocky body and stumpy legs which are covered with coarse reddish-brown hair. Its body length is from 8 to 8.5 feet and stands 4.5 feet at the shoulders. A mature rhino weighs from 2200 to 4400 pounds.

The Sumatran rhinoceros is the only Asian rhinoceros with two horns. Both sexes of rhinos have horns, the front horn being larger, averaging 15 to 20 inches. The male's horns are usually bigger than the female's, whose second, smaller horn is often absent. The upper lip curves down and can move around to grasp objects.



Information about the Sumatran rhino has been difficult to come by because it survives in small, scattered populations in the thick undergrowth of their rainforest habitat. It is known that the females have territories of about 1.2 to 2.2 miles in diameter that partially overlap with other females. The males seem to be nomadic. The estimated density per animal is approximately one animal per 15 sq. miles in high density areas, and one animal per 31 to 46 sq. miles in low density areas.

They live in a variety of habitats, but prefer higher elevations in the mountain moss forests and tropical rain forests with few human developments. The rhinos are most often found near water, and spend much of the day in mud wallows, which they dig out themselves and whose perimeters are kept clean. The wallows help the rhino avoid biting insects and protects them from the heat .

Sumatran rhinos are solitary animals who only come together to breed. Breeding of captive Sumatran rhinos has shown that the female will not come into estrus until she senses the nearness of a male. This reduces energy spent on cycling when the rhinos don't come into contact with each other on a regular basis. Gestation is 475 days with one calf per birth. The calf is covered with a dense coat of reddish hair. Calves are weaned at 18 month, but stay close to their mother for 2 to 3 years. Females reach sexual maturity at 4 years, and males take 7 years to reach sexual maturity. Birth intervals between calves is 3 to 4 years. The life span of captive rhinos is around 35 years.

Rhinos feed just before dawn and after dusk and move about during the night. The normal diet of the Sumatran rhino includes wild [durian](#) mangoes, [figs](#), bamboo and plants species characteristic of disturbed forests. It will knock down saplings to get at the tender leaves. They are very fond of salt licks and each territory will include one.

The Sumatran rhinoceros is the smallest and rarest rhinoceros species. There are thought to be only 300 animals still in existence and the IUCN has put it on its critically endangered list in 1996. These survive in very small and scattered populations, their habitat fragmented into smaller and smaller pieces by encroaching human populations. The number of Sumatran rhinos has declined 50% due to poaching in the last 10 years. There are no signs that the situation is stabilizing. Efforts have been made by IUCN to set up a 3 year program for the protection to the Sumatran rhino in Indonesia and Malaysia in the wild. They are seeking to extend the program, whose funding ended in 1998.

Captive breeding programs have also been set up, but have not been very successful. Since 1984 40 rhinos have been captured to

participate in breeding programs, but 19 of these have died. Artificial insemination efforts have also not been very successful. These failures were the result of lack of knowledge of the diet and reproduction of the Sumatran rhinoceros. Experience so far has shown that the rhinos need larger enclosures with more natural conditions. Time is running out as efforts to save the Sumatran rhinoceros from extinction continue.

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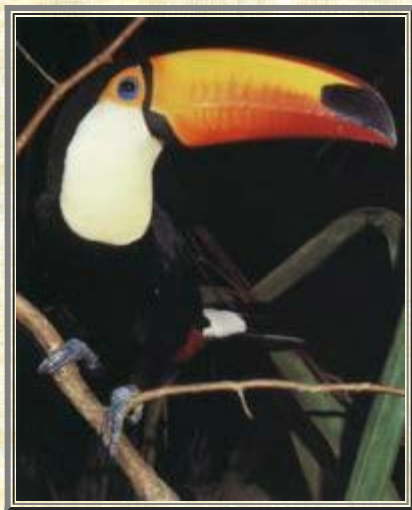
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Toco Toucan

Genus: Pamphastos

Species: toco



The Toco Toucan is the largest of the toucans. It can get to about twenty-four to twenty six inches in length. Its bill is brightly colored orange and black and can get to about eight inches in length. The Toco Toucan weighs about ten to seventeen ounces. The Toucan's massive bill is not as heavy as it looks; it has a hard outside and a hollow inside. A bright blue patch of blue skin surrounds the eye.

A Toco Toucan has strong feet and toes to support its weight. Two toes point forward and two point backward. Its tongue is almost feather like and is six inches long. Its wings are short and rounded and it has a long broad tail. It's generally black with touches of white, scarlet and yellow. The Toco Toucan likes to live in open areas,

lowland rainforests and palm groves of South America.

The Toco Toucan will mate at different times, depending on where they live. They breed once a year and have two to four shiny white eggs in a clutch. The incubation period is sixteen days. The Toco Toucan nestlings are born without feathers and are blind. These babies stay in their nest for about seven weeks. Both parents care for their young, protecting and feeding them. Scientists do not know how long toucans live in the wild.

Toucans usually live in pairs or groups called flocks. Their nests are in holes in trees. They talk to each other using toad like noises. They take turns cleaning each other's feathers with their beaks.

The Toco Toucan's feather-like tongue helps move food along its bill. Its strong toes help it get a good grip on branches. The Toco Toucan has a very wide tail. It helps him stay balanced in the trees. The Toco Toucan eats fruit, seeds, insects, and spiders; steals eggs and nestlings from smaller birds. The Toco Toucan is a predator. It hunts lizards and snakes and steals eggs and nestlings from smaller birds. I can't find any sources about what eats the toco toucan. The Toco toucan is not endangered because it's able to adapt to man made habitats when the rainforests are destroyed.

by Drew K. 2001

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Vampire Bat

Genus: Desmodus

Species: rotundus



The Vampire bat looks sort of like a pig with fangs and large pointy ears. The Vampire bat is about 3 inches long and has a wingspan of about 8 inches. It weighs about 1 ounce. It has strong legs. The Vampire bat has a clawed thumb that comes out of the front edge of the wing.

Its coat is dark gray-brown. Its mouth has two pointy front teeth. It walks by lifting itself up on its hind legs and wrists.

A thumb claw sticks out from the front of its wings. It uses this for climbing around on its prey.

The vampire bat likes tropical and subtropical places of Central and South America. The vampire bats habitat changes from scrub to rainforests.

The Vampire bat mates year round. The female usually gives birth, in April to May or October to November. The female only has one baby at a time. The gestation period is 205-214 days. When the pup is born its eyes are open. The mother nurses the pup for the first two months. The mother feeds the pup on blood, which she throws up after she drinks a good amount. At four months the pup leaves the nest to learn about foraging. The pup can take care of itself at nine to ten months. A vampire bat lives up to nine years but can survive up to nineteen years in captivity.

The Vampire bat has two incisors. Incisors are two sharp and pointy teeth. It also has special saliva that runs down grooves in the tongue to stop the blood from clotting. The saliva has an anticoagulant in it called draculin. Unlike other bats the vampire bat can walk, run, and hop along the ground to stalk its prey.

The vampire bat drinks the blood of birds and mammals. It lands beside the animal and will creep up to it. It then makes a little bite

with its incisors and licks the blood. It shares the blood with other bats from its colony. They are not always successful in getting a meal. If the vampire bat doesn't eat for two days it will die.

The vampire bat is a predator and prey. Its predators are eagles and hawks. Farmers are killing them because they carry rabies and other diseases, which affect both humans and cattle, but they're not endangered.

by Drew K. 2001



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Wagler's Pit Viper

Common Names: Wagler's Temple Viper

Genus: Tropidolaemus

Species: wagleri



The Wagler's pit viper lives in trees of the Southeast Asian rainforest. The climate in the rainforest is wet and humid and it rains a lot. During the wet season, or monsoon season, it usually rains every day. The rainforest temperature during the day varies very little and is about 96° Fahrenheit. The nights are cooler than the day time, with temperatures averaging about

75° Fahrenheit. During the dry season, which is from March to May, it doesn't rain quite as often as the monsoon season, but is not completely dry. Wagler's pit vipers like the humidity to be around 90 %.

Wagler's pit viper is a medium sized viper which can grow up to 4 feet in length. It is called a pit viper because they have pits just behind the nostrils which contain special organs that can sense heat and locate warm-blooded animals. This is an important adaptation since Wagler's pit viper is nocturnal and hunts at night.

It is an arboreal species, which means it lives in trees. The adult male is green, with a black border and many greenish-yellow crossbars on its back. The young viper changes its color as it grows. The young are all green with spots of white and red. The spots are sometimes arranged in pale crossbars.

The adult female goes through four different phases named: The Malaysian phase, the Sulawesi phase, the Kalimantan, and the Philippine phase. During these phases, the snakes are a wide variety of colors and sizes. For





example: most pit vipers can grow to be larger than 40". But in the Philippine phase the snake is smaller and usually doesn't grow any bigger than 20". In the Malaysian phase, the snake has a black background with yellow bars across its back, a yellow belly and green spots, one on each scale. In the Sulawesi phase, the viper has a green background with blue bars and white across the back and a cream and blue belly. It also has a blue stripe from the nostril through the eye. In the Kalimantan phase, the snake has a yellow background with bright blue bars across the back. Its belly is shades of green and cream. The last phase is called

the Philippine phase. In that phase, the pit viper stays the same coloring as when they are young, but they remain a smaller size.

Pit vipers are viviparous, which means their babies are born live (no eggs). The eggs open inside the mother's body. One of the advantages of this is that the eggs are better protected than eggs that are hatched on the ground. The number of snakes born in a litter ranges from 6 to 50. All babies are able to look after themselves as soon as they are born. Venomous snakes have fangs already loaded with venom and poison as soon as they are born.

The Wagler's pit viper is a carnivore. That means that they eat other animals. They hunt at night. The adult feeds on lizards, birds, and rodents. Snakes in the tropics don't need to use food energy to keep themselves warm. Snakes can also get all the energy they need with just 3 meals a month.

Vipers have a pair of hollow fangs. They lie up against the roof of the mouth and shoot out when the viper strikes. The venom of Wagler's pit viper attacks red blood cells and their ability to carry oxygen, as opposed to attacking the nervous system.

One of the predators of the viper is the King Cobra. The pit viper preys on animals such as mice, lizards, and birds. The young pit vipers prey on

animals such as rodents, small birds, and an occasional frog. The pit viper is not endangered.

by Dylan C. 2002

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Tropical Moist Climate Tropical Moist Climates (Af)

In an average year in a tropical rain forest, the climate is very humid because of all the rainfall, which amounts to about 250 cm per year. The rain forest has lots of rain because it is very hot and wet. This climate is found near the equator. That means that there is more direct sunlight hitting the land and sea there than anywhere else. The sun warms the land and sea and the water evaporates into the air. The warm air can hold a lot of water vapor. As the air rises, it cools. That means it can hold less water vapor. Then as warm meets cold, condensation takes place and the vapor forms droplets, and clouds form. The clouds then produce rain. It rains more than ninety days a year and the strong sun usually shines between the storms. The water cycle repeats often along the equator. The main plants in this biome are trees. A lot of the rain that falls on the rain forest never reaches the ground. It stays on the trees because the leaves act as a shield, and some rain never gets past the trees to the smaller plants and grounds below. Trees in this climate reach a height of more than 164 feet. They form a canopy. The forest floor is called understory. The canopy also keeps sunlight from reaching the plants in the understory. Between the canopy and understory is a lower canopy made up of smaller trees. These plants do receive some filtered sunlight.

The tropical rain forest is classified as Af meaning tropical forest. The A is given to tropical climates that are moist for all months which have average temperatures above 18 degrees Celsius. The f stands for sufficient precipitation for all months. The latitude range for rainforest climate is 15° to 25° North and South of the equator.

The annual precipitation of a rain forest is greater than 150 cm. In only a month the rain forest receives 4 inches of rain. The rain forest is different from a lot of other climates. In other climates, the evaporation is carried away to fall as rain in far off areas, but in the rain forests, 50 % of the precipitation comes from its own evaporation.

The average temperature of a rain forest is about 77° Fahrenheit. The rain forest is about the same temperature year round. The temperature never drops below 64° Fahrenheit. Rain forests are so hot because they are found near the equator. The closer to the equator you are, the more solar radiation there is. The more solar radiation there is, the hotter it is. Rain forest are never found in climates which have temperatures 32° Fahrenheit and below because the plant life will not be able to live because they aren't adapted to frost. All the plants will die out if the rain forest is cooler.

The plants that make up the understory of a rainforest have adapted to the small amount of sunlight that they receive. Ferns and mosses do well, along with epiphytes. These are plants that grow on other plants. They can be found growing on branches of tall trees where they can get sunlight. There are many different plant species found in the rain forest.

by Michael G. 2001

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Southeast Asian Climate

Tropical Moist Climate (Af)

Southeast Asia is a part of Asia. It consists a 3,100 mile long chain of about 20,000 islands strung between Asia and Australia. Winds called monsoons control much of the climate of Southeast Asia. The word monsoon comes from the Arabic word "mausim", meaning season. Southeast Asian rainforests have four different seasons; the winter northeast monsoon, the summer southwest monsoon and two intermonsoon seasons. The northeast monsoon season is from November to March and has steady winds from the north or northeast that blow from 10 to 30 knots. These winds originate all the way in Siberia and bring typhoons and other severe weather. Typhoons are the southern Hemisphere's version of hurricanes. The east coasts of the Southeast Asian islands get heavy rains during this time. The southwest monsoon season is from late May to September. The winds don't blow as hard and the weather is a little drier. This doesn't mean everything dries up, it still rains every day, just not as much. During the intermonsoon seasons the winds are light. All seasons are hot and humid, and there is very little seasonal variation in temperature.

Southeast Asia's rainforests were thought to be the most bio-diverse regions in the world. They found as many as 200 tree species in one single hectare. Recently the record has been beat by Peru. There are also a lot of endangered species in the Southeast Asian rainforest. Southeast Asia has 10 independent countries. They are Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.

The letter code under Köppen's climate classification is Af. The A stands for a place that has a rainy, cool summer but a warm spring. The f stands for moist, fair rainfall in all months. Af climates are caused by consistent warmth in the temperatures. So, Af stands for the tropical rainforest climate. The Af climates have high humidities, which cause afternoon clouds and rain showers. These are some temperatures of the Af climate. The average temperature in the coldest month of the year is at least 18° C. The daily temperature range is 10° C to 25° C. The humidity is very oppressive! The vegetation for Af is a broad leaf evergreen forest. The location of the Af climate is low-lying areas near the equator.

Southeast Asia has uniform temperatures, high humidity and lots

of rain. The average temperature per year is 80° F. Ninety five degrees Fahrenheit, however, is the high temperature for tropical rainforests. The climate is very humid and sticky because Southeast Asia is surrounded by oceans. The average humidity is from 70 to 90 %. The annual precipitation is heavy; 60 inches to over 100 inches.

The latitude range of this climate is 16° S to 20° N latitude, and the longitude range is 95° to 130° E.

by Lydia F. 2002

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Bengal Bamboo

Common Names: Spineless Indian Bamboo, Calcutta Cane

Genus: Bambusa

Species: tulda



The *Bambusa tulda* can be found in the biome of the Southeast Asian rainforest. It often grows as an undergrowth scattered or in patches in the forest. It does very well in a moist environment with a lot of rainfall. It likes temperatures between 40 degrees Fahrenheit and 100 degrees Fahrenheit. Rainforests get around 100 inches of rain per year. Rainforests are found mainly around the equator. They hold many varieties of plants and animals. The vegetation in rainforests grows in layers. Some of the layers get sunlight, but the bottom layers get little or no sunlight.

This particular bamboo can grow anywhere between 40 feet and 80 feet in height. It is approximately 3 inches in diameter at maturity. This bamboo has dark green straight stalky culms,

which are the stems. The leaves are long and narrow and green in color. They grow alternately on opposing sides of the stem, in two rows. Usually the blades fall off when the leaves have matured. This leaves a sheath like base. Bamboo is a perennial plant. Believe it or not, bamboo is not a tree or a shrub, it is a grass. It is the largest grass. It is very fast growing. In two to three months it is full grown. The culms or stems never get thicker after they are full grown. They only flower once in their lifetime and die after they bloom. No matter where they grow, different plants of the same species flower at the same time. New plants grow from the seeds that resemble rice kernels. This species life span is 25 to 40 years.

Bambusa tulda is important to its environment. It can reduce soil erosion. It sucks up water from heavy rains that might cause flooding. It also provides shelter for many animals. A rainforest has plenty of water for this plant to grow. It physically adapts to its environment by growing tall fast so it gets a lot of rain and sunlight.

Bambusa tulda is mainly used by the Indian paper pulping industry. It is also used for furniture, making baskets and reinforcing concrete. This type of bamboo is used to make a sacred flute called the "Eloo". It is also used for fishing rods. It is one of the most useful species of bambusa.

Rainforests are disappearing at the rate of 80 acres per minute, which is a little over 1 acre per second. *Bambusa tulda* is not on the endangered species list. It is native to India, Burma, Bangladesh, Myanmar and Thailand. Although there is no formal conservation plan, some of the local people are trying to conserve it in their area. They do this in their homestead and settled forest areas by planting it and being cautious about how much they harvest.

By Zachary C. 2002

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Photo Credit: © Hans Erken

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Bengal Tiger

Genus: Panthera

Species: tigris tigris



The Bengal Tiger is a beautiful animal. The base color is orange/brown, and white on the cheeks, mouth, eyebrows, and stomach. The tiger also has long black stripes on it. The weight of the tiger can be up to 575 pounds. The Bengal tiger is not the biggest tiger in the world, Its cousin the Siberian tiger is the largest tiger. The body of the Bengal tiger is broad with legs that are slender. The fur of the tiger is very fine in texture. The Bengal tiger is very sneaky

and quiet. The cubs look the same. The Bengal tiger can get up to ten feet long and three feet tall.

The Bengal tiger lives in the Sundarban regions of India, Bangladesh, China, Siberia, and Indonesia. The tiger reaches maturity at the age of five, and the life span of the tiger is about 15 years. The Bengal tiger mates about any time of year. The Bengal tiger can have a litter of up to four cubs. The cubs don't hunt for themselves until they are at least 18 months old. Then they go hunting with their mother. The gestation period is about three months and ten days.

The Bengal tiger is a carnivore. It eats boars, wild oxen, monkeys, and other animals. The Bengal tiger can catch big animals, but prefers killing either young or old animals because they don't run as fast. The Bengal tiger is a nocturnal and greatly feared predator. It eats wild oxen and other animals, which eat plants, which are part of the food web. So it helps balance the web.

In the year 1900 there were 50,000 tigers on the earth, but now there is only 4,000 left in the world. So you can see that the population has decreased because of poachers and other cruel and selfish people. The Bengal tiger is protected in many places such as: The Nagarahole National Park 250 guards, and The Ranthambhore National Park 60 guards. The guards in the national parks are important because they know the kind of tools and weapons poachers use, so the guards can identify poachers. In India the Indian government made an effort to save the tigers. It was called "Project Tiger", and it was thought up in 1972 from Prime Minister Indira Gandhi. Under this protection from the government, hunting and trading tiger parts were banned. A sad thing happened 8 years ago when 850 pounds of tiger bones, which adds up to about 42 tigers were found in New Delhi, India hunted by poachers. The reason why poachers and other people hunt beautiful animals like tigers is because the eyes, bones, and even whiskers are very valuable to researchers who are making medicine to treat or cure human ailment, and to give people a longer life.

Babette B. 2001



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Southeast Asian Climate

Tropical Moist Climate (Af)

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by Lydia F. 2002

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Badger

Genus: Taxidea

Species: taxus



The badger is an animal with a stocky, powerful build, having four short, strong legs and large, sharp claws. It has a long, pointy nose, with a white streak from the tip of it all the way down its back. It also has two white and black patches on its cheeks. It has strong teeth with four longer canine teeth. Badgers have small heads with short, erect ears. They have long, coarse, brown fur that covers a soft under coat. Its tail is short and bushy. Males are 21-29 inches long and females are 17-26 inches long and their average weight is 9-27 pounds.

The badger is a solitary animal and guards its territory fiercely. They mate in August and September. In the winter, the badger goes underground and goes into a state of torpor, its body processes slow down, and they survive on their fat. The female has a unique process called "delayed implantation" of the fertilized eggs. The fertilized eggs are dormant for four months until late winter, then after two months gestation, the female gives birth to one to five baby badgers in the spring. The babies are ten inches long, and are born with soft silky fur and their eyes are closed. The babies need two months to be weaned and then they stay with their mom for two more months to learn to fend for themselves. They reach sexual maturity at 5 - 12 months. The badger lives for an average of 20 years.

The badger is a carnivore, eating mostly meat like small mammals, lizards, snakes, insects and carrion. Badgers are one of the only animals which can kill and eat rattle snakes. Badgers are fearless hunters.

The badger has sharp powerful claws for digging and a strong jaw

with sharp teeth for tearing apart meat. The badger has poor eyesight but a keen sense of smell. Sometimes it pairs up with coyotes for hunting ground squirrels. The coyote sees the ground squirrel diving into its hole but can't get it. The badger comes over and digs into the hole, scaring the squirrels out. Both the badger and the coyote get some to eat.

Badgers have no natural predators. They are an important part of the food chain, since they keep the populations of ground squirrels and other small animals in check. However, agriculture, trapping (for fur), shooting, and use of poison have contributed to their decline. Ranchers hate them because they dig up and enlarge small burrows in an effort to capture its occupants, making a hazard for livestock.

Because man has altered the badger's environment, the badger is listed as a Species of Special Concern by the California Department of Fish and Game.

Ben S. 2001



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Bobcat

Genus: Felis

Species: rufus



The bobcat is a wild cat that weighs an average of 33 pounds when it is full grown. Its body is 26 - 42 inches in length and its tail is 4 to 8 inches long. These medium sized cats average 2 feet tall. Their coat is light brown to reddish. Their fur is covered in black spots that fade into light black streaks. They have a smallish, round face with erect ears that have little black tufts at the tips. Bobcats have a shortish white beard below their chin. Their claws and teeth are razor sharp. The bobcat gets its name from its short, 4 to 8 inch tail.

The Bobcat is a solitary animal that

guards its territory well. Generally a male's territory is 100 square miles. It overlaps with up to three female's territories although they stay apart for most of the year. Between February and June the male bobcat will try to breed with most of the females he shares his boundaries with. A mature female Bobcat will breed once a year. The male bobcat leaves the female to take care of the young herself. In 60 days, 2-3 kittens are born. After ten days they open their eyes and are eager to explore their surroundings. When their mother is still nursing them, she will bring back live mice so the kittens will have practice hunting. They will stay with their mother until the fall when they are ready to live on their own. By then they weigh 12 pounds and are half grown. The bobcat reaches sexual maturity at 9 months.

Bobcats' teeth are sharp and strong enough to slice through flesh. They have sharp claws for climbing and dragging down prey. Bobcats have ears that swivel, giving them a keen sense of hearing so they can hear the slightest rustle in the leaves. Their fur is camouflaged so both their predators and their prey can not see them. They can run up to 30 miles an hour but prefer to walk.

The bobcat's favorite food is rabbit but it also will also eat rats, squirrels, ground nesting birds, turkeys and small sick deer. They hunt at night because their prey comes out at night. They have very good vision, sense of smell and soft padded feet for silently sneaking up on their prey. They jump on the animal and bite it in the neck to kill it.

The bobcat is a predator. It is prey to cougars and pumas and humans who hunt them for their beautiful fur.

The bobcat is not endangered but it is threatened in areas where they are over hunted, particularly in the eastern states. On the Least Concern list, the bobcat is one of the few success stories of wild cats surviving in today's world. It is highly adaptable in both habitat and prey, as many as 1 million live across the United States and southern Canada today. As many as 80,000 are trapped for their fur every year, with 37 states allowing this.

Ben S. 2001

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Bumble Bee

Genus: Bombus

Species: bimaculatus



Imagine you are sitting on a nice grassy field having a picnic with a couple of friends. Suddenly you spot a black and yellow flash speeding right toward you. You panic immediately but sit as still as possible. That would be the best thing to do when you see a bee. It is very likely that they wouldn't sting, but some people like to horse around with bees and try to kill them. That is when the trouble starts. The truth is, bumble bees are practically completely harmless. You just have to

leave them alone and let them do their job. Let me explain more thoroughly.

Bumble bees are always the traditional bee colors of black and yellow. They are covered with long thick hairs. To us bumble bees look small but for an insect they are pretty big. Queen bumble bees are about $\frac{3}{5}$ to 1 inch long. The other types, workers and drones, are slightly smaller than that.

Bumble bees live all over the United States and in every grassland you could find, but *Bombus bimaculatus* is native to the state of Iowa. In the summer they make their homes in abandoned underground nests of mice or other small creatures. The bumble eats some of the pollen that it carries from flower to flower on its hind legs like the honey bee. You may also know the stories of the bee hive and the bears always trying to get some honey. The bee mainly feeds on that honey.

When the queen first comes out of her winter resting stage, called diapause, she finds an abandoned tunnel. She makes a small mound of pollen, and lays about 5 to 10 eggs in this mound. She then seals it off with a wax cap. When the eggs hatch they are called larvae and will feed from the pollen. The queen forages and feeds the larvae herself until they turn into bees. Then they start caring for the new larvae and forage themselves. Only then does the queen stop foraging and

concentrate only on laying eggs. Like the honey bee, bumble bees have workers and drones. They only store enough honey to last them through rainy days or other days that they can't fly.

Bumble bee's nests are annual. When the end of summer is near, the queen will lay some queen eggs. When these hatch, the drones fly away with the new queens and mate. The new queens will then find a protected place to spend their diapause. Only the queen survives through the winter, all the other bees die off with the first hard freeze. She wakes up in the spring and starts to make another hive.

Bumble bees play a huge role in our world. They are unique because of their sting. Unlike honey bees, the stinger of a bumble bee doesn't come off when it stings something. They fertilize or pollinate different plants or flowers in their area, helping them produce fruit. Their long tongue makes them important in pollinating certain flowers that other bees can't reach. They are also active in much cooler weather than honey bees and can pollinate plants that flower in the early spring. Without bees, many plants on our planet would not be able to reproduce and their species would become extinct. Without all those plants, animals that depended on them would starve and die. We depend on many of those animals for our food supply. We also depend on many of the plants that bumble bees pollinate.

Bumble bees have many enemies including the beetle, fly, ant, mite and wasps. They are hunted by birds and skunks. Many people do not like them because of their sting. But their population is very high. If your father or mother has a garden, next time you go outside look at the flowers and see if you can find a bee. Don't be afraid, just be silent and watch it work. I assure you that you will soon be wrapped in amazement at the bee's quick and thorough job.

Sarah B. 2000

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Coyote

Genus: Canis

Species: latrans



When you think of a coyote, you think of huge, snarling, blood-thirsty wolves, right? Well, that's how I felt when I first started researching these animals. After you read my essay I hope you will have learned more about coyotes and realize that they aren't as scary as you thought.

Coyotes belong to the dog family. They do look a lot like the wolf, but if you got an up-close look then you might see a few differences. For instance, coyotes

are smaller, have a narrower nose, and longer ears than the wolf. Grown males are usually 18 to 44 pounds, while females are 7 to 18 pounds. They are 4 feet long, including their 11 to 16 inch tail. Coyotes are a mix of gray, brown, and yellow.

Coyotes used to live in the northwestern United States, but now they are ranging around all states, Canada, Mexico, and Central America. Coyotes live either in pairs or alone.

I would say that there are two different categories that everyone fits into. One goes into a restaurant and knows exactly what they are going to order and they won't eat anything else. Another will go to the same restaurant and just pick the first thing on the menu they see. From researching the coyote I can safely say they easily fit into the second group. What I mean is, they are omnivores, which is a mammal that eats both animals and vegetables or fruits. The Coyotes main diet is rabbits, birds, gopher, prairie dogs, rats, and fruits. In the winter they will eat remains of animals, watermelon, berries, and mesquite beans. Gosh, my mom would like to have them to dinner! She is so used to having my sister and I be picky eaters.

Coyotes mate at two years of age. They are pregnant for 60 to 63

days. The females give birth in the spring to 5 or 6 pups. The pups weigh 7 to 10 ounces, and are born blind. Their eyes open up within 2 weeks. The mother provides milk for 6 weeks, but after that the pups are on their own to find their food.

Not a lot of animals have a better hearing system than coyotes. Their ears move back and forth, pinpointing any noise they hear. This special ability makes it easy for them to find food. Coyotes are smart animals and when they sense trouble, they don't investigate, they run.

Coyotes have a good population. They are the hunters, not the hunted, though some humans think it is fun killing coyotes for sport. You will probably agree with me that taking pride in killing an animal for the fun of it is very dumb. But the coyotes are proud animals and will not be defeated.

Lauren F. 2000.

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Prairie Dog

Genus: Cynomys

Species: ludovicianus



Imagine yourself on a huge open land with nothing to see but grass. when you look down you see a parade of little animals that almost look like squirrels. These are the prairie dogs. They are named after their dog-like yip.

If you have seen one, you'll agree they look cute, with their short legs and tails. Prairie dogs are cousins to ground squirrels. They have light

brown fur with lighter underparts. Their tails are kind of flat, usually with a black tip at the end. They have round heads with large eyes and tiny round ears. The adults usually weigh around 1 to 3 1/2 pounds There are two types of prairie dogs; black-tailed and white-tailed. Most common is the black-tailed prairie dog.

The prairie dogs range from Canada to northern Mexico. The white-tailed prairie dogs are found around the [prairies](#) of southern Montana to northern Arizona. Prairie dogs live together in a system of burrows called "towns". These towns are broken up into family groups called "coteries". The burrows usually have two or more entrances to bring in fresh air and for quick escapes in times of trouble. Prairie dogs don't like shrubby places because they can't see predators coming. They will chew through tall weeds around their towns so they can see farther. That is also why prairie dogs live on the short grass prairies.

They come out or their burrows during the day to eat. Their diets consist mostly of grasses and herbs. Sounds a little boring, but when they find them, they will also eat grasshoppers and other small insects.

The black-tailed prairie dog becomes mature at 2 years. They will mate in the early spring, from February to March. The female is pregnant for 34 to 37 days. There are 1 to 6 babies in a litter who are born blind and hairless. They only have one litter a year. The

babies come out from the burrows after 5-6 weeks. Until then their mother nurses them. Prairie dog females can live up to 8 years, but the males only live to be 5 years.

The thing that is so special about prairie dogs is that they are very social animals. Kind of like teenage girls! They make their burrows connecting to each other so they can visit anytime they want. When they meet they will kiss and nuzzle each other. They groom and play together and talk to each other by yipping. If you were to ever see a prairie dog, its likely it'll have a couple of friends with it.

They always have a sentry at a couple of entrances who sits straight up to look for predators. When they spot a predator they will bark out a warning and everybody dives for their burrows. They will wait for one of them to sound the all clear before going out again.

Prairie dogs are always busy at work. They work on their burrows from sunrise to sunset. The only problem with this is that ranchers live on the grassland too, and their cattle and livestock can step into a burrow and break or twist its leg.

Prairie dogs play an important role in the prairie. They are the major food source for many predators. Their empty burrows are used by the Burrowing Owl, the Texas Horned Lizard, the Black-footed Ferret and rabbits and hares. They also cut down large weeds and brush so they can see better. This keeps the prairies from getting overgrown with trees.

In the old days there was one huge prairie dog town that covered 25,000 square miles and had about 400 million prairie dogs in it. Now the prairie dog is still common, but there are less than 1% of the prairie dogs and their habitats left. But somewhere out there the prairie dog still roams the empty plains where Laura Ingalls lived. And if you find the right place, you might spot a couple of heads peeking out from under the ground, trying to get a glimpse of you.

by Lauren F. 2000.

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Grassland Climate [Dry Midlatitude Climates \(Bs\)](#)

There are many types of grasslands around the world. Some of the grasslands are tropical and some are dry grasslands. Grasslands in North America are known as Prairies, and in South America they are known as the Pampas. Eurasia has the Steppes, and in South Africa they are called Savanna and Veldt.

The prairies of the midwestern United States are both tall-grass and short-grass. West of the Mississippi River the temperature is moist and humid. This allows for some very tall grasses of up to 10 feet. Summers are warm and humid. Winters are cold but not to the extreme. The farther west and in the interior of the country, the temperatures becomes drier. Moisture from the Pacific Ocean is blocked by the mountains. This is where the short-grass prairies are found. Summers are hot and winters very cold. There are no natural barriers, like trees, so there is a constant wind. Grasses with deep root systems keep the soil from blowing away. Most animals have adapted to the open, treeless prairie by digging burrows. Even owls, like the Burrowing Owl, use the holes dug by prairie dogs as nesting sites. The mean temperatures for the prairie in January is 20° F, and 70° F in July. Annual precipitation is 10-30 inches.

The Savanna is a tropical grassland in Africa. This grassland has a very hot, wet season when warm, moist air from the equator moves in. This is followed by a cooler dry season that can last for 8 months or more. Hot, dry air moves in from the Sahara. It is cooler by a few degrees Celsius because there is no moisture to trap the sun's radiant energy, and most of the heat escapes into space again. The Veldt is in South Africa and is pretty much like a savanna, except in the southern hemisphere.

Another southern hemisphere grassland is the Pampas of Argentina. Moist, tropical air dominates this area and there is a lot of rain. Here tall-grass varieties of grasses grow very well.

The Steppes have a cold, dry climate. Here you find short-grass type of plants. The Himalayas block warm, moist air from the Indian Ocean, so there is very little precipitation. Nothing blocks arctic winds though, so winters are very cold and windy.

The grassland biome climate is in a mid-latitude zone. It is classified as a type "B" category, with a "Bs" subtype climate under the Köppen classification system. The grasslands have a very large latitude range, spanning from 55° N to 30° S. This is because of the many different types of grasslands throughout the world. The grasslands are on every continent, except for Antarctica.

by Emma K. 2000.

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Big Bluestem Grass

Common Names: Turkey Feet, Beard Grass

Genus: Andropogon

Species: gerardii



This grass is also called Turkey feet because the shape of the seed heads look like turkey feet. It is also called beard grass. The name big bluestem grass comes from the fact that this grass can grow to very big, 3 to 10 feet as a matter of fact. It blooms from June through September.

Big bluestem is known as a bunch grass because it grows in little hill shapes. This grass forms 3 inch

bronze to purple or green seed heads. The tall and slender stems are blue-green in the summer.

The hairy blades, which can get to be 12 inches long and 1/2 inch wide, will get a red tinge on the leaves as they get older, and turn bronze in the fall.

Big bluestem grass grows in dense stands. This keeps other grasses from getting any sun and growing. As a result there are usually large areas covered only by big bluestem grass. This grass has very deep roots. This kept the wind that constantly blows on the prairie from blowing away the dirt. When settlers plowed the big bluestem grass there was nothing to keep the dirt from blowing away. That is how the dust bowl disaster of the 1930s began.

This type of grass was an important food for the American bison, because it was the biggest type of grass there was. This type of grass is part of the tall grass prairie, which is located in the midwestern United States. It does best growing in moist, well drained soil. Big bluestem is the tallest grass in the tall grass prairie.

Celeste G. 2000

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Blue Grama Grass

Genus: Bouteloua

Species: gracilis

Parts Used: used for erosion control, browsing and as decorative plant.



Blue grama grass is a warm season tufted perennial grass. It is native to the short and tall grass prairies, and makes up 75% to 90% of the grasses found there. The prairies lie in central North America. Cold arctic air currents blow in from the polar regions in the winter. Summers are hot and dry because the prairies lie in the middle of the continent, and don't get moisture from oceans.

Blue grama can grow up to 18 inches tall. It grows as a bunch grass, forming open sod mats. As it matures and is grazed on by animals, the bunches grow together and form the thick sod. Blue grama is an important prairie grass because its dense, shallow root mass holds down the soil and keeps it from blowing away like it did during the Dust Bowl Era in the 1930s. Because the root system is shallow it can quickly absorb any rain that might fall.

Blue grama is 6 to 12 (15-30 cm) inches high. It has flat leaves that come to a point at the end. The leaves can grow from 1 to 10 inches (2.5-25 cm) long and 1/8 inch (3 mm) wide. The flower stems grow 7 to 18 inches (17-46 cm) tall. The flowers look like crescent moons perched on the end of the flower stem. A flower consists of 20 to 90 little spikelets. Blue grama flowers from June to August, depending on what part of the prairies its growin in, and how much moisture it gets.

When plowed under, or otherwise disturbed, it can take blue grama grass as long as 50 years to re-establish itself. On the prairies blue grama begins to grow late in the season, mid-April, when the soil is about 52° F (11° C). Blue grama goes dormant in the winter, and when there is a drought.

Blue grama likes to grow in full sun with well-drained good soil, and can stand drought, heat, cold, and mowing. Although it doesn't like shade, it can grow in open piñon forests. People use it instead of regular grass where there are dry areas, for grazing animals, and to control erosion. Some people use the flowers in dried flower arrangements and the plant is also used in rock gardens.

2000.

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Buffalo Grass

Genus: Buchloe

Species: dactyloides

Parts Used: for turf and feed purposes



Buffalo grass is a very hardy grass and grows mostly in the North American prairies. The North American prairies lie in the middle of the continent and have a dry climate during the summer, and a very cold and windy climate in the winter.

Buffalo grass is a warm-season, native, perennial shortgrass. It grows between 2 and 5 inches (5-13 cm) tall and spreads out between six feet and 12 feet (3-4 m). It has a round hollow stem with gray, green curly leaves. The leaves are 1/10 " wide and 2" long.

In winter it turns tan and in the autumn it turns lavender. It is very drought resistant. In dry seasons it gets brown, and stops growing, and goes dormant. It is also heat and cold resistant.

Buffalo grass has both male and female plants. The flower stalks are 4 to 8 inches (10-20 cm) tall. The female seed head of buffalo grass grows in clusters of three to five hairy spikelets. The tiny clusters of yellow to golden male flowers of buffalo grass grow about 2 inches (6 cm) above the blades. The burs on buffalo grass seeds don't cling to animal fur for very long and the seeds fall close to the parent plant.

Buffalo grass sends out many thin roots that can reach 5 feet below the ground, forming a dense sod. Seventy percent of the roots are in the first 6 inches (15 cm) of soil. Buffalo grass also reproduces through [stolons](#).

Buffalo grass is one of the most important grasses on the short grass prairies. Both livestock and white-tailed deer, buffalo, pronghorns, jackrabbits and prairie dogs use it as forage. It was the main source of food for the buffalo when huge herds roamed the prairies. Mountain plovers build their nests in buffalo grass.

Fires set by lightning strikes often swept across the prairies, and became an important part of the ecosystem. Native Americans used to set fire to various parts of the prairie. Grassland fires move quickly and don't stay in one place for very long. Buffalo grass has adapted to grassland fires and sometimes grows better after a fire. The actual growing parts of buffalo grass are protected from fire by soil. It sends out new shoots from the roots or bottom of the unburned stolon buds. Seeds are also protected from fire by the burs they are enclosed in.

Besides being found on the prairie, buffalo grass is used in meadows, and for turf grass. It's ornamental flowers can look pretty no matter where it grows.

2000

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Fleabane

Common Names: Philadelphia Daisy, Philadelphia Fleabane

Genus: Erigeron

Species: philadelphicus

Parts Used: the extract and the whole plant



Fleabane is part of the Aster family and blooms from April through June.

Fleabane looks like a daisy, with about a 100 ray-like petals that can be white or pinkish. The centers are yellow. The flowers grow in clusters, with several clusters per plant. They can grow to be 4-30 inches high.

They have hairy, alternate leaves that can be oval or lance-shaped with a pointed tip. They can grow up to be 6 inches long, and 2 inches wide.

When you burn Fleabane it produces an oily smoke that repels insects like fleas. Tannins in Fleabane protect cuts from infection and promote skin-tissue healing. Also, the weed was used to soothe sore throats.

Fleabane can be found all over the United States and Canada growing in meadows, along streams, roads and ditches. It is mostly considered a weed. You can also find it

in Wales. White-tailed deer like to eat fleabane.

by Becky Williams

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nbsp;

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Indian Grass

Genus: Sorghastrum

Species: nutans

Parts Used: the blades for forage



Indian Grass is a perennial bunchgrass native to the United States. It is known as a warm season grass and will start growing in May, and go to seed in July and August. It has yellow spikelets (seed heads) that have white hairs, which make it look silver and gold in the sunlight. The grass has long, flat, and narrow leaves that usually are called blades. The blades are 1/4 to 1/2 inch wide, 5 to 12 inches long, and pointed at the end. They have a rough texture to them. They become yellowish bronze in the fall and becomes dormant in the winter. It has glossy seed heads.

The grass grows on the prairies in North American, but can grow as far north as southern Manitoba, Canada, and as far south as Texas. It can extend west to about the 100th meridian and can now also be found in Europe, Asia, and Africa. It grows best where it is moist.

Indian Grass is used for grazing animals and for meadows on

farms. Its very tasty for animals when it is young, but isn't too good after it has gone to seed. It is also used as ornamental grass in gardens or as border grass.

by Hilary W. 2000.

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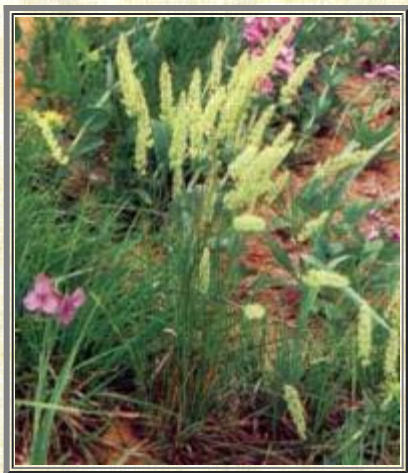
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June Grass

Genus: Koeleria

Species: cristata



June Grass has pale green-silvery colored flowers. Its lower stems are covered with small hair about .5 inches along the stem. The stem is hollow at the bottom of the plant. June Grass grows to about 1-2 feet, and is a cool season grass commonly found in sandy soil of dry upland prairies and open woods. June Grass grows straight up, has relatively fine leaves and has a shallow root system. June Grass is a long-lived perennial. June Grass has small and skinny leaves. Its flowers look like long fuzzy spikes and bloom in May-July and mostly June.

June Grass likes to grow where there is 10 inches or more annual

precipitation. June Grass prefers sandy or coarser soils but will grow on clay loam soils. June Grass will grow in the dry prairies of Midwestern USA.

June Grass can be found growing in sandy or coarser soils. June Grass can survive through very strong winds, snow, and very hot days. This grass can survive through all this because it has a very strong root system.

June Grass is usually eaten by grazing livestock and is also eaten by wild animals during the summer time. Songbirds and small mammals eat the seeds.

June Grass does not cure well and is generally considered only fair forage for fall and winter grazing. June Grass is plentiful in the wild, and can be found growing in Mitchell County, Kansas, Nisku Alberta, prairies, and forest openings.

by Jon N. 2001

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Milkweed

Common Names: Blood-flower, Tropical Milkweed

Genus: Asclepias

Species: curassavica

Parts Used: roots and flowers



This herb produces red and yellow blossoms in the spring which are less than an inch across. The 5 outside petals, or corolla, are red and curve down. The 5 inside petals are hooded and yellow or orange. They grow in a cluster at the top of woody stems

The milkweed has a white, poisonous sap from which it gets its name, and can grow to be 2 to 3 1/2 feet. It has big leaves that can grow to be 9 inches -1 foot long. The seeds, which grow in a pod, have a silky tuft of hair which allows them to be blown by the wind like little parachutes.

It attracts bees, butterflies, and hummingbirds. Monarch butterflies particularly like it , just like butterfly weed, which is in the same family. Milkweed is the flower of choice for Monarchs in North America.

It was an all-purpose remedy for Native Americans. The Omaha Indians used milkweed root as a salve for wounds. Navaho women made a tea from it to prevent pregnancy, but scientists do not believe that it helped. However, the weed's roots do possess properties that heal wounds.

Milkweed is a native plant of the South American grasslands. It can be found in southern Canada, and the central United States, but its favorite place to grow is South America.

by Becky W. 2000.

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Purple Coneflower

Genus: Echinacea

Species: purpurea

Parts Used: the flowers, stems and roots



The purple cone flower has a reddish center and purple, red or white petals that hang down. It can grow to be 2-3 feet tall. The center can grow to the size of a child's fist, and the petals are about as long as the diameter of the center. It is part of the daisy and dandelion family.

Scientists have discovered some anti-bacterial properties in its extracts. It gets the immune system of the body

going by activating macrophages, which are involved in destroying bacteria. It also provides relief from insect bites and stings. The flowers also cure acne, boils, and toothaches. The flower may even be helpful in treating tumors. Native Americans used it to fight off the effects of snake bite. They also used it for fevers and to treat infections.

The purple coneflower is a native plant of North America and grows on the plains of midwestern United States. It was used a lot by the Native Americans and early settlers. It also has been successfully grown in New Zealand. It is still used today to treat fever and infections.

Becky W. 2000.

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Stinging Nettle

Common Names: Great stinging Nettle, Common Nettle

Genus: Urtica

Species: dioica

Parts Used: roots and leaves



This plant is a very interesting plant. When you look at it, it looks like an ordinary, hairy weed with attractive little flowers. It can be a very dangerous plant, however, because when you touch it with your bare skin, you will get a terrible sting, which is very painful. When you get this sting it can be so bad that you might need treatment for it. If it is a minor sting and you get home quick enough, you can put some anesthetic cream on it. The sting feels very much like a bee sting and can last for hours or days. The stinging sensation is caused by formic acid which covers the tiny hairs of the plant.

The stinging nettle grows to a height of 2 to 4 feet. The slender

stems are four-sided. It has a creeping, stretching root from which new shoots emerge. The dull, dark green leaves grow opposite each other on the stem. They are thin and sort of egg-shaped with a toothed and tapered end and covered with stinging hairs. They are 2 to 6 inches long and 1 to 2 inches wide. The hairs on the leaves are particularly painful. They lose their stinging qualities when they are dried.

When the plant flowers in the summer, it has tiny greenish or greenish-white flowers that hang down in clusters just above where the leaves attach to the stem. It flowers from June to September. It reproduces through seeds and a creeping rootstock.

Believe it or not, stinging nettle can be very useful too. It has been used as a medicine in Europe for over 2,000 years. It can

be turned into a tea made from the leaves and stems. This tea has been used to stop bleeding. Stinging nettle seems to have a lot of medical uses, but the nettle root is known to be a diuretic and to give relief from prostate problems.

Stinging nettle can be found growing in Europe and the United States. It can grow up to 3 feet tall in moist, shady spots, in flood plains, woodlands and along streams and river banks. This plant can be found growing in the short grass prairie in North America, but it is common all over the world.

by Celeste G. 2000.

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Dry Midlatitude Climates (BS)

A steppe climate is found in the middle of continents and in the lee of high mountains. The mountains block moist air from oceans or tropical climates from reaching the steppe. There is not enough precipitation for trees to grow except by rivers. The plants have adapted to these drought conditions by being small and growing extensive root systems. Animals have adapted by burrowing into the ground to stay cool or warm, and to find protection on the open plains of the steppe.

The temperature between summer and winter varies a lot. Summer temperatures of the steppe aren't much different from the dry savanna. Both are grasslands, and both can reach temperatures of 104° F, and have heavy thunderstorms. In the winter, however, there are no clouds to keep heat from escaping into the upper atmosphere. The land gets colder and colder. Winter temperatures of -40° F are not uncommon. There are no trees to block the wind, so it howls. The combination of low temperatures and dry winds make it a very harsh place to live.

The Steppe climate tends to go in cycles where there may be 10 years or more of good rains followed by as many years of drought. In order to be able to cope with this climate, people used to be nomadic. They would move to where the water supply was best. Now they drill deep wells and have created irrigation systems. The climate is still too harsh for large cities and industries to develop there.

The Steppe climate comes under Köppen's BS classification. The B stands for dry climates, and the S for Steppe climate. The difference between steppes and deserts are determined by the mean annual temperatures and precipitation. With a little less rain the steppe could easily turn into a desert. More rain, and it would be classified a prairie.

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Big Bluestem Grass

Common Names: Turkey Feet, Beard Grass

Genus: Andropogon

Species: gerardii



This grass is also called Turkey feet because the shape of the seed heads look like turkey feet. It is also called beard grass. The name big bluestem grass comes from the fact that this grass can grow to very big, 3 to 10 feet as a matter of fact. It blooms from June through September.

Big bluestem is known as a bunch grass because it grows in little hill shapes. This grass forms 3 inch

bronze to purple or green seed heads. The tall and slender stems are blue-green in the summer.

The hairy blades, which can get to be 12 inches long and 1/2 inch wide, will get a red tinge on the leaves as they get older, and turn bronze in the fall.

Big bluestem grass grows in dense stands. This keeps other grasses from getting any sun and growing. As a result there are usually large areas covered only by big bluestem grass. This grass has very deep roots. This kept the wind that constantly blows on the prairie from blowing away the dirt. When settlers plowed the big bluestem grass there was nothing to keep the dirt from blowing away. That is how the dust bowl disaster of the 1930s began.

This type of grass was an important food for the American bison, because it was the biggest type of grass there was. This type of grass is part of the tall grass prairie, which is located in the midwestern United States. It does best growing in moist, well drained soil. Big bluestem is the tallest grass in the tall grass prairie.

Celeste G. 2000

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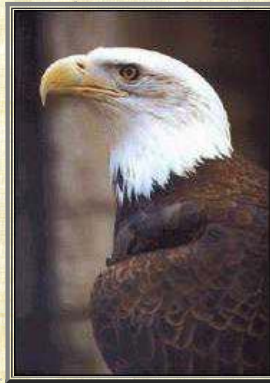
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Bald Eagle

Common Names: Fish Eagle, Sea Eagle

Genus: Haliaeetus

Species: leucocephalus



The Bald Eagle is the national bird of the United States of America. It is considered a sea eagle that has a white head. It is large and strong and weighs eight to twelve pounds. Their wingspan can be two meters (seven feet) and they can be larger than a meter from head to tail. The Bald Eagle has a curved beak which is large and very strong. It's toes have talons which are very strong claws. They have excellent vision which helps them to hunt.

The Bald Eagle is found over most of the North American taiga but eighty percent of them are in Alaska. They build several kinds of nests that can be very large and can be in trees, on cliffs, and on the ground. They change the shape of their nests to fit different trees.

The Bald Eagle prefers to eat dead animals but will also eat live chickens or fish. They hunt in pairs and will steal food from other Eagles. They do not need to eat every day and will change their diet depending on where they live.

The Bald Eagle is a bird of prey and they will attack for food. Until this year they were called an endangered species but as of July 2000 they will changed to a recovered species.

Jai B. 2000.

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Prairie Photo Gallery



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Pampas Grass

Common Name: Silver Pampas Grass, Uruguayan Pampas Grass
Genus: Cortaderia

Species: selloana



Pampas Grass is a sort of grass that dwells mostly in the Pampas of South America. It is a very pretty, large and unique kind of grass.

The habitat of Pampas Grass is mostly moist areas in the South American grassland biome. The climate of this biome is pretty hot with grassy plains. Pampas Grass grows the best in sun filled places with somewhat damp ground. It also grows well along a small stream bank or in a shallow moist

ravines. An amazing feature about Pampas Grass is that it can live in almost any habitat. This amazing grass can grow in hard, rocky areas, flooded areas, dry and damp ground plus its normal habitat. The leaves die during frosts in northern climates, but grow back in the spring. The habitat it flourishes in is a damp, warm environment like that of the South American Pampas.

Pampas Grass can grow to an impressive size for grass, about 8-12 feet tall. Its leaves are only .5 inches to .75 inches long but can be 10 feet long. It grows in large clumps called tussocks. Each tussock is about 12 feet tall with many plants in it. The leaves are razor sharp and could slice you open just by rubbing against them. The leaves are a deep green color. The Pampas Grass has large pink plume like flowers that give the grass an ornamental sort of look. It also has oval shaped seeds growing off of it, which are .25 inches long. Its seed has a tan crusty shell. The female plants are prettier and their flowers are fuller.

Pampas Grass can adapt to most places and can adapt fairly quickly. This quick adaptation is the product of a deep root system that digs down and finds water so it can survive in the driest areas.

Pampas Grass is used in many ways. A common use is as a hedge because of the razor sharp leaves and stiff stems. It is used mainly as a decoration. Pampas Grass makes a nice ornamental plant because of its large plume-like flowers. The only setback to having it as an ornament is the sharp leaves because just brushing against it can give you a cut that becomes inflamed. Many people put this plant in garden beds or on lawns. It is not farmed for any purpose because there is no value in it for farmers.

The Pampas Grass is not an endangered plant. These plants are very common in the South American Pampas. This plant has an incredible seed output. Each plant puts out over 1 million seeds in its life time. This large seed output results in Pampas Grass being a very prolific plant. California has listed them as an invasive weed that pushes out native plants. They are banned in New Zealand and Hawaii and are on their noxious weed list.

by Augie W. 2002

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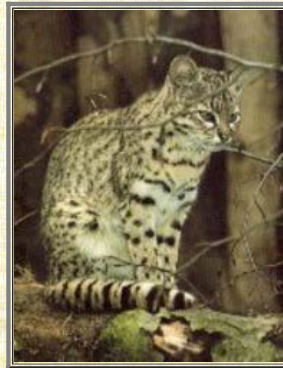
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Return to the Pampas

Geoffroy's Cat

Genus: Oncifelis

Species: geoffroyi



The Geoffroy's cat is South America's most common cat and lives in parts of the [Andes Mountains](#), [Pampas](#) grasslands, Chaco shrub and woodlands. It prefers the scrubby woodland of the Pampas and avoids open grass areas. The Pampas grasslands are in parts of Argentina. They have a thick cover of grasses, with patches of scrubby forest. The climate is often humid, with not too much rain.

The cat can weigh 4.5 to 7.5 pounds. From its head to the base of the tail, it can be 18 inches to 30 inches long. Its tail is 9 to 15 inches long. At the shoulder it is 6 to 10 inches high. It is about the same size as a house cat. The cat's colors can be different from animal to animal. In the north the color can be brown and yellow, because it lives in mountainous areas. In the south

it is gray in color. Its coat is covered with black spots and sometimes black stripes. The stripes and spots also help to camouflage the cat. It has a rounded head, and medium sized legs. It has short fur in the summer and longer fur in the winter. Its head is as big as a house cat head. Males are larger than the females.

The Geoffroy's cat has large, rounded ears which help it to hear its prey in the thick stands of grass. It has razor sharp claws which help it to climb, and to stab and hold on to its prey. It is a good climber and swimmer. It can swim across rivers up to 100 feet wide. It can also catch frogs in the river. The color changes from north to south and the stripes and spots make it camouflaged.

The mating season for the Geoffroy's cat is in the early spring. It can have one litter per year, and 2 to 3 kittens in a litter. At birth the kittens can weigh 65 grams. After mating, the father takes no part in the care of the kittens. The females are pregnant for 72 to 78 days. The kittens are born in a rocky area, and their eyes open 10 days later. The females are sexually mature in 18 months. It takes 2 years for the male to become sexually mature.

The cat is a solitary cat, with a home range of about one square mile. It can live to be 10 to 15 years in the wild.

The Geoffroy's cat hunts small lizards, insects, and rodents. It can

catch frogs in the water and insects off the trees. It can also catch fish, as it is such a good swimmer.

The only known predator of the Geoffroy's cat is man. Man often killed the cat for its fur, to make fur coats. It is one of the few predators on the Pampas. It shares its grassland niche with another small cat called the Kodkod. The Geoffroy's cat likes dense ground cover while the Kodkod likes open grassland which keeps them from competing with each other.

Although it appears to be plentiful, the Geoffroy's cat has been hunted extensively in the last decade for its beautiful pelts, so people could make fur coats. As many as 150,000 pelts are traded each year. This has made conservationists worry that the cat might be in danger. But laws have been passed to protect the cat. The sale of pelts was banned in Europe in 1986 and 1992. It is now listed on the CITES Appendix 1 which restricts sale of its pelts and capturing the cat for the pet trade.

by Jared M. 2002

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Return to the Pampas

Pampas Grassland Climate

Dry Midlatitude Climates (Bs)

The world's grasslands happen in five big areas: The prairies, the pampas, the veldt, and the steppes. Soil associated with the grasslands are mostly Mollisols, which are deep, dark and rich. Most of the grasslands have been disturbed and now are big crop fields of wheat, corn, and other grains. Grasslands are generally found in the center of continents where rainfall is lower. The Pampas covers the central area of Argentina that surrounds the city of Buenos Ares, and is almost 1,000 km. across.

Argentina has a mild climate. Summers are warm, and lasts from late December through late March. The winters are mild, and lasts from late June to September. The north has the highest temperature and the south has the lowest. Argentina lies south of the equator so it's seasons are the opposite from the Northern Hemisphere. Animals that live there are mostly burrowing animals because there are few trees on the pampas. The animals are ungulates, woodrats, chipmunks, lizards, rheas, maned wolves, and pampas deer. The plants are mostly shrubs and short grasses. They are relatively resistant to both fire and grazing because their leaves grow from the base, unlike most plants in which new leaves keep growing from the branch tips. Burrowing is an important adaptation for small animals to hide from predators. The Pampas is largely dominated by grasses, but the average height of the grass is correlated with rainfall.

Köppen's climate classification for the pampas is **Bs**; grasslands with a dry season in the summer of the respective hemisphere. The average temperature is 64° F. The highest temperature is about 77° F the lowest temperature is about 40° F. Winds from the Atlantic Ocean effect the Argentinian climate because the moist air makes summers uncomfortably humid. Pacific winds are stopped by the Andes Mountains.

The average precipitation is about ten to twenty inches a year. The average precipitation a season ranges from four to five inches.

The Latitude Range of the pampas is 30° to 35° South latitude, and ° to ° West longitude.

by Samantha R. S. 2002

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Ombu

Common Names:

Genus: Phytolacca

Species: dioica



Did you know that there are bushes the size of large trees? In the Pampas grasslands in South America there is a "tree" called the Ombu. It is the only tree-like plant that lives on the [Pampas](#) because it does not need a lot of water to survive.

The Ombu can be found in Argentina, Brazil and Uruguay. It does not need

much water considering there is only 10-30 inches of rainfall a year in its natural habitat. That amount of water is not enough to support a lot of trees and even the Ombu plants are widely spaced because of the limited availability of water. Droughts can occur in the grasslands, so the plants that grow there often develop unique characteristics.

The Ombu is a large evergreen with an umbrella like canopy. It can have a girth of 40 to 50 feet and its height can reach 40 to 60 feet. It grows rapidly. Its wood is soft and spongy, soft enough to be cut with a regular knife. The Ombu often has multiple trunks and is the only tree-like species for miles. Its sap is poisonous, therefore the bush is not browsed by cattle. It is also immune to locusts and other pests. The bush is covered with dark, glossy, green leaves. It has greenish-white flowers that grow in long clusters. These clusters droop from the weight of the crimson, ripe berries that develop from these flowers.

The Ombu's massive, fire resistant trunks contain water storage tissue, an excellent adaptation for intense grassland fires which are common in this region. The "trees" have enlarged bases in

which they store water. This plant is plentiful in the pampas regions. It grows naturally in these areas.

The Ombu is also known as the "Lighthouses" of the pampas, since the "tree" provides shade for gauchos (South American cowboys) and other people that are traveling through the grasslands. Sometimes the leaves are used locally for a hot drink.

The Ombu grows plentiful in the wild. It grows naturally in the Pampas grasslands. It is also planted in places like Southern California as a shade tree.

by Seth S. 2002



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Greater Rhea

Common Names: Ñandú, Greater Rhea, Gray Rhea, Common Rhea

Genus: Rhea

Species: americana



The Greater Rhea lives on the pampas, and open woodlands in the south-eastern part of South America. Although they live in the grasslands, they avoid open places and prefers areas with some tall vegetation. It prefers areas with tall vegetation near swamps or rivers.

It has powerful legs, each ending in three toes. Rheas can't fly and rely on their legs to outrun predators. Their long legs also help them spot predators

over the tall grass of the pampas. They can also suddenly disappear in the tall grass by lying flat on the ground, with their heads straight out in front of them. They have very keen eyesight and hearing, and will jump and kick to protect itself and its chicks.

In spite of being unable to fly, they have very long wings. Rheas use their wings like rudders when they run to help them evade enemies. The Greater Rhea has grey and brown plumage with a little white and black sprinkled in it. They have feathers on their necks, but don't have any tail feathers.

The Greater Rhea belongs to a group of birds known as ratites. The African ostrich, the cassowary and emu from Australia and kiwis from New Zealand all belong to this group. These land masses were all once one giant continent called Gondwanaland.

Greater Rheas stand about 5 feet tall (1.5 meters) and are about half the height of an ostrich. They weigh about 50 pounds (20 to 25 kg). At six months the young rheas are almost as big as their parents. The male rhea is slightly larger than the female.

Greater Rheas are omnivorous, but prefer broad-leaved plants and clover as well as several kinds of seeds, roots and fruit. They also eat insects and

small animals like lizards, frogs, small birds and snakes. As they feed they are constantly on the move.

The breeding season for the Greater Rhea is from August to January. Like the ostrich, the male rhea, will court two to twelve females. The males build a nest formed from a shallow hole in the ground surrounded by twigs and other vegetation. Each of the females will lay one egg in his nest at intervals about two days apart, and then move off to the next male to lay some more eggs.

The male rhea stays close to the nest until he has about ten to sixty eggs. These are cream-colored and weigh about 600 grams. After incubating the eggs for about six weeks, the chicks hatch and are raised by the male until they are 6 months old. The young rhea reach sexual maturity in 2 to 3 years.

In the spring the male Greater Rhea stay by themselves while the females form small flocks. Yearling rheas stay with the female flock until they are two years old. At the end of the summer, male, female, and yearling rheas all come together to form large flocks.

The population of Greater Rhea has gone down significantly and are considered as near threatened, although permits are now needed to export them. Their feathers are used to make feather dusters, while their skins are made into leather. Both their eggs and meat are eaten. Considered as pests because they will eat almost any crop, they are killed by farmers. As more of the pampas is turned into farmland, more rheas are killed.

2002

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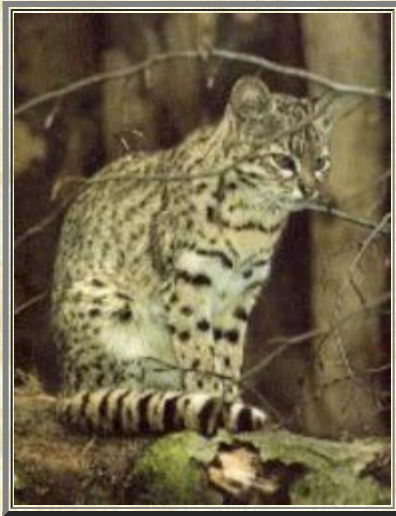
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Geoffroy's Cat

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Species: *geoffroyi*



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by Jared M. 2002



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Barrel Cactus

Common Name(s): Barrel Cactus, Compass Cactus

Genus: Ferocactus

Species: wislizeni



When you imagine a desert, what do you think of first? Maybe it's sand, heat, or Gila monsters, but most likely it's cactus. Cacti are probably the most memorable characteristic of the desert. In all of the Speedy Gonzales cartoons, Speedy is always leading his unsuspecting predators into a cactus. And what is in the background as Wily Coyote accidentally blows himself up with Acme dynamite? Cacti of course!

American deserts is the barrel cactus. The Barrel cactus can be easily distinguished from other cacti

because of its cylinder-shaped body. The cactus usually reaches from around five to eleven feet tall, and at that height it is one of the largest cacti in the North American deserts. This cactus is really a man-sized (or bigger) cylinder with numerous parallel ridges that run down the sides. These ridges are topped with dangerously sharp 3-4 inch spines. The barrel cactus is also a flowering plant. It has rings of yellow-green or red blossoms at its top.

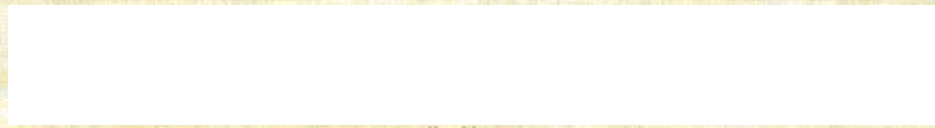
Like many plants of the world, this cactus has numerous uses. Native Americans who lived in the desert found the barrel cactus very useful. In the vast untamed land and scorching heat, you couldn't really hop in your air-conditioned car and cruise down to the local A&P. The Native Americans had to look hard to find food. The barrel cactus provided some very important provisions for them. They stewed the Barrel Cactus to make a cabbage-like food. They got water to drink from the pulp and they made fish hooks from the spines, which are pointed at the end. The pulp is

also made into "cactus candy".

The Barrel cactus is found in the Mojave, Sonora, and the Chihuahua deserts. These deserts are found in the land of Speedy and the Roadrunner: Baja, Arizona, California, Texas, and Central Mexico. The barrel cactus grows in the desert washes and slopes, but can also be spotted growing along canyon walls.

The barrel cactus is my favorite of all the cacti because it is very beautiful, but can really make you sore if you step too close. So keep an eye out for this cactus if you're anywhere in the vicinity of the southwest part of America. Just think, if you are ever stuck in the desert, you know what plant to boil for dinner.

Simone M. 2000.



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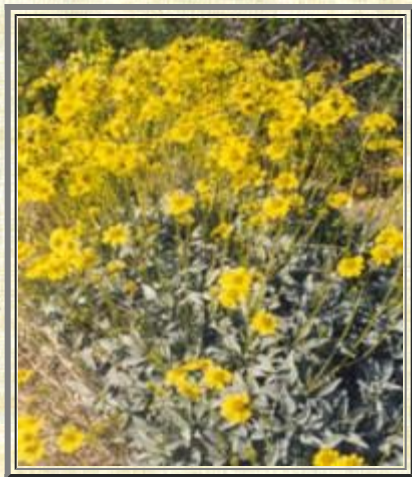
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Brittle Bush

Common Names: Incienso, White brittle bush

Genus: Encelia

Species: farinosa



The brittlebush is a common plant of the Mojave and Sonoran deserts. It is a small deciduous shrub which grows as a low, roundish mound 2 to 5 feet high. Brittle branches sprout from a woody trunk. The leaves have serrated edges, and are broader at the base than at the tip. They are about 1 to 4 inches long. The leaves are covered with a thick mat of short hairs giving a gray-green appearance. Many desert plants have this kind of hairy leaf. The hairs form a blanket over the leaves and act as an insulating layer against the heat and cold. They also trap any moisture that is in the air, and reduce the amount of water lost to dry air.

The brittlebush flowers from March to June, turning the desert bright yellow. It's a member of the sunflower family and its flowers resemble the sunflower, only in miniature form. The flower is disk shaped, on long bare stems, rising several inches above the mound of white leaves, giving an impression of a layer of color over the plant. It has a solitary head with a dark yellow-orange to purplish mound of disk-corollas from which radiate 1 inch yellow rays with a lobed, squared off tip.

Brittlebush can be found growing in the coastal chaparral and interior valleys of southern California, east to the creosote bush scrub, Death Valley through the Mojave Desert and the Colorado Desert, and south to Baja California. It likes to grow in dry slopes and washes. In most of these areas, the brittlebush and creosote bush dominate the vegetation.

Brittlebush has had many uses in the past. The stems of the brittlebush secrete a clear resin which was used by Native Americans from the Southwest as a glue and also as a gum. Ground up it was used by the Seri Indians of Mexico as a toothpaste. They also would sprinkle the paste on sores or heat it and spread it on their bodies to relieve pain. The early Spanish missionaries burned it as an incense.

Mule deer and desert bighorn sheep browse on it, and kangaroo rats will eat its seeds, but aren't all that fond of it. Other than that, it isn't used for domestic livestock. Brittlebush is most useful for rehabilitating landscapes, and stabilizing disturbed areas. It is used in Arizona to minimize erosion near highways. It can be easily transplanted and grows well from seeds. The brittlebush is very abundant and is not on the endangered species list.

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Chain Fruit Cholla

Common Names: Hanging Chain Cholla, Jumping Cholla, Cholla Brincadora, Vilas de Coyote

Genus: *Opuntia*

Species: *fulgida*



The chain fruit cholla looks as much like a tree in the desert as a cactus possibly can. It has a central trunk from which sprout many spiny "branches". It is commonly found in dry, sandy soils of bajadas, valleys floors, and plains of the Sonoran and Chihuahua Desert, south Arizona and northwest Mexico. It is found at elevations up to 4,000 feet above sea level.

The chain fruit cholla is a shrubby cactus. It has many segmented,

irregular, drooping branches. These are covered with a dense layer of sharp spines. These spines have a straw-colored sheath when young which turns a dark gray as they mature. The sheath acts to reflect sunlight and prevent over heating. As the cholla gets older the spines fall off and leave a rough and scaly bark on the trunk and old branches. It is the largest of the cholla, and can grow to a height of 15 feet, and be 6 feet across

The segmented branches have light-green leaves about 1/2 inch to 1 inch long when they are young. One inch long white and pink flowers streaked with lavender bloom from June to August. The flowers bloom at the end of the branches and on old fruit. The pear shaped fruit is about 1.5 inches long and half as wide. Clusters of these fruits sometimes stay attached for many years. New flowers will bloom on them every year and the



chains grow longer with every year, sometimes as long as 2 feet. That is why they are called chain fruit cholla.

The chain fruit cholla is also called jumping cholla because the segments break off easily when brushed up against and stick to you, giving you the impression that the cactus jumped at you. They attach themselves to desert animals and are dispersed for short distances. The ground around a cholla is usually covered with segments that have fallen off the parent. The fruit is not always fertile and the cholla relies mainly on fallen stem joints and fruit to take root and grow new plants.

During droughts animals like the Bighorn Sheep rely on the juicy fruit for food and water. Large forests of chain fruit cholla grow in Arizona. The cactus is not considered to be vulnerable or endangered, mostly because they grow in inaccessible and hostile places of the desert.

2002



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Creosote Bush

Genus: Larrea

Species: tridentata

Parts Used: leaves



The Creosote Bush is named that way because it smells a lot like the creosote tar that is used on telephone poles to preserve the wood. This shrub is mostly found in the southwest part of America and the northwest part of Mexico. You will most likely spot this plant in the desert slopes and plains of Utah, Nevada, California, Arizona, New Mexico and, Texas.

The bush's leaves were made into antiseptics and emetics by desert Native American desert tribes. Antiseptics destroy germs, and emetics

induce vomiting to clear the stomach of poisons. Although they are no longer used for medical reasons today, they did greatly help the Native Americans in times of sickness.

Well, I have told you of the way that the leaves of the Creosote Bush can be used, but I have not told you about how the bush looks. The Creosote Bush is unique. The bush is a robust shrub that grows very abundantly. The bush is basically a group of 4 to 12 plants that shoot up from one plant in all directions. Some bushes are thought to be thousands of years old.

The Creosote Bush has small (1-2 inch) pointy green leaves that are covered with a varnish. These leaves grow directly from the branches of the bush. The Creosote Bush has flowers that also grow along the stems. These flowers are yellow and about the same size of the leaves. The fruit is small and round with gray or white hairy tufts growing from them.

This bush is very useful to us in our everyday lives just as it was to the Native Americans of the desert. It is, like many other plants, a contributor to the world in a small, but important way.

Simone Mc. 2000.

[More imanges of the creosote bush.](#)



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Crimson Hedgehog Cactus

Common Names: Hedgehog Cactus, Claret Cup Cactus, King's Cup Cactus, Mound Cactus

Genus: Echinocereus

Species: triglochidiatus

Parts Used: pulp, flowers and stems



There are many different kinds of hedgehog cacti. The Crimson hedgehog cactus is a small barrel shaped cactus that grows in clumps of a few to a hundred stems. The stems are cylindrical in shape and are up to 1 foot long and 1 to 2 1/2 inches thick. There are about 9 or 10 ribs on the stem. This cactus has no leaves and has chlorophyll in the stems. The stems of this Crimson hedgehog are

shorter and more tightly packed together than other hedgehog cacti.

Echinocerens comes from the Greek word for hedgehog, echinos. Early settlers thought the spines of the cactus made it look like a hedgehog. Triglochidialus means "three barbed bristles". The hedgehog cactus has clusters of three spines along its ribs. Each spine can be 2 to 3 inches long.

The flowers are a beautiful deep red, with many petals that form the shape of a cup. The fruits are red, and edible. The flowers bloom from April through June, and are the first to bloom in the desert. Unlike other cacti, they stay open at night, and bloom for about 3 to 5 days. This species is the only red-flowered hedgehog. They also have pink or lavender anthers.

Not only are the flowers open at night, but so are the plant's pores, or stomata. They use the cool night temperatures to exchange oxygen and carbon dioxide. During the day the plants do their photosynthesis, but they keep their stomata closed so

they won't lose any moisture.

Some Native Americans collect the flowers stems, burn off the spines and mash them. Sugar is added and then it is baked to make sweet cakes.

The plants grow in middle elevations of deserts and mountain deserts. They often grow against rocky outcroppings. They can grow in colder climates because the stems clump so closely together. This reduces surface area through which it can lose heat. It can grow in elevations from 3,020 to 7,915 feet. This plant is native to the American continent.

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Desert Ironwood

Common Names: Arizona Ironwood, Palo-de-Hierro, Palo-de-Fierro

Genus: Olneya

Species: tesota

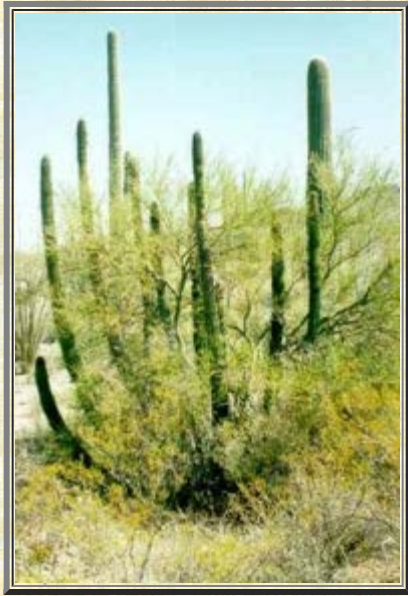


The desert ironwood only grows in the washes and valleys of the [Sonoran Desert](#) below 2,500 foot elevation. The Sonoran Desert is located in southwestern Arizona, southern California, and the northwestern part of Mexico. The Sonoran desert is known as a hot, dry desert. The vegetation is mostly desert scrub. The boundaries of the ironwood's habitat and that of the Sonoran desert are almost the same. Desert ironwoods are usually found in sandy washes where water is available.

Desert ironwoods are from the pea family and their leaves and flowers resemble those of the sweetpea. They're the tallest trees in the Sonoran Desert, reaching heights of 15 to 25 feet, but they can grow as tall as 30 feet. Usually they grow as small, sparse trees. They are very slow growing, with bluish gray-green leaves, and a wide, spreading crowns. They are one of the longest living trees in the Sonoran desert, and can live as long as 1,500 years, although those are very rare.

The desert ironwood, or palo fierro in Spanish, provides desert plants and animals with the food and shelter they need to survive. Its importance comes from the part it plays in the survival of over 500 plants and animals in the Sonoran Desert. As the desert ironwood grows, it alters the environment around itself, and creates a micro-habitat. Its dense canopy shades the ground under it, bringing temperatures down at least 15° F. Its seeds provide food for many doves, quail, and small rodents. Insects thrive in the

ironwood canopy, which also attracts birds and reptiles. They make their home under and in the ironwood, providing prey for [cactus owls](#), hawks and [coyotes](#). Its



nitrogen-fixing nodules on the root system, and nutrient-rich leaf litter fertilizes the soil around it. Native bees pollinate the ironwood flowers, which are also used as medicine.

The ironwood is known as a "nurse plant". It provides a safe place for seed germination, and protects seedlings from extreme cold. It also protects saplings from the damaging effects of the sun. Thorny, low-hanging branches shelter young [saguaro](#) and organ pipe cacti, night-blooming cereus, and other desert plants from browsing animals. Many wild flowers grow under the desert ironwoods, which are eaten by [jack rabbits](#), [desert bighorn sheep](#), [Sonoran pronghorns](#), and mule deer. As many as 230 plant species have been recorded growing under the ironwoods.

The desert ironwood is the only member of the Olneya genus, but is part of the Fabaceae, or Pea family. Its leaves and flowers resemble those of the sweet pea. The tree usually grows from several trunks which can reach a diameter of 24 inches on very old trees.

The bark on young branches is gray and smooth. Older bark becomes wrinkled and creased, eventually shredding on older trunks. It has leathery, [compound](#), [pinnate](#) leaves about 2 inches long with 6 to 9 leaflets about .75 inches long. The leaves are covered with fine hairs. A pair of thorns about .5 inch long grows at the base of each leaf. During the dry season the ironwoods will drop their leaves to conserve water. They never drop all of their leaves, so their canopy provides protection from frost and high heat all year round.

They bloom from April to June just before the new leaves grow



back. Clusters of pea-like flowers ranging from pink, pale-rose, to white, grow in archs at the end of branches. These develop into brown, bean-like seedpods about 2 inches long. Each seedpod has 1 to 4 brown beans in it. The ironwood seeds mature at a time of year when very few plants are producing fruit. Wildlife is highly dependent on its seeds. The seeds can also be roasted and eaten, or ground into a flour.



When given enough water the desert

ironwood is an evergreen tree. It is being used in landscape plantings as a shade tree. The desert ironwood is well adapted to the heat and lack of water of the Sonoran Desert however. The desert ironwood is **drought deciduous**, and will shed its leaves during dry periods to conserve water. This avoids loss of water through **transpiration**. The desert ironwood puts all of its energy towards flowering and regeneration after the spring rains. New leaves appear shortly after the tree has begun to bloom. The leaves have a soft covering of hair which protects them from damaging ultraviolet rays of the sun. The leaf litter under the tree acts as mulch and keeps the soil around the tree moist for longer periods after a rain. Sharp thorns discourage browsing by desert inhabitants.

The wood of the desert ironwood is very hard and dense. It actually sinks in water. It was used by the Seri Native Americans of Mexico for tool handles. Today the Seri Indians make carvings of desert plants and animals from the ironwood. Dead wood is gathered from the desert floor, and the carvings are made with hand tools. Tradition has it that carvings made from the desert ironwood bring good fortune and long life. The carvings are in much demand, especially large carvings, and bring in a lot of money. Illegal harvesting of ironwood is on the rise and live trees are being cut down.

Desert ironwood burns very hot and is used to make charcoal. Woodcutting causes an average of 17% reduction in ironwood. Wood has been illegally cut even in the Organ Pipe Cactus National Monument and other protected areas.

Desert ironwood trees grow only in the Sonoran desert. Urban developments are threatening their habitat. Many of Tucson, Arizona's housing developments are expanding into the ironwood

forests. The destruction of the forests means the destruction of the special ecosystem the ironwoods create. The already endangered cactus pygmy owl, which depends on the ironwoods for its prey, would be in greater danger of extinction. The threatened desert bighorns and Sonoran pronghorn antelopes depend on it for forage. It would mean the disappearance of the saguaro and the pipe organ cacti which need the shade of the ironwoods when they are young. Although it doesn't look like a very important tree, in the desert the ironwood tree enables life to flourish. Without it, that life would disappear.

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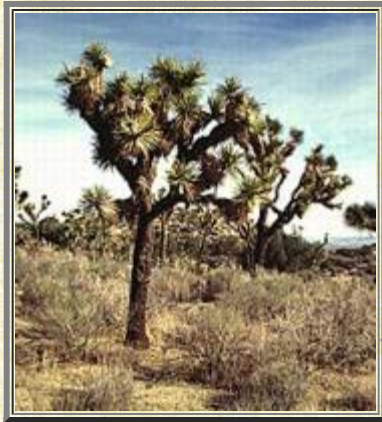
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Joshua Tree

Genus: Yucca

Species: brevifolia



The Joshua Tree got its name from the Mormon pioneers who thought the tree reminded them of Joshua, from the old testament of the Bible, a prophet who was waving them on to the Promised Land. The unusual Joshua Tree grows in the protective setting of the Joshua Tree National Park in California and in the Joshua Forest Parkway in western Arizona. The Joshua Tree is the largest of the yuccas and grows only in the Mojave Desert. The Joshua Tree's height varies from 15 to 40 feet and has a diameter of 1 to 3 feet. The Joshua tree has a lifespan of about 200 years. The Joshua Tree is a member of the lily family. The growing

habitat of the Joshua Tree is similar to one of the palm trees.

The Joshua Tree bears 1.25 to 1.5 inch flowers that are a creamy yellow and green. The flower is bell shaped, and has many 12 to 18 inch clusters on each branch. There is a very unpleasant odor that goes along with the flower. Some Joshua Trees do not flower annually. The fruit of the Joshua Tree is green and brown, and is 2.5 to 2 inches long. Soon after the Joshua Tree Tree's fruit matures in late spring, it will fry and fall off the branches. When the fruit falls it lets off many flat seed.

The Joshua Tree grows in arid deserts; they often grow in groups called groves. The Joshua Tree can be found in the Mojave Desert with elevations from 2,000 to 6,000 feet.

The Joshua Tree has two sets of root systems, one stores any surplus water and it also develops bulbs. The bulbs are buried 10 to 30 feet under the soil. Sometimes they reach up to 4 feet in circumference and weigh up to 40 pounds. The other set is a shallow root system; the shallow roots only reach down to a

couple of feet. The spiny leaf of the Joshua Tree is turned upwards in hopes it will catch any moisture in the air. Then it stores the water in the limbs and trunk. The Joshua Tree is only pollinated by the Pronuda Moth. The moth is commonly called the Yucca Moth. The moth evolved special organs so that it is possible for the moth to pollinate the Joshua flower. The larvae of the Yucca Moth feed on the seeds of the Yucca. The Joshua Tree could not reproduce without the moth's pollination and likewise the moth is equally dependent on the tree.

Both people and animals have relied on the Joshua Tree for survival. The Indians would remove the rope-like centers from the limbs to use as canisters for nuts and berries. They also used the lightweight bark for dishes and bowls. As far back as 1883 the pulp of the Joshua Tree was used to make paper for the London Daily Telegraph. During WWI, the U.S. government used the strong wood as splints for injured soldiers. The pioneers used the Joshua Tree as fence posts, and roasted parts of the tree and gave it to children for a sugary treat.

The Joshua tree is plentiful in the wild but only grows in the Joshua Tree National Park. The Joshua Tree is protected by the U.S government and you must have permission to cut one down even if it is on your own property.

by Alice H. 2001

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Jumping Cholla

Common Names: Teddybear Cholla, Silver Cholla, Cholla Guera

Genus: Opuntia

Species: bigelovii



From a distance the jumping cholla, or teddy bear cholla, looks like a fuzzy, soft plant with many short, fuzzy branches looking like teddybear arms, growing from the top. As you get closer you realize that the cuddly looking plant is completely covered with silvery spines. If you are unlucky enough to touch the spines, you will find yourself painfully stuck to a spiny segment that seems to have "jumped" off the plant. Segments will also "jump" when stepped on and attach themselves to your leg.

The segmented joint of the jumping cholla separate easily when brushed up against. These segments can be found littering the ground around the cholla. There they take root and grow, sometimes forming large forests of cuddly looking teddy bear chollas. Although the jumping cholla has flowers and forms fruit, the fruit is usually sterile, and the plant relies on the dropped stems to propagate.

It's dense, 1 inch spines completely hide the stem. The cylindrical segments are light to bluish green. They are about 10 inches (25 cm) long, and 2.5 inches (4 cm) in diameter. The jumping cholla can be 3 to 7 feet (1 to 2 m) tall and has a single trunk with short branches at the top. The spines on young branches are silvery white, and have a detachable, papery sheath. As they age, they become dark chocolate brown to black in color.

The jumping cholla blooms from

February to May. The greenish-yellow flowers grow at the end of the stems. They are about 1.5 (2 cm) inches in diameter. The fruit is less than 1 inch (2.5 cm) in diameter, and sometimes has spines growing on it.



The jumping cholla have developed several adaptations to survive in the arid desert environment of its habitat. The thick covering of spines shades the plant from the desert heat. They also prevent animals from eating them. The stems are separated into segments that store water and allow for photosynthesis. They separate easily so that animals, and even a strongwind can disperse them away from the parent cholla.

Jumping chollas grow on the valley floors of the Sonoran Uplands at 100 to 2,000 feet (30 to 600 m), the Mohave Desert, California, and Sonora, Mexico.

2002

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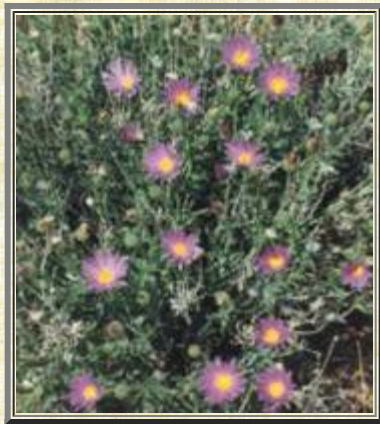
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Mojave Aster

Genus: Xylorhiza

Species: tortifolia



The Mojave aster is a member of the sunflower family (Asteraceae). It's a shrubby plant which can grow up to 30 inches high. The stems are gray-green and long. It has whitish-green to silverish-green, narrow, hairy leaves. They are about 3 inches long, and have small spike-like points on their edges .

Its flowers have narrow purple to lavender rays surrounding a yellow disk. The flower can get to be up to 2 inches in diameter. They usually bloom in March and May but will on occasion also bloom in the fall. It may get as many as 20 blooms. After flowering, the plant dies back.

The Mojave Aster grows in the Sonoran, Great Basin and Mojave deserts of southeastern California. It tends to grow in creosote scrub growths on rocky slopes, in canyons or dry, flat areas at about 2,000 to 5,500 feet.

The Great Basin Desert is colder than the Mojave Desert and the Sonoran Desert is very hot and dry. Although it grows in all three deserts, it grows abundantly in the Mojave.

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Ocotillo

Common Names: Candlewood, Slimwood, Coachwhip, Vine Cactus, Flaming Sword, Jacob's Staff

Genus: *Fouquieria*

Species: *splendens*



The Ocotillo has many interesting names such as Candlewood, Slimwood, Coachwhip, Vine Cactus, Flaming Sword and Jacob's Staff. The Ocotillo is indigenous to the Sonoran Desert, which is located in the Southwestern United States and Northern Mexico at latitude is 23° to 33° North and longitude 107° to 112° West.

The terrain of the desert is open and very rocky, and its soil is well drained. The elevation of the Sonoran Desert is about 5,000 feet. The average yearly temperature is 90°F, and the average yearly precipitation is less than 10 inches.

There are many plants indigenous to Sonoran Desert; one of interest is the Ocotillo, or Vine Cactus. The Ocotillo prefers to grow in the Sonoran and Chihuahuan Deserts of Southeast

California to West Texas and south into Mexico.

The Ocotillo is abundant in the Southwest because the soil is well drained on rocky slopes, mesas, out washed plains and desert grasslands. The ocotillo is deciduous, drought tolerant shrub. From its root crown it grows stems that can be any where from 9

to 30 feet tall. These stems grow in an "S" like pattern making the shrub look like an inverted funnel. The stems are covered with spines that can be 1.5 inches long. The leaves of the shrub are thick and leather like and grow several times in the growing season depending on the amount of rainwater available. The leaves are narrow 2-inch ovals, which can sprout within 3 day of a rainfall. The leaves turn brown and fall off when water is scarce. When the leaves die the stalk and part of the steam become woody and form spines. In the spring the Ocotillo produces flowers, which are tube like and bright red. The flowers are 1/2 to 1 inch in size with 5 lobes curled into 10-inch clusters. They can be seen from March to June and even later depending on rainfall. The Ocotillo can be leafless for a long time, because the roots are deep and do not get much water.



The Ocotillo has adapted to its environment by shedding its small leaves during dry spells. It can also grow new leaves 5 days after getting water. It has a shallow, but wide root

system, which it uses to gather rainwater. It produces food because the Ocotillo can perform photosynthesis during dry spells.

The Ocotillo is pollinated by hummingbirds that like the honey nectar it produces. They feed on the flowers during their travel north from Mexico to the mountains of the Western US.

The Ocotillo is very plentiful and not endangered because it's the only *Fouquieria* to be cultivated. The plant is easily grown from seed and cuttings and sold as nursery stock. The shrub is often use as "fencing" because its spines stop people and animals from passing through. The Ocotillo can be planted at anytime of the year.

The Ocotillo is a desert success story. It is a plant that has adapted to its environment, and it is useful to both animals and mankind.

by Kaitlin K. 2003



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Palo Verde

Common Names: Yellow Palo Verde, Foothills Palo Verde, Littleleaf Palo Verde, Green Stick

Genus: Cercidium

Species: microphyllum



The yellow palo verde is a very strange looking shrub or small tree which grows in the Sonoran Desert of the southwestern United States and northern Mexico. It has adapted in unique ways to survive the killing heat of the desert sun.

Palo verde, or "green wood" in Spanish, has a thin, almost waxy

looking green bark studded with large of thorns. The smooth greenish trunk and branches have for a large part taken over the photosynthesis. The green bark contains **chlorophyll**, which gives it the ability to carry on **photosynthesis** when the tree has shed its leave during dry, hot periods. This way the tree doesn't have to shut down completely and can still store up energy in its roots. The tree has a very deep root system to access any underground water supply. Palo verdes are "branch deciduous", meaning that they may shed some of their branches during severe droughts, becoming a smaller tree.

The palo verde has low hanging, dense and twiggy branches and a strange irregular shape. Six to four major stems sprout out about 8 inches (20 cm) from the ground. The crown is 12 to 18 feet (3.7 - 5.5 m) wide. Palo verde can get to be 10-20 feet tall, but grow very slowly and are considered climax species in the Sonoran Desert.

Its leaves are **compound** and **pinnate**, and about 1 inch (2.5 cm) long, with tiny, round leaflets. The palo verde is **drought deciduous**, and drops its leaf during dry, hot periods. This is an adaptation that prevents water loss through **transpiration** for some desert plants.



The flowers of the palo verde are 1 inch solitary blooms that flower in late spring. The small, pale yellow flowers grow on the edge of a branch, and are pollinated by insects. They may not flower every year, depending on the rainfall.



The one to five seeds are contained in 2 to 3 inch (4-8 cm) long pods which pinch in between each seed. Seeds are produced when the spring has been wet and cool. They ripen in July, and cling to the branches. Rodents will often cache the seeds underground, where some of them will germinate after a rainy season. The seedlings are very sensitive to drought for the first two to three months of their lives, and only about 1.6% will survive after germinating. Those that do survive usually have germinated under triangle bursage.

The palo verde is a very important tree in the Sonoran Desert ecosystem. The black-tailed gnatcatchers use the palo verde as nesting sites, and the Gambell's quail use them as roosts. White-throated woodrats also use them for shelter. **Desert bighorn sheep**, mule deer, **jackrabbits** and other rodents browse on its leaves. **Javelinas** like to eat the seed pods. The canopy cover reduces the temperature below the palo verde which is very important for the germination of other desert plants. The palo verde is the primary nurse plant for the **saguaro cactus**.

Palo verdes grow in arid to semiarid climates with mild winters and hot summers, and two distinct rainy seasons. They are found on gradual to steep lower mountain slopes and alluvial outwash plains at altitudes of 1,000 to 4,000 feet (305-1,219 m). They are the dominant species of the Arizona Uplands of the Sonoran

Desert.

The seeds can be ground up and used for flour. The Seri Indians of northern Mexico used the seeds and flowers as a food source, and made necklaces out of the seeds. Red dye can be made from the flowers. Palo verde wood is only good for fire wood, and the tree is not an endangered species.

2002



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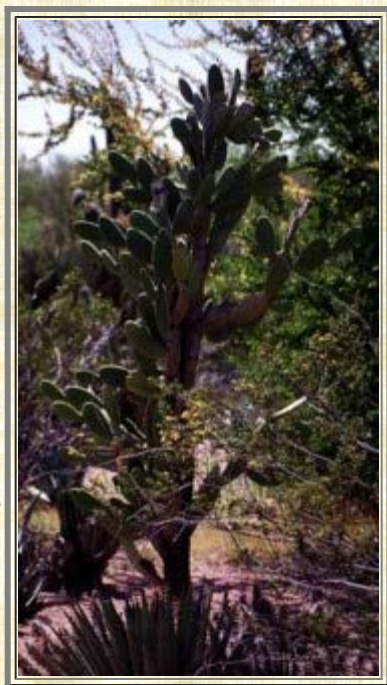
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Pancake Pricky Pear Cactus

Genus: Opuntia

Species: chlorotica



The prickly pear cactus is a widely used and versatile cactus. It can be used in many different ways such as foods, crops, etc.. In many places the prickly pear is grown as a crop, but in others they are just grown in the wild. The prickly pear has started to grow as a weed in some areas but in others it is vulnerable.

The prickly pear cactus grows in many places. It's found in the Sonoran and the Mojave Desert. The Sonoran Desert is located 25.3° to 33° North and 105° to 118° West.

In the Sonoran Desert it's very hot and dry, and the ground is very sandy. The temperatures drop very low at night and rise very high during the day. In the Sonoran Desert, rainfall, rather than time of the year, more clearly predicts the seasons than the calendar. It does have two rainy seasons. The Sonoran Desert is the wettest desert in North America with temperatures that

vary in different months. In January the average temperature is 51.8° F, in April it's 65° F, in October it's 70.6° F, and in July it's 85.9° F. This cactus likes to grow in dry hot areas, as well as areas with intense monsoons and high temperatures.

The pancake prickly pear cactus grows up to 7 feet tall. It has

circular pads arising from a thick, round trunk. The pads are actually fast growing stems. This cactus grows in a upright position with pads sticking out at all angles covered with barbed spin. The pads are four to six inches long, 9 inches wide, and .75 inches thick. The pads are very coarse and covered with spines. There are flowers located on the pads of the cactus. They are yellow with red centers and three to four inches wide. Several flowers grow on the edges of each pad. The fruit that grows from the flower are red or purple and turn gray when they get old. The fruit is one and six tenths to two and four tenths in diameter. The seeds of the plant are tan or cream colored and smooth with four-millimeter diameter.

There are many adaptations that the pancake prickly pear cactus has to the Sonoran Desert. Cacti have reduced their leaves to spines to reduce water loss and to protect the cactus. The roots of the prickly pear cactus are also made for very dry environment to help adapt to the deserts hot weather. Plants in the desert don't require much water or they need a way to store it for a drought. For example, the pads of the prickly pear cactus are used to store water for when they need it during a drought. In some places these adaptive significances help well. In some places these adaptive significances help well.

The pancake prickly pear cactus thrives as both a wild and domesticated plant.

by Prudence F. 2003

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Saguaro Cactus

Genus: Carnegiea

Species: gigantea



The Saguaro Cactus has a smooth and waxy skin and is covered with two-inch spines that are located on the tree's vertical ribs. In May and June, the Cactus bears creamy white flowers with yellow centers that measured about three inches. The Saguaro Cactus flower can be found on the end of the branches. The flower only opens on cooler nights and is closed during the heat of midday. The stem of the cactus can be 18 to 24 inches in diameter, The Cactus and its branches grow upright as do all cacti in the southwestern U.S. When it rains the Saguaro Cactus soaks up water and holds it in its ribs. Since it does not rain a lot in the desert, the cactus uses the water that it stores when it doesn't rain. The Saguaro Cactus is Arizona's state flower. The average lifespan for a Saguaro cactus is about 200 years.

The Saguaro Cactus lives in an especially rocky terrain consisting of desert slopes and flats. The Saguaro cactus also lives in bajadas or lowlands. The cactus likes a hot, dry climate. It does not need a lot of water to survive. The Saguaro Cactus lives only within the Sonoran Desert of southeastern

California, southern Arizona, and northwestern Mexico. In the Sonoran Desert, the Saguaro Cactus can grow in very limited areas below

elevations of 3,500 feet.

The Saguaro Cactus can absorb a lot of water because the ribs on the plant can expand. The Saguaro Cactus has an amazing root system. The root system is very shallow for such a tall, heavy plant. The Saguaro Cactus has one tap root that is only about three feet long. It also has two sets of radial roots. One is a thick root system, which is only about one foot long, and there is also a thinner root system that grows to a length equal to the height of the Saguaro Cactus.

The Saguaro Cactus has a very strong framework consisting of three different structural features. There is a woody tissue that runs parallel up and down the Saguaro to form a cylindrical shape. There is also a thick whitish pith, and a fleshy tissue. Downward pointing spines make it easier to direct rainwater into the depressions of the cactus. The spines help to cool the outer skin. The spines also help redirect the wind and insulate the plant. Many animals eat the Saguaro Cactus; the Long-Nosed bat, bees, wasps, ants, and butterflies drink the nectar of the Cactus flower. Small animals such as the Pack Rat, and Pocket Mice will come to eat the Cactus. Gila woodpeckers like the interior of the Saguaro Cactus because it is the only plant it can hollow out for their nest in the desert. The woodpecker will drill 2 to 3 holes before it decides to live in one. It will peck right into the soft tissue that is used to store water. The cactus will fix the damage by sealing up the inside with "callous scar tissue" and that stops water loss. The Saguaro Cactus is protected by the United States government, because the Saguaro Cactus was beginning to disappear from the landscape. There is a national park to protect the Saguaro Cactus. The name of the park is Saguaro National Park.

by Alice H. 2001

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Soaptree Yucca

Genus: Yucca

Species: elata

Parts Used:



Imagine bumping down a dusty desert road, looking at the wide open land stretching out in all directions. Along the sands are plants, some squatting in the burning sun, others standing tall, watching the sky for a chance of rain. As you speed along, you notice an exotic looking plant growing in the mesas and washes of the desert. You turn to your driver and inquire about the plant. The driver tells you that it is the Soaptree Yucca.

The Soaptree Yucca is commonly found in the Sonora and Chihuahua deserts, Texas, New Mexico, Arizona and northern Mexico. Thanks to its exotic look, the plant has been introduced to eastern soil, and can be found growing in

climates that are not just hot and dry like the desert.

The Soaptree Yucca is a tall 10-18 foot plant with palm tree-like leaves. These leaves are at the base of the plant. They are very similar to those of a palm tree in the respect that the green leaves of the Soaptree Yucca are long and triangular shaped and are not wide. The stalk that shoots up from the leaves is a twig-thin stalk with small white flowers growing at the top. The plant's fruit is also on the stalk and is a brown capsule until the summer, when it splits into three sections that contain black seeds.

Maybe you are wondering why the plant is called the "Soaptree" Yucca. There is a logical reason. Inside the roots and trunk of the plant is a soapy substance. This substance was commonly used as a substitute for soap. In a drought, ranchers use the plant as an emergency food supply for their cattle. In the days when Native Americans dwelled in the deserts, the fiber of the Soaptree

Yucca's leaves were used to weave baskets. This plant gave them a head start to finding enough food, because the Native Americans most likely used the baskets to collect food. The Yucca is also used for decoration in many American gardens. So this plant's leaves, roots, trunk and stalk have been useful to humans since the time of the Native Americans.

The Yucca is a very climate compatible plant because if you look hard you can find it almost anywhere.

by Simone Mc. 2000.



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Triangle-leaf Bursage

Genus: Ambrosia

Species: deltoidea



Triangle-leaf bursage is a native plant of the Sonoran Desert and can be found throughout southwestern Arizona, USA, south into Sonora and Baja California, Mexico.

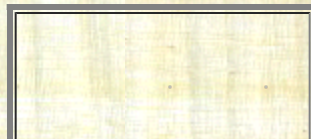
Triangle-leaf bursage can be found growing in upper and lower bajadas, lowland creosote growths and desert grasslands. It grows at altitudes of 1,000 to 3,000 feet on open flat, spaces, and steep, gravelly hillsides. Triangle-leaf bursage prefers to grow in coarse soils with a high pH where rain

percolates quickly and drains away. It is the dominant plant in the Upland Subdivision of the Sonoran Desert where it gets two rainy seasons. It is found growing with palo verde, mesquite, ironwood and mixed varieties of cacti.

Triangle-leaf bursage is a small, round shrub about 1 1/2 feet tall and 2 feet wide. It has many slender and brittle branches that grow from the base to create a dome-like crown. The crown contains many old, dead growth.

Young branches and leaves are hairy and resinous, but become smooth with age. The triangle shaped leaves are about 1 inch long and 1/2 inch wide. The margins are serrated but can sometimes be smooth. They have a gray-green color on top and are white and fuzzy underneath. Triangle-leaf bursage is drought deciduous and will lose its leaves during the dry seasons.

Triangle-leaf bursage has small, 1/4 inch wide yellow-green flowers without petals. They grow in pairs



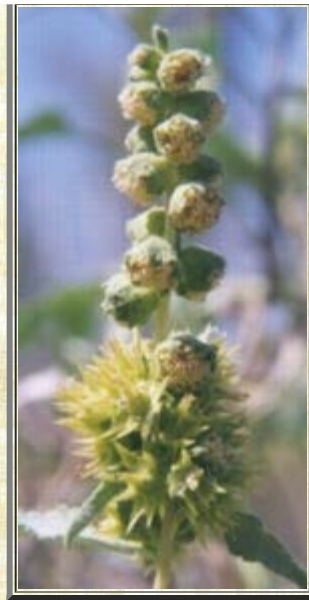
from the end of growth spikes and flower from February to July. Bursage gets its name from its burr-like seeds. The round seeds are covered with hook-tipped spines that attach themselves to the fur of passing animals. The plants produce many seeds after both summer and winter rains.

For a desert plant it has a short life-span, only 50 years. Its most significant function is as a "nurse plant" for other species. Because it prefers to grow in open, sunny areas, it is one of the first plants to populate an empty space too hot for other seedlings. Once it is established, it provides a microhabitat for the seedlings of other species and protects them from herbivores with its tangle of branches. In time the area becomes populated with many different species of desert plants.

Triangle-leaf bursage is well adapted to desert life. Because of its long taproot and well-developed lateral roots it can survive with very little precipitation. During droughts the tiny rootlets that grow on the main root system after it rains die off. When it grows among creosote bush and jumping cholla, bursage has a very distinct root zone. No other plant will grow near triangle bursage roots, cutting down the competition.

The triangle-leaf bursage is a member of the Sunflower family and a cousin of common ragweed.

2002



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Armadillo Lizard

Genus: Cordylus

Species: cataphractus



The nostrils of the Armadillo Lizard are formed into little tubes. The tubes help the Armadillo Lizards smell for food or predators. A ground dwelling lizard, it is active in the daytime and feeds on a wide variety of insects, as well as on spiders and other invertebrates. The head of the Armadillo Lizard is narrow in shape. It is fairly slow moving animal, but when the Armadillo Lizard thinks or knows it's in danger, it runs as fast as it can go for cover.

The body length is 15-17 inches, the tail is 14-16 inches long, and it weighs 8-17 lbs. Its back legs are a little shorter than the front. The head, body, and club-like tail are all flattened, enabling it to wriggle easily into rock crevices for shelter. It may also adopt a curious defensive posture when threatened by rolling itself up like an Armadillo, with its tail tightly held in its jaws, presenting a spiny ring to the predator and protecting the softer, vulnerable belly area. That's why its called the Armadillo Lizard. The armored Armadillo Lizard has protection all around its body so that predators can't harm any of its under parts. Also squeeze into small places for escape. Another protection is their spiny scales that go all the way around its body. Their tails and spines also can be used to defend themselves as well. The Armadillo Lizard can be found in the deserts of the southern tip of Africa.

The Armadillo Lizard has its babies in the late summer. Only 1 or 2 babies are born during that time. The Armadillo Lizards stay in family groups, and they will all live in the same rock crevice. When the lizards give birth, the babies are live-born, but do have a thin membranous shell that they need to break through.

The Armadillo Lizard is a prey animal. It is preyed upon by bigger and stronger predators, such as humans, etc. The Armadillo Lizard's armor is most usefull against many birds, mammals, and other reptiles.

The Armadillo Lizard is not an endangered species although it does have a lot of enemies to protect itself from. The Cape Provincial

Ordinance helps the Armadillo Lizards when their injured or sick.
That way the Armadillo lizards can be less endangered.

Zach S. 2001

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Banded Gila Monster

Genus: Heloderma

Species: suspectum cinetum



The Banded Gila Monster is very shy but can strike back very quickly, with painful results. It is a subspecies of the Gila Monster (*Heloderma suspectum*), and is one of two venomous types of lizard in the world.

They are pink, orange and red. Four or five black bands with spots in them run around the body. The tail is also banded. Their heads are spotted with black around their eyes and mouth. Their

patterns are really amazing because their colors send out a warning to any predators that they are venomous.

The Banded Gila Monster can get to be 2 feet long and can weigh up to 3 pounds. They have a big head, fat body, and a thick, short tail. They have short legs with average sized claws for a lizard of its size. Its skin is dry because it lives in the desert and can't afford to lose fluids. The texture is bumpy.

The gila monster hunts at day, but is hardly ever seen by people because it is so shy. The Banded Gila Monster is mainly found in the Mojave Desert. It is named for the Gila River Basin which is found in the southwestern United States

The Gila Monster mates in July and lays its eggs a few weeks later. They lay 3 to 15 eggs in a hole then cover them with sand. They hatch in 28 to 30 days. The babies are 3.5 to 4.5 inches long. They can survive on their own after they hatch. When they are 1 to 3 years old they are adult size.

We don't know much about the Banded Gila Monster, because it spends most of its life underground in burrows. It is most active in the spring time. It is active during the day and comes out in the morning, because it gets too hot in the afternoon. The Banded Gila Monster spends most of its life alone, but they do gather together

during mating season.

This amazing lizard has such good hearing and vision that it can lay inside its burrow until it is safe to come out. When it is under trees or bushes it is camouflaged and when it is not, its red, pink, orange, and black colors are a warning to predators. It stores fat in its tail and its body. It can survive on its fat, or stored energy, for about three months. It has very strong jaws and venom that can be released through its bottom teeth. The bottom teeth are large and have grooves for the venom to flow through them. The Gila Monsters venom is about as strong as a Western Diamondback Rattlesnake. When it bites you it chews as it bites and that is how the venom gets into you. You don't usually die because it only injects a small amount of venom. When it bites you its jaws are hard to get off because they are very strong. Scientists are testing the venom to see if it can be used to treat diabetes.

The Gila Monster eats bird and reptile eggs, young rodents and small reptiles, baby birds, rabbits and hares. They can eat huge amounts of food at one time and they can store fat in their tails and their bodies.

The Gila Monster is a predator. Sometimes it digs its own holes and some times it uses holes dug by other animals for their burrows. They live in heavy brush, or rocky brushy wash bed or canyon bottoms.

The Gila Monster is not endangered. It is listed in Conservation on International Trade in Endangered Species (CITES), Appendix II. CITES lists species that can become endangered. Collectors for the pet trade can only catch a certain amount of lizards and need permits to do that. The International Union for the Conservation of Nature (IUCN) lists them as vulnerable so you cant collect them or own them without a permit. Many people are making farms and destroying their habitat.

Mike D. 2001

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visit:

http://www.calacademy.org/exhibits/venoms/education_resources

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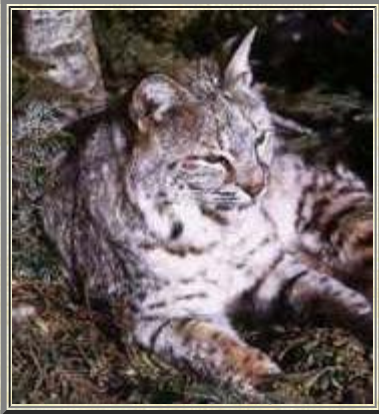
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Bobcat

Common Names: Bobcat

Genus: Felis

Species: rufus



The average bobcat weighs 15 to 20 pounds, and is 2 feet tall and 3 to 4 feet long. The bobcat looks pretty much like a regular cat except bigger. The desert bobcat's color is a mixture of white, black, brown, and orange. The bobcat often gets confused with the mountain lion because of its fearsome growl.

Bobcats can be found almost anywhere, but one of the most common places is the southwest desert. They like it there the most because of the bushy, and rocky terrain. The bushes give shade if it's hot, and the rocks are a perfect hiding spot if they're hunting prey.

The bobcat's diet consist of rabbits, squirrels, mice, gophers,rats, and fish. They're good at catching all their prey because of their hunting ability.

A bobcat's mating is a lot like a regular house cat's mating. That's one similarity that they have. Bobcats will have one litter of kittens a year. A litter of bobcats consists of 2 to 3 kittens. When food is scarce, a bobcat will not have a litter at all.

When a female has kittens, she will only hunt right around her den and not use all of her hunting territory. She will wean the kittens by three months and then bring back killed animals. Once they get used to eating meat, she brings them back live prey so they can practice hunting and killing. They will stay with the mother for almost one year, leaving in the spring.

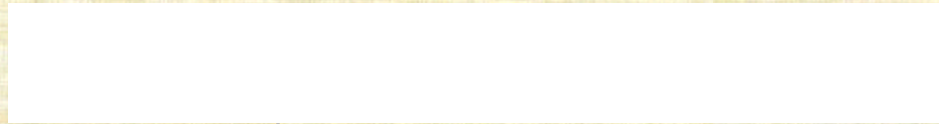
Despite the bobcat's cute appearance it is actually very fierce and can kill animals as large as deer. A good thing about the bobcat is it won't kill

any healthy large prey unless it's desperate. The bobcat always goes for the sick or wounded first. This is good because the sick won't spread disease to others.

Bobcats are loners. Each bobcat has its own territory which it will not share with other bobcats, except for females.

The bobcat's status in the wild used to be very plentiful, but too many people took advantage of that and almost killed them off. A good thing now is that the big game people are protecting them.

Tristan A. 2000.



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Coyote

Common Names: Coyote

Genus: Canis

Species: latrans



The Coyote has a tan coat mixed with hairs of rusty brown and gray, and the ends of the hair may be black. The different colors help to hide the coyote in the underbrush, rocks, and grasses. The coyote has large, pointed ears and a bushy tail. Coyotes are known for their sharp eyesight, keen hearing and a keen sense of smell. Adult coyotes can grow to be 4 feet long (including the tail which can be 11 - 16 inches long). They can be 2 feet tall and weigh up to 30 pounds.

Coyotes once only lived in Western America, but people have forced them to find other habitats. Coyotes can be found in the United States, Canada, and Mexico. They live in all kinds of habitats including deserts, prairies and mountains. Coyotes have even been found on Cape Cod.

Coyotes eat mostly rabbits and rodents. They also hunt antelope, goats, sheep, and other animals. They will eat insects and reptiles. Dead elk and deer, as well as cattle will become the main food in the northern wintertime. Coyotes will also eat fruits and nuts. As coyotes are forced to move closer to people, they will also eat garbage.

Most coyotes live alone or in pairs. They might live together in larger groups. Coyote families guard and mark their own areas. Pups are born in the spring. A female can have from 3 - 12 pups. Both parents care for and feed the pups.

Coyote's coloring help it to hide in the desert and hunt for it's prey. Coyotes will eat almost anything available to them where ever they are; fruits, rodents, small animals, and garbage. Coyotes are clever animals and adjust to their environment.

Coyotes are not endangered. Their natural enemies include mountain lions and more recently man.

2000.

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Desert Bighorn Sheep

Common Names: Nelson Bighorn Sheep

Genus: Ovis

Species: canadensis nelsoni



Desert bighorn sheep is a subspecies of the Rocky Mountain bighorn sheep. Its preferred habitat are steep slopes on, or near mountains, with a clear view of the surrounding area. They have excellent eyesight and can spot predators from a long way off. They live in small pockets of dry desert mountain ranges, foothills near rocky cliffs, and water when it is available. They exist in a barren, mostly waterless environment in the Mojave and Sonoran deserts on the North American continent

The desert bighorn sheep have a solid, stocky, and muscular body on short legs. They are not as stocky as the Rocky Mountain bighorn, and their horns are

flatter and spread out more from their heads. The horns can weigh as much as 30 lb (14 kg). Their muzzle is narrow and pointed, while their ears are short. They have very acute eyesight which helps them gauge distances when jumping from rock to rock. Their sharp-edged cloven hooves are elastic and concave. Their coat is smooth and made up of an outer coat of stiff guard hairs and a short, wavy undercoat. In the summer it is a rich, glossy brown color with a white rump patches. By late winter the color fades.

The males, or rams, have huge brown horns with horizontal ridges. They curl back over the ears, down and up again past the cheeks. The females, or ewes, have smaller horns that never get larger than half a curl. Bighorn sheep have a double-layered skull honeycombed with bone struts to protect their brains during their impressive head-banging battles. Thick tendons link the skull and spine to help recoil from the impact. The rams weigh from 119-127 kg, and measure 160-

180 cm from head to tail. Ewes weigh 53-91 kg and are approximately 150 cm long.

Ewes and rams usually gather in same sex groups, and go their separate way when they are not breeding. During the summer lamb-rearing season ewes stay in the upper levels of the mountains. In late fall and early winter the rams will gather up to 12 ewes into a harem. They don't defend territories, but battle other males over mating access to the females. Rams will charge each other and smash their heads together in impressive and loud battles. Age and the size of its horns determine the dominant status of a ram. Males usually don't mate until they are seven years old.

The average life span of a desert bighorn is approximately 9 years. Most sheep live for more than 10 years, except when they become overcrowded, in which case their life span is only 6-7 years. The females are led by an old ewe. Young females will usually stay with their mother's group, but the males leave when they are 2-4 years old to join a group of rams.

Desert bighorns have a long lambing season. In the Mojave Desert it begins in December and ends in June. A few lambs are even born during the summer as well. Mating can last from July to December. Their gestation time lasts about 174 days. They will have from 1-3 lambs. The females will choose a steep and safe area for the birth and raising of the lambs. The lambs are able to quickly follow their mother after only a week. Within a few weeks the lambs gather in small bands of their own, and search out their mothers only to suckle. They are completely weaned by 4-6 months. A disease has been documented in Mojave and Sonoran desert bighorns which results in high death rates for lambs from pneumonia. This disease can continue for several years and results in large population declines.

Bighorns are **ruminants**, which allows them to digest grass, even when it is dried out. They are mostly diurnal and will feed on and off throughout the day on a large variety of plants. They eat grasses, sedges, and **forbs**. They will also browse on shrubs and trees like the desert ironwood when their preferred food is scarce. The desert bighorns need water about every three days in the summer. Some wildlife refuges construct artificial water holes. However, desert bighorn sheep get a lot of their moisture from the food they eat.

The Rocky Mountain bighorns and the desert bighorns of the Mojave and Sonoran deserts are descended from the wild sheep of Central Asia. Before the last ice age the ancestors of North America's bighorn sheep crossed the Bering land bridge from the Mongolia and Tibet.

Originally the bighorn sheep were found from Baja California and Texas in the south to the Canadian Rockies. Their eastern boundary reached western Nebraska. Approximately 2 million bighorn sheep lived in North America at one time. Now they live on only 4% of their historic ranges. Today the overall population of bighorn sheep is about

25,000, with the desert bighorn sheep numbering around 4,000. Desert bighorn sheep have been nearly wiped out by diseases, over-hunting, loss of habitat, and competition with livestock. Fragmentation of their population by fences, highways and aqueducts has also contributed to some decline in their population. Access between mountains is necessary to give the desert bighorn access to other bighorn populations, thereby keeping them genetically healthy.

2002

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Desert Kangaroo Rat

Common Names: Kangaroo rat, Desert Rat

Genus: Dipodomys

Species: deserti



The kangaroo rat is a very cute little critter that kind of looks like a mini kangaroo, but is as big as a mouse. It has large hind legs and feet. It usually grows to about 14 inches (38 cm) in length, including its tail. Its hair is a yellow buff color above and white below. The tail has a white-tipped tuft at the end. The thing that sticks out the most is the Kangaroo rat's very big eyes.

The kangaroo rat lives in the desert scrub of the [Mojave](#) and Sonoran deserts of California and Arizona, and western through southern Nevada. These are the most arid desert regions in the United States.

They live in large dens with wide openings which they dig themselves at the base of bushes, like [creoste bush](#), or in the banks of wind drifted sand. There may be 6 to 12 entrances which they block off during the day. Their burrows are up to 4 1/2 feet (1.5 m) deep, with many passages which connect to food storage rooms and a nest chamber. The nest is made out of grass and other plants. It spends most of its day underground sleeping, and comes out to feed at night when it is cooler.

The female kangaroo rat has 3 or more litters of babies a year which are born from January through June. She is pregnant for 29 to 32 days. The newborns weigh about 1/16 oz (3 g). The babies are weaned at 3 to 4 weeks. Their life span in the wild is 3 to 5 years. They are solitary creatures, only one animal occupies a burrow, and have territories of about 1/2 acre.

The kangaroo rat moves exactly like a real kangaroo, but is not a real kangaroo. It is actually a rodent. They drum the ground with their hind legs and kick sand at objects, probably to see if its alive.

The kangaroo rat mostly eats seeds, leaves, stems and insects. It has adapted to desert life by getting its water from the food it eats. Another great adaptation the kangaroo rat has is a cheek pouch, which it can store food in for weeks while finding

shelter. Another is its big, long, fluffy tail. It uses its tail for balance and steering its way.

The Kangaroo rat is the biggest of its kind and dominates other Dipodomys. Predators include coyotes, foxes, badgers, snakes, owls.

The kangaroo rats are not endangered, and their status in the wild is very good right now.

2000.

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Desert Tortoise

Common Names: Gopher Tortoise

Genus: Gopherus

Species: agassizii



The Desert Tortoise can be found in the Mojave and Sonoran Deserts of southern California, two of North America's four deserts. They inhabit semi-arid grasslands, gravelly desert washes and sandy canyon bottoms below 3,500 ft.

The Desert Tortoise is a land dwelling turtle belonging to the Testudinidae family. The Desert Tortoise is also known as a gopher tortoise because it belongs to one of 4 species of the Gopherus genus.

Its front legs are muscular and flattened with long claws, and are very well adapted for digging deep burrows. Desert Tortoises can make hissing, popping, and pinking sounds, usually out of fear or distress. Its domed, brown shell (carapace) can grow to be 9-15 inches in length, 4-6 inches high, and the tortoise can weigh from 8 to 15 lbs. They usually live to be about 80 years, but some have been known to be a 100 years old.

Both sexes have an extension on the front of their lower shell called a gular horn. The horn is longer on the males and they will use them to upturn rival males. Males will fight each other whenever they meet. These fights usually end with the defeated male scurrying away. Males and females will share crevices and burrows to get out of the extreme heat of the day, but when they emerge, the males will again try to upturn each other.

To escape the heat of the summer and the cold of winter the desert tortoises live in burrows which they dig. Some of them can be three to six feet deep. They will spend November through February in a torpid state in their underground burrows. Some burrows have been used for over a hundred years. 95% of a tortoise's life is spent underground. Their most active time is in

the spring when they will forage for herbs, grasses, new growth of cactus and annual flowers.

Desert Tortoises will develop a preference for certain plants, to which their digestive systems become accustomed. When forced to eat unfamiliar plants, their digestive tract need several months to become accustomed to them and be able to extract all available nutrients and water from them. Because they only have a few months in the spring to take in enough water to last them all year, destruction of their habitats and the plants in it can be fatal to the desert tortoise in the long run.

The Desert Tortoise will dig catch basins in the soil to catch the infrequent rain that falls. They remember where the basins are and return to them when it rains. Most of their water intake comes from moisture found in the grasses and wildflowers they eat in the spring. The tortoise has the ability to store about a quart of water in its bladder to be used when necessary. Adult Desert Tortoises can go for years without water.

The Desert Tortoise will mate anytime it is above the ground. The females can store sperm and will lay a clutch of 4-8 hard-shelled eggs in a nest dug near the burrow opening in May, June, and July. She can lay 2 to 3 clutches a year. The female will leave the nest and the eggs are then incubated by the warm soil. After 90 to 120 days the young tortoises hatch.

Only a few out of every hundred of the 2-3 inch hatchlings will make it to adulthood. Their shells stay soft for the first 5 years and they are preyed upon by coyotes, roadrunners, gila monsters, and ravens (*Corvus corax*). In some parts of the Mojave Desert ravens are responsible for the death of about 50% of the juvenile Desert Tortoises.

Another reason the Desert Tortoise population grows slowly is because they don't reproduce very fast. Females don't breed until they are 15 to 20 years old and then may only lay eggs if there is enough food available. Their birth intervals are 2-3 years.

It is unlawful to touch, harm, harass or collect a wild Desert Tortoise. Please keep your distance if you ever see a Desert Tortoise in the wild. When frightened they will empty their bladder as a defense mechanism, and the loss of water can be fatal to the tortoise. The Desert Tortoise is considered a "threatened" species under the California state Endangered Species Act in 1989 and the federal Endangered Species Act in 1990.

Illegal collection for the pet trade, destruction of their habitats by urban area expansion and by off-road vehicles, and increased predation by ravens are some of the factors contributing to the Desert Tortoise's decline. Several military bases there use the

desert as a practice range, and people race off-road vehicles through it, destroying the forage plants and crushing vulnerable juvenile Desert Tortoises. The population of the Desert Tortoise in the Mojave Desert has gone down 90% since 1980.

Even though a desert looks empty and lifeless, it is filled with many species of animals, like the Desert Tortoise, who need our special consideration.

2001

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Javelina

Common Names: Collared Peccary, Musk Hog, Tayaussa

Genus: Tayassu

Species: tajacu



The javelina is the only wild pig in North America. It looks exactly like a real pig except a little bigger. It is a grizzled blackish-gray color with a yellowish band which runs under the neck. The name collared peccary comes from the ruff of hair around its neck. It has small, round ears and beady eyes. Its body is barrel-shaped with short legs. Its head is pointed, ending in a disc-like nose. Javelinas have 3 toes on each hind foot. The upper tusks (1.5 inches long) are pointed down, instead of up like some other wild pigs. The javelina grows from 46 to 60 inches long, and can weigh up to 60 pounds.

Javelinas live in the canyon area of the desert. They live there because it is bushy and there are water holes everywhere. They need the bushes for the shade and they need lot's of water to live.

The javelina eats cacti, grass, bulbs, berries, flowers, mushrooms, and fruit, which is easy for them to get in their habitat.

The javelina always travel and live in groups. The female gives birth to twins about once a year. Her young travel with the group their whole life until they die. No new members are ever accepted into the group unless they are born into it.

The javelinas have a very good nose. That can have its advantages if there is a predator around. They also look for food in groups so if they're attacked they can fight back in numbers.

The javelina's niche is the water holes and bushes in the canyon area where they live. They get shade under the bushes, so they won't over heat. They can't survive long without water, so it's good to have water close by if you are a javelina.

Javelinas' status in the wild is very good right now. There lots of them around and they're not dying off or going extinct.

by Tristan A. 2000.

[More javelina pictures](#)



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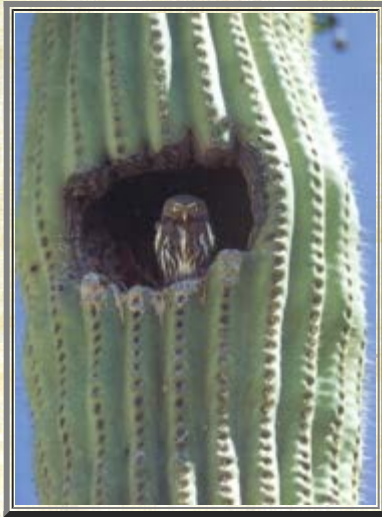
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Cactus Ferruginous Pygmy Owl

Genus: *Glaucidium*

Species: *brasilianum cactorum*



For a tiny bird, the cactus ferruginous pygmy-owl has a very long name. It is small enough to hold in your hand. It averages 6.5 inches (17 cm) in length and weighs only 2.5 ounces (62 g). Females usually weigh a few tenths of an ounce more than the males. The feathers on their back are creamy-brown, and the underside is cream-colored with reddish-brown stripes. The top of their heads are slightly streaked and on the back of the head they have two black eye spots outlined in white. Their eyes are yellow and round. Their tails are longer than most owls, and they have no tufts on their ears.

Cactus ferruginous pygmy-owls live in the desert habitat of southern Arizona in the southwestern United States, and northwestern Mexico. They live at

elevations below 4,000 feet (1,200 m). The owl prefers desert scrub thickets, trees and large cacti for nesting and roosting. In the Sonoran desert the owl often lives where ironwood, mesquite, acacia, saguaro and organ pipe cacti can be found. The vegetation provides good cover for its favorite prey of birds, lizards, insects, small rodents, frogs and earthworms. Cactus ferruginous pygmy-owls are fierce hunters and can kill a dove twice their size. The vegetation

also shields it from larger birds of prey. The pygmy-owl is diurnal and hunts during the day.

Cactus ferruginous pygmy-owls don't migrate. In late in the winter or early spring they begin nesting in the cavities of trees or cacti like the saguaro and organ pipe. These holes have often been made by woodpeckers. They lay 3 to 5 white eggs in late April, which hatch about 28 days later. The young owls are fed by both parents. They fledge, or leave the nest about 27 to 30 days after hatching. They stay close to their parents until they are ready to be on their own.

This small owl's future is in grave danger from the loss of its habitat. It used to be very common and could be found in Arizona from the New River north of Phoenix to the Mexican border. Now they can only be found between Tucson and the Mexican border, and less than 50 remain in the state. Most of the owls live in the ironwood forests northwest of Tucson and Marana. They live in the fastest growing areas of Tucson. People are moving into the desert, changing the environment to suit their needs, and destroying the forest's fragile ecosystem. Logging, woodcutting and livestock overgrazing are other threats the pygmy owls face.



A federal judge removed the pygmy owl's critical habitat status in September 2001. She stated that the U.S. Fish and Wildlife

consider the economic impact when it designated 731,000 acres critical habitat for the cactus ferruginous pygmy-owl in 1999. The U.S. Fish and Wildlife Service is expected to redesignate their critical habitat by April 2003, and it is hoped their habitat will double as a result. It is presently on the U.S. Endangered Species List. They are also in the CITES, Appendix II which allows the owls to be traded commercially only if it doesn't harm their survival.

2002

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Sonoran Desert Toad

Common Names: Sonoran Toad

Genus: Bufo

Species: alvarius



A toad is a small animal without a tail that looks a lot like a frog. It is a type of animal called an amphibian. That means that toads live in water and on land. Toads have dry, warty skin with a raised area behind the eyes. The desert toad is olive green in color with a white "wart" bumpy area near the jaw and on the back legs. The Sonoran Desert Toad is the largest toad found in the United States, and it measures 7 inches in size.

The Sonoran Desert Toad is found in the Southwest United States Desert. The toad lives in the areas of the desert

that stay wet. Sonoran Desert Toads eat insects and mice.

In the spring, the male toad "sings" to attract the female. A female toad can lay up to 8,000 eggs. The eggs are laid in water and hatch in 2-12 days and are called tadpoles. The tadpoles change or go through "metamorphosis". This change can take from 3 to 8 weeks. Once the toads have changed, they live on land. They grow to their adult size in less than 1 year. Toads can live ten years or more.

Toads can live in the desert where water is sometimes not easily available. The toad spends the dry winters buried under ground. The spring rains "wake" the toad. The toad survives on fat in its body. This is called hibernation.

Sonoran Desert Toads are not endangered.

by Amanda K. and Edey Y. 2000

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Sonoran Pronghorn Antelope

Common Names:

Genus: Antilocarta

Species: americana sonoriensis



Pronghorn Antelopes are native to America and are found nowhere else in the world. They are the last surviving member of the Antilocarpidae family. Once they were as abundant as the buffalo. But by the 1920s only about 13,000 animals remained. Due to conservation and range management there are now about 500,000 pronghorns in the United States and Canada. The Mexican population isn't doing as well and it is estimated that only 1,200 animals remain.

Part of this dwindling population consists of the Sonoran Pronghorn Antelope, a desert sub--species of the pronghorn. Only about 480 animals remain in North America and they are on the brink of extinction. They are found only in two small areas of the Sonoran Desert of southwestern Arizona and northern Mexico. In Arizona they are found in alluvial

valleys, separated by mountains and mesas. It rains in the winter and summer, but spring and autumn bring very dry, arid weather. The landscape is dry and sparsely vegetated with cactus, creosote bush, tumbleweed, and ocotillo.

Smaller than a white-tailed deer, the Sonoran pronghorns stand less than 3 feet at the shoulders. Their overall body length, including their short tail, is 48 to 57 inches. Males can weigh 90 to 130 lbs. and females 75 to 110 lbs. Females are about 10% smaller than the males. The upper part of the Sonoran pronghorn is a rich tan color. Their underpart, rump, and two bands across their neck are white. A short 2-4 inch black mane runs down the back of their neck. Males have a black mask and black cheek patches.

Their eyes are set high on their heads, and are very large in comparison to their body. They can see something moving as far as 4 miles away. The pronghorn has a unique ability to raise patches of its stiff, hollow hair to release body heat in the hot summer. In the winter months the hairs insulate them against the cold. The pronghorn also has very special horns. Both males and females have antlers. The female antlers are short. The male has large, straight pronged antlers about 12 inches long which curve back at the ends. They are made of an outer sheath of black keratin which grows around a permanent bony core. After the breeding season they lose the sheath, but the short horn underneath remains. Next year new antlers grow back over the bony horn.



Sonoran pronghorns are lightly built and have long, slender legs which allow them to run faster than any mammal in North America. They can reach speeds of 60 miles per hour for short bursts, but can run at 35 miles per hour for long distances. Both their speed and keen eyesight help them avoid predators. They are able to make the white hairs on their rump stand straight up to signal danger. This white flag can be seen from a long distance. Their one weakness is their curiosity. They will often return to see what scared them in the first place. Native Americans and early settlers used this weakness to lure them into a trap by waving a piece of cloth or branch.

Pronghorn does can breed at 16 months, and bucks are ready when they are 1 year old. The Sonoran pronghorn breeds from July to September. Their gestation period is about 245 days.

The doe gives birth to 1 and sometimes 2 fawns which weigh about 5 to 7 lbs. She will hide her fawns in separate places in dips or swales, and come back to feed them twice a day. The fawns have no smell, and lie very still, which makes it difficult for predators to find them. They are weaned at 4 to 5 months and reach their mature size at 6 months.

Pronghorns are ruminants. They have a four part stomach which lets them digest rough textured food and get more moisture from it.

The Sonoran pronghorns are listed on the U.S. Endangered Species Act, and endangered by the IUNC, or International Union for the Conservation of Nature. It is also listed as CITES Appendix I. The Convention on International Trade in Endangered Species is a United Nations treaty which regulates international trade in wild animals and plants. Poaching, habitat loss from overgrazing of cattle, and restriction of movement by fencing (pronghorns don't jump) are all threats to its survival. Fawns are vulnerable to coyotes, bobcats, and golden eagles.

2002



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Thorny Devil

Common Name: Moloch

Genus: Moloch

Species: horridus



The strangest of lizards is the Thorny Devil. This is the only species in its genus. The lizard's body has conical spines all over, including spines above each eye and a hump behind its head which is spiny. The tail is also spiny. Its spines make it easy to identify. The color changes on the Thorny Devil's body from yellow to reddish brown to black, depending on which type of soil it is crossing.

They change colors to be camouflaged and makes it easier for them to hide.

The total length they can grow is 20 cm. This lizard is a harmless reptile. When the lizard walks, the lizard's tail lifts and it walks in a shaky way. People say its a slow moving creature. The Thorny Devil is found in Western Australia, and North and South Queensland.

The Thorny Devil lays about 3 to 10 eggs underground, between September and January. The eggs hatch 3 to 4 months later. They reach maturity after 3 years. The Thorny Devil lives for about 20 years.

The Thorny Devil is one of the least aggressive reptiles. It likes to defend itself but has weird ways of doing it: 1) They have the ability to change colors to match their environment. 2) They hide in small shrubs. 3) When they're scared they put their head between front legs, which shows a fake head or knob on its neck in the place where a normal head should be. 4) If a predator tries to flip it over it puts its spine and curved tail against the ground to prevent it from falling over. 5) Its movement looks like a leaf, and it often "freezes" instinctively. 6) They have the ability to puff themselves up like a ball, which makes them look bigger.

The Thorny Devil usually eats ants, eating a very large number of ants in a single meal, about 600 to 3000 ants! They can only eat one ant at

a time with their sticky tongue, but can eat at a rate of up to 45 ants a minute.

The Thorny Devil is a prey animal, because it's a small, slow moving creature. Their worst predators are humans and Bustards (a type of bird). The Thorny devil has to be careful about the Bustards, because it can just swoop down, and at least hurt it. The Bustards is found on many continents, and is the size of a chicken.

The Thorny Devil is an endangered animal. People have been saving the Thorny Devil's nests and eggs by placing wire enclosures around the nests. By doing this they are keeping predators out and hold the babies in after hatching. This technique seems to be working.

When the Thorny Devil goes to sleep at night, it digs up the soil, and covers itself with it to stay warmer during really cold nights. The Thorny Devils dig themselves underground burrows, sometimes under scrub to provide protection from the heat.

Zach S. 2001

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Desert Climate Dry Tropical Climate (BW)

The dry desert is in Köppen's **BWh** climate category. It is a Low Latitude climate. The *B* stands for Dry Desert climates. All months have average temperatures over 64° F (18° C). The *W* stands for desert climate. Finally, the *h* stands for dry and hot, with average annual temperatures over 64° F (18° C). I guess they're trying to tell us its hot, hot out there.

The description of this awesome biome climate is quite odd, but also as it is odd, it is also very interesting.

Dry Desert climates are formed by high-pressure zones in which cold air descends. Then the descending air becomes warm but, instead of releasing rain, the heat from the ground evaporates the water before it can come down as rain. The ground is super hot because the sun's rays beat down on it directly overhead. Not a lot of atmosphere to protect it from radiant energy.

By the way, approximately 1 in. (2.5 cm) of rain falls in dry deserts per year. The average annual temperature of these miles of hot sand is 64° F (18° C).

The latitude range is 15-28° north and south of the equator. Their global range covers about 1/5 of the earth, including the world's great deserts: Sahara, Sonora, Thar, Kalahari and the Great Australian.

Plants of the Dry Desert have adapted to the lack of water by using dew for moisture and taking in water through their leaves and stems.

Justin S. 2000

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Mojave Desert Climate Dry Tropical Climate (BW)

The Mojave Desert is found at elevations of 2,000 to 5,000 feet, and is considered a "high desert". It is a transition desert between the hot Sonoran Desert to the south, and the cold Great Basin Desert to the north. The climate of the Mojave Desert has extreme fluctuations of daily temperatures, strong seasonal winds, and clear skies.

Temperatures have been as low as 8°F in January and as high as 119°F in August. In May the temperature will begin to climb in excess of 100°F and continue into October. The night temperatures in July and August can at times be in the low to mid 90s.

In late winter and early spring the wind is a prominent feature, with dry winds blowing in the afternoon and evening. Winds in excess of 25 mph, with gusts of 75 mph or more are not uncommon. Although it is windy during all months, November, December and January are the calmest.

The humidity is below 40% most of the year. During most winter nights, and during and after summer rains the humidity can get above 50%.

The Mojave Desert lies in the rainshadow of the Coast Ranges and receives an average annual precipitation of 5 inches. Most of the rain falls between November and April. There is, however, a summer thunderstorm season from July to September with violent and heavy rainstorms possible. In 1986 only 1.5 inches of rain fell on the Eastern Mojave Desert, while in 1983 6.5 inches came down. May and June are usually the driest months.

During cycles of El Niño, as we have experienced in recent years, more rain falls on the Mojave Desert than usual. The runoff has resulted in shallow ponds in the normally dry washes and playas. For the last few years there has been more rain overall than the climate of 20 years ago.

The Mojave Desert experienced very heavy rains in the 1950s, when surface runoff resulted in severe erosion of gullies and washes and heavy silt deposits. A long dry period followed, ending with the present wet period.

According to the U.S. Geological Survey, vegetation has grown

denser since the early 1970s, most likely due to the increased precipitation. They conclude that the climate of the Mojave Desert hasn't been static, and has experienced many changes this century. Their ongoing research suggests that the recent climate variation has influenced both the landscape and the plants and animals of the desert ecosystem.

2001

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- [Common Saltbush](#)
- [Creosote Bush](#)
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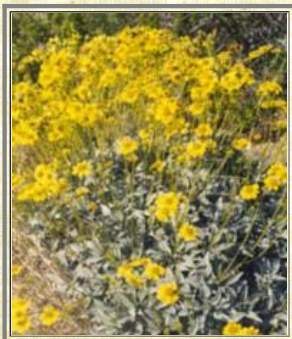
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Brittle Bush

Common Names: Incienso, White brittle bush

Genus: Encelia

Species: farinosa



The brittlebush is a common plant of the Mojave and Sonoran deserts. It is a small deciduous shrub which grows as a low, roundish mound 2 to 5 feet high. Brittle branches sprout from a woody trunk. The leaves have serrated edges, and are broader at the base than at the tip. They are about 1 to 4 inches long. The leaves are covered with a thick mat of short hairs giving a gray-green appearance. Many desert plants have this kind of hairy leaf. The hairs form a blanket over the leaves and act an insulating layer against the heat and cold. They also trap any moisture that is in the air, and reduce the amount of water lost to dry air.

The brittlebush flowers from March to June, turning the desert bright yellow. It's a member of the sunflower family and its flowers resemble the sunflower, only in miniature form. The flower is disk shaped, on long bare stems, rising several inches above the mound of white leaves, giving an impression of a layer of color over the plant. It has a solitary head with a dark yellow-orange to purplish mound of disk-corollas from which radiate 1 inch yellow rays with a lobed, squared off tip.

Brittlebush can be found growing in the coastal chaparral and interior valleys of southern California, east to the creosote bush scrub, Death Valley through the Mojave Desert and the Colorado Desert, and south to Baja California. It likes to grow in dry slopes and washes. In most of these areas, the brittlebush and creosote bush dominate the vegetation.

Brittlebush has had many uses in the past. The stems of the brittlebush secrete a clear resin which was used by Native Americans from the Southwest as a glue and also as a gum. Ground up it was used by the Seri Indians of Mexico as a toothpaste. They also would sprinkle the paste on sores or heat it and spread it on their bodies to relieve pain. The early Spanish missionaries burned it as an incense.

Mule deer and desert bighorn sheep browse on it, and kangaroo rats will eat its seeds, but aren't all that fond of it. Other than that, it isn't used for domestic livestock. Brittlebush is most useful for rehabilitating landscapes, and stabilizing disturbed areas. It is used in Arizona to minimize erosion near highways. It

can be easily transplanted and grows well from seeds. The brittlebush is very abundant and is not on the endangered species list.

2001



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Coyote

Common Names: Coyote

Genus: Canis

Species: latrans



The Coyote has a tan coat mixed with hairs of rusty brown and gray, and the ends of the hair may be black. The different colors help to hide the coyote in the underbrush, rocks, and grasses. The coyote has large, pointed ears and a bushy tail. Coyotes are known for their sharp eyesight, keen hearing and a keen sense of smell. Adult coyotes can grow to be 4 feet long (including the tail which can be 11 - 16 inches long). They can be 2 feet tall and weigh up to 30 pounds.

Coyotes once only lived in Western America, but people have forced them to find other habitats. Coyotes can be found in the United States, Canada, and Mexico. They live in all kinds of habitats including deserts, prairies and mountains. Coyotes have even been found on Cape Cod.

Coyotes eat mostly rabbits and rodents. They also hunt antelope, goats, sheep, and other animals. They will eat insects and reptiles. Dead elk and deer, as well as cattle will become the main food in the northern wintertime. Coyotes will also eat fruits and nuts. As coyotes are forced to move closer to people, they will also eat garbage.

Most coyotes live alone or in pairs. They might live together in larger groups. Coyote families guard and mark their own areas. Pups are born in the spring. A female can have from 3 - 12 pups. Both parents care for and feed the pups.

Coyote's coloring help it to hide in the desert and hunt for it's prey. Coyotes will eat almost anything available to them where ever they are; fruits, rodents, small animals, and garbage. Coyotes are clever animals and adjust to their environment.

Coyotes are not endangered. Their natural enemies include mountain lions and more recently man.

2000.

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- [Teddybear or Jumping Cholla](#)
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Barrel Cactus

Common Name(s): Barrel Cactus, Compass Cactus

Genus: Ferocactus

Species: wislizeni



When you imagine a desert, what do you think of first? Maybe it's sand, heat, or Gila monsters, but most likely it's cactus. Cacti are probably the most memorable characteristic of the desert. In all of the Speedy Gonzales cartoons, Speedy is always leading his unsuspecting predators into a cactus. And what is in the background as Wily Coyote accidentally blows himself up with Acme dynamite? Cacti of course!

American deserts is the barrel cactus. The Barrel cactus can be easily distinguished from other cacti

because of its cylinder-shaped body. The cactus usually reaches from around five to eleven feet tall, and at that height it is one of the largest cacti in the North American deserts. This cactus is really a man-sized (or bigger) cylinder with numerous parallel ridges that run down the sides. These ridges are topped with dangerously sharp 3-4 inch spines. The barrel cactus is also a flowering plant. It has rings of yellow-green or red blossoms at its top.

Like many plants of the world, this cactus has numerous uses. Native Americans who lived in the desert found the barrel cactus very useful. In the vast untamed land and scorching heat, you couldn't really hop in your air-conditioned car and cruise down to the local A&P. The Native Americans had to look hard to find food. The barrel cactus provided some very important provisions for them. They stewed the Barrel Cactus to make a cabbage-like food. They got water to drink from the pulp and they made fish hooks from the spines, which are pointed at the end. The pulp is also made into "cactus candy".

The Barrel cactus is found in the Mojave, Sonora, and the Chihuahuas deserts. These deserts are found in the land of Speedy and the Roadrunner: Baja, Arizona, California, Texas, and Central Mexico. The barrel cactus grows in the desert washes and slopes, but can also be spotted growing along canyon walls.

The barrel cactus is my favorite of all the cacti because it is very beautiful, but can really make you sore if you step too close. So keep an eye out for this cactus if you're anywhere in the vicinity of the southwest part of America. Just think, if you are ever stuck in the desert, you know what plant to boil for dinner.

Simone M. 2000.



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Banded Gila Monster

Genus: Heloderma

Species: suspectum cinetum



The Banded Gila Monster is very shy but can strike back very quickly, with painful results. It is a subspecies of the Gila Monster (*Heloderma suspectum*), and is one of two venomous types of lizard in the world.

They are pink, orange and red. Four or five black bands with spots in them run around the body. The tail is also banded. Their heads are spotted with black around their eyes and mouth. Their

patterns are really amazing because their colors send out a warning to any predators that they are venomous.

The Banded Gila Monster can get to be 2 feet long and can weigh up to 3 pounds. They have a big head, fat body, and a thick, short tail. They have short legs with average sized claws for a lizard of its size. Its skin is dry because it lives in the desert and can't afford to lose fluids. The texture is bumpy.

The gila monster hunts at day, but is hardly ever seen by people because it is so shy. The Banded Gila Monster is mainly found in the Mojave Desert. It is named for the Gila River Basin which is found in the southwestern United States

The Gila Monster mates in July and lays its eggs a few weeks later. They lay 3 to 15 eggs in a hole then cover them with sand. They hatch in 28 to 30 days. The babies are 3.5 to 4.5 inches long. They can survive on their own after they hatch. When they are 1 to 3 years old they are adult size.

We don't know much about the Banded Gila Monster, because it spends most of its life underground in burrows. It is most active in the spring time. It is active during the day and comes out in the morning, because it gets too hot in the afternoon. The Banded Gila Monster spends most of its life alone, but they do gather together during mating season.

This amazing lizard has such good hearing and vision that it can lay inside its burrow until it is safe to come out. When it is under trees or bushes it is camouflaged and when it is not, its red, pink, orange, and black colors are a warning to predators. It stores fat in its tail and its body. It can survive on its fat, or stored energy, for

about three months. It has very strong jaws and venom that can be released through its bottom teeth. The bottom teeth are large and have grooves for the venom to flow through them. The Gila Monsters venom is about as strong as a Western Diamondback Rattlesnake. When it bites you it chews as it bites and that is how the venom gets into you. You don't usually die because it only injects a small amount of venom. When it bites you its jaws are hard to get off because they are very strong. Scientists are testing the venom to see if it can be used to treat diabetes.

The Gila Monster eats bird and reptile eggs, young rodents and small reptiles, baby birds, rabbits and hares. They can eat huge amounts of food at one time and they can store fat in their tails and their bodies.

The Gila Monster is a predator. Sometimes it digs its own holes and some times it uses holes dug by other animals for their burrows. They live in heavy brush, or rocky brushy wash bed or canyon bottoms.

The Gila Monster is not endangered. It is listed in Conservation on International Trade in Endangered Species (CITES), Appendix II. CITES lists species that can become endangered. Collectors for the pet trade can only catch a certain amount of lizards and need permits to do that. The International Union for the Conservation of Nature (IUCN) lists them as vulnerable so you cant collect them or own them without a permit. Many people are making farms and destroying their habitat.

Mike D. 2001

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Sonoran Desert Climate

Dry Tropical Climate (BW)

The sunlight of the Sonoran desert changes during the day and it gets hotter. Seasonal temperatures range from an average of 52° F in the winter, to 86° F in the summer. In some seasons the temperatures can reach 32° F at night. In some portions of the desert, near the tip of Mexico, the temperature can reach a high of 134° F in the shade.

The Sonoran desert is one of the wettest deserts in North America and averages from 3 to 16 inches of rain a year. It has two rainy seasons, one in the summer and another in the winter. The summer rains are short and heavy and are often followed by a rainbow. The winter rains are longer and lighter and are more widespread.

There are a lot of sand dunes and grasses in the desert. There are also a lot of cacti, herbs, thorny and thornless shrubs. The creosote bush is the most common plant, and the saguaro cactus is the largest and the most conspicuous plant in the desert.

Many desert animals, such as bighorn sheep, pocket mouse, and pronghorn antelope (an endangered species) use cacti and other vegetation as a shelter from harsh weather and as a source of water. The bighorn sheep has adapted to the desert, because it has big feet, good for the rough terrain, and only needs to drink every few days. The pocket mouse has adapted to the desert, because it is very small, is sand colored, and can run fast from predators. It also doesn't need to drink because it gets all the water it needs from the food it eats and retains its urine.

The latitude of the Sonoran Desert ranges from 25° to 33° North, and the longitude ranges from 105° to 110° West.

The Köppen classification of this climate is **BWh**, where **B** stands for a dry climate, **BW** stands for an arid climate with annual precipitation usually less than 15 inches (40 cm.), and **h** stands for a dry and hot climate with a average annual temperature over 65° F.

Even though the Sonoran desert is one of the hottest North American deserts, it has lots of diverse vegetation and wildlife due to its two rainy seasons.

by Daniel F. 2003

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Sonoran Desert Climate

Dry Tropical Climate (BW)

The Sonoran Desert has many different climates and plants. This desert gets 120 to 300 mm of precipitation each year, mostly as rain. Daytime temperatures can reach or go over 40° C during the summer months of May through September. The rain falls during two wet seasons. One rainy season occurs from December through March and the other from July through September.

Winter rainfall is higher in the western part of the desert, and lowest in the southeast. The Upland Sonoran Desert has regular amounts of winter and summer rainfall. Although winter frosts are common there, they are not extreme. Where the Sonoran desert merges with the Mojave desert in the northwest, summer rainfall is usually scarce. The Arizona Upland has five seasons. There is the summer monsoon from early July to mid-September. Autumn exists from October to November with warm temperatures and low humidity. Winter is from December to February and has mostly sunny, mild days, with some storms with wind, rain and cool temperatures. Spring is from late February to late April. The temperatures are mild with little rain. The fore-summer drought occurs in May and June. The temperature is high and the humidity low. There is no rain in most years.

The Lower Colorado Valley region of the Sonoran desert is the hottest and driest. Annual rainfall is 50 mm or less. Summer temperatures are usually around 50° C. Sand dunes and drought tolerant shrubs with some succulents are found in this region. One of the driest areas in North America lies in the western Sonoran near the Desierto de Altar. The region gets less than 9 cm of rain per year and droughts can last for more than 2 years.

In Sonora, Mexico the desert has a wetter summer rainy season with a drier

winter. Drought deciduous plants are common in this area.

The Sonoran desert on Baja has cool moist weather in the winter. Summer isn't quite as hot as most of the Sonoran desert because of the cooling effect of the Pacific Ocean. Moisture from fog and dew allow epiphytes to grow on the desert plants. Many different types of agaves and yuccas grow in this region.

The Köppen classification for the Sonoran Desert is **BWh**. The **B** stands for a dry climate where rain evaporates before it falls on the desert floor. There is no water surplus in this type of desert, therefore no permanent streams originate from this zone. **W** stands for an arid climate. **BW**, therefore, is an arid climate with an annual precipitation usually less than 40 cm (15 in.). The **h** designates that the average annual temperature is over 18° C (64.4° F)

2002



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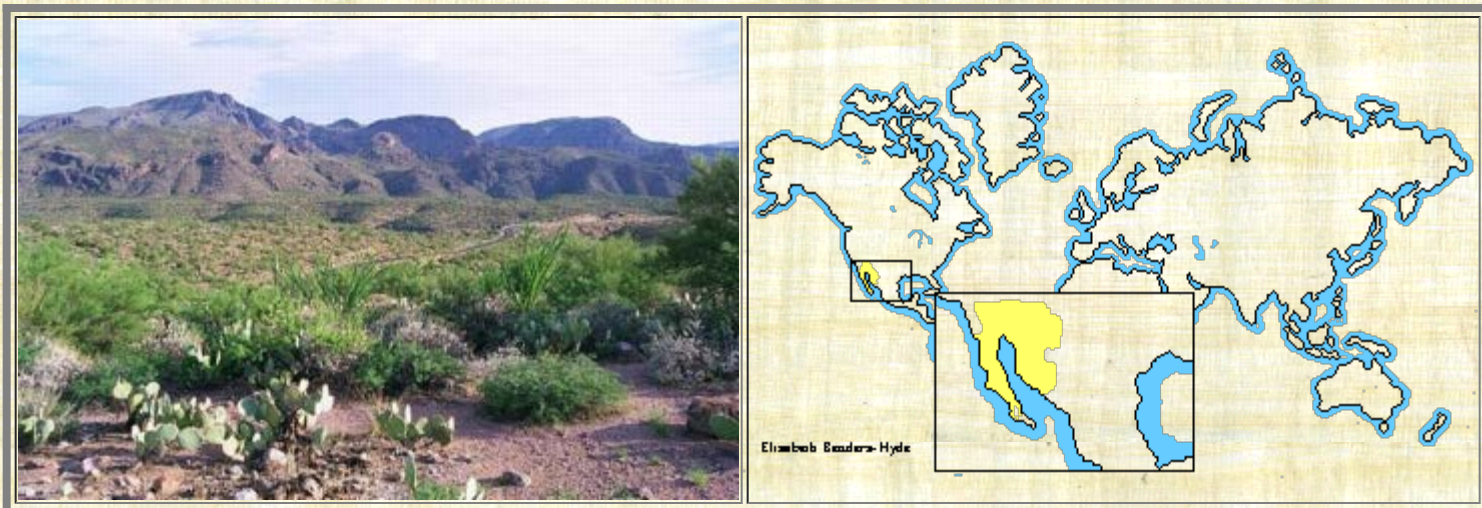
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Return to Desert

The Sonoran Desert is one of North America's most interesting deserts, with more plant and animal types than any other desert in the world. It is the wettest and the warmest desert on the North American continent. The Sonoran Desert is located in the southwestern United States and northern Mexico. In the United States it reaches from southeastern California to the western two-thirds of southern Arizona. In Mexico it includes much of the state of Sonora and the eastern shore of Baja California. It covers an area of approximately 120,000 square miles. There are some mountainous areas where frost occurs, but most of the desert is frost-free. The Colorado, Yaqui, Salt, Verde and Gila Rivers pass through this desert.

The boundaries of the Sonoran Desert are determined by the plants and animals that live in the regions. The Arizona Upland region is located in south-central Arizona and northern Sonora. It has more mountain ranges than other areas of the Sonoran Desert and is the highest and coldest region. The valleys are very narrow. Saguaro cacti are found everywhere except on the valley floors. It is the only region of the Sonoran Desert that experiences frequent hard frosts. Succulent cacti, drought resistant and thorny shrubs are common. On mountainous slopes towards the north, these plants mix with chaparral type vegetation of dense thickets and fire adapted plants

The Lower Colorado Valley is the largest, hottest and driest region of the desert, and is known for its beautiful wildflowers displays. Drought deciduous trees and

shrubs are common here. Many are very thorny to discourage browsers. Toward the south the Sonoran Desert gradually merges into the Tropical Dry Thorn Forest of southern Sonora and Sinaloa.

The Sonoran Desert on the Baja peninsula is also known as the Vizcaino desert. Off-shore islands located in the Gulf of California are also part of the Sonoran Desert. The summers aren't quite as hot as the rest of the Sonoran Desert. A high mountain range shields the desert from Pacific storms and accounts for the small amount of rain that falls in the winter. Moisture and fog from the Gulf of California can be considerable, allowing epiphytes to grow on the desert plants. Many different species of succulents like agaves and yuccas grow here.

The Sonoran Desert is known for its beauty and for the amazing cacti and succulents. Some 2,500 plant species grow in the harsh conditions of the Sonoran Desert. More than 160 plant species depend on other plants, like the nitrogen fixing [desert ironwood](#), [mesquite](#), and [palo verde](#) trees, to germinate and grow into mature plants. These trees provide plants and animals with a habitat, food and shelter necessary for their survival. Found on the Sonoran coastal plain region, the desert ironwood is the oldest desert tree. The ocotillo has adapted to the severe climate by remaining leafless during the coldest or driest months. They grow new leaves with every rainfall, only to drop them a few weeks after the rainy spell is over. During severe drought, they even drop some of their branches. The most recognizable cactus in the Sonoran Desert is the [saguaro cactus](#). The [chain fruit cholla](#) and [teddybear chollas](#), pipe organ, [barrel cactus](#), and jojoba are some other cacti found here.

Between late February and mid April beautiful carpets of annuals like poppies, lupines and owl clover cover the desert floor. These flowers depend on rainfall and this display of flowers occurs only about once in a decade. Locally a good bloom can occur every three years or so. Winters need to come earlier and be wetter than normal. Seeds of summer poppy and devil's claw germinate soon after the first rain and begin flowering only 3 weeks later. Chinchweed has adapted well to all conditions, and ranges from New Mexico into the central Mojave desert.

Herbaceous perennials and shrubs like penstemon, [brittlebush](#), and [fairy duster](#) are less sensitive to the timing of rainfall and are more dependable bloomers than the annuals. These plants grow in small patches and don't carpet the ground with color like the annuals do however. Most herbaceous plants flower opportunistically with enough rain, and sometimes more than once. The desert zinnia will flower in both rainy seasons. Ocotillo will grow and shed its leaves three weeks later after every rain.

The Sonoran Desert, like many other deserts, was considered by people in the past to be a wasteland. Now more and more people are attracted to, and moving into the Sonoran Desert. They come to enjoy the large open spaces the desert can give them, to camp and experience the desert in their all-terrain vehicles. Unfortunately, the lifestyles of people, and the needs of wild life are often conflicting. Urbanization is spreading further into the desert every year around Tucson, Arizona. Roads bisect territories, and many animals become road-kill as they attempt to cross. Many species won't cross roads and become isolated in smaller and smaller pockets. This reduces their ability to find mates and

reproduce, resulting in the extinction of that species in that particular area of the desert.

Large parts of the Sonoran Desert are still intact due to careful planning and conservation. The [Coalition for Sonoran Desert Protection](#) was responsible for getting The Ironwood Forest National Monument designated on June 9, 2000. Located northwest of Tucson this 129,000 acre area contains large stands of ironwood trees and an amazing diversity of birds and animals.

Many areas are already managed by the federal government. Organ Pipe Cactus National Monument is run by the National Park Services, Cabeza Prieta National Wildlife Refuge by the U.S. Fish and Wildlife Service, and the Barry M. Goldwater Air Force Range by the Department of Defense. All together these parks cover more than three million acres west of Tucson, Arizona. The [National Parks Conservation Association](#) proposes the establishment of a Sonoran Desert National Park and Preserve. Legislation to authorize a study of management options for the parks is pending in the US Senate.

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Tumbleweed

Common Name: Russian Thistle

Genus: Salsola

Species: collina



When westerns were big in the movies, you could always hear some lonesome cowboy sing about the tumbling tumbleweed. The tumbleweed stood for everything a cowboy was; a little ugly, lanky, and a foot loose rambler. Deserted ghost towns would have tumbleweeds rolling down main street.

Would you believe that tumbleweed actually hitched a ride from the steppes of Mongolia with a shipment of grain? That's how it got here, and it isn't a native plant at all. Very strange, but true.

Tumbleweed is also known as Russian thistle, and is a member of the Goosefoot family. It is a round, bushy, much-branched plant growing 1 to 3-1/2 feet high. The branches are slender, and soft when young, woody when mature. The leaves are alternate. The first ones start off being dark green, soft, slender, and 1 to 2-1/2 inches long. These drop off and the next set of leaves are short, stiff, spiny, and not over 1/2 inch long. The flowers are small, green-white or pink in color. Seeds are about 1/16 inch in diameter and shaped like a cone.

Tumbleweed grows on dry plains, in cultivated fields, roadsides, and waste places, mainly in grain-growing areas. It has a special way of broadcasting its seeds. It doesn't depend on the wind, or birds. It doesn't hitchhike on the fur of animals. When it becomes mature, it breaks off at the base and because it is shaped like a ball, it tumbles before the wind, scattering seeds where ever it goes. It is all over Colorado up to 8,500 feet.

2000



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**Return to
Alpine Biome**

Alpine Phacelia

Common Name(s): Silky Phacelia, Purple Fringe

Genus: Phacelia

Species: sericea



Alpine Phacelia is a tubular, bell-shaped or bowl-shaped flower. It can be blue, violet, or white in color. The anthers of the flowers stick way out past the flower, giving it a fringed look.

"Phacelia" comes from the Greek word "phakelos" which means "bundles". The flowers grow in clusters of 10 to 100 flowers around the top of a straight stem, which can grow to be 1 to 2 feet high. Several stems will grow from one long taproot.

The leaves have several narrow spreading lobes and grow around the stem. They are

covered with silky, wooly hairs. The lower leaves are large, with the upper leaves becoming smaller.

The Alpine Phacelia grows on rocky, open or wooded places in the mountains. In the United States they can be found growing at an elevation of 9 -10,000 feet east of the Cascade Range in Oregon, California, Nevada and much of Utah. They can be found on almost all mountains throughout the world.

The Alpine Phacelia blooms in mid-summer. Alpine Phacelias belongs to the Waterleaf family. These flowers are used for bordering peoples gardens.

by Sarah B. 2000

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Bear Grass

Common Names: Indian Basket Grass, Soap Grass, Squaw Grass

Genus: Xerophyllum

Species: tenax

Parts Used: roots and leaves are used in weaving



Bear Grass looks like a grass, but really belongs to the lily family. It is about 4.5 feet tall. Its olive-colored, grass-like leaves grow from the base of the plant and are tough and wiry. The outside leaves clasp around the stem. The leaves have toothed margins, and grow about 35 inches long, getting shorter as they near the flowers, looking very much like a fan.

The flowers of bear grass grow on a stalk that can be 6 feet tall with many small flowers. Each flower is creamy white, and saucer shaped, and has a sweet

aroma. The lowest flowers bloom first, creating a tight knot of buds at the top. The entire flower looks a little like fluffy, upside down ice cream cone. Bear grass tends to flower in 5 to 7 year cycles. After the fruit sets, the plant dies. It reproduces by seed, and by sending out offshoots from its rhizomes.

Bear grass is found in open forests and meadows at sub alpine and low alpine elevations in the western United States. It is commonly found under alpine larch (*Larix lyallii*) and whitebark pine (*Pinus albicaulis*) stands on cold, rocky sites at upper timberlines.

Bear grass is a fire-resistant species that is the first plant to grow after a fire. Beargrass, and many other native plants, need periodic burns to produce strong, new growth. After a fire beargrass sprouts from its rhizomes which lie just under the surface. Light fires of short duration are best. Intense fires which linger in the same place for a long time will kill the rhizomes under the ground, and prevent the beargrass from growing back.

Native Americans in Oregon, Washington state, and British Columbia

have traditionally made beautiful baskets with the stems and roots of beargrass. When the leaves are dried in the sun in preparation for making baskets, they turn a creamy white. Combined with other materials of different colors, beautiful designs were woven into the baskets. Hats and other practical objects were also made of beargrass. A wonderful site to find out more about Native American basket weaving is: <http://www.kstrom.net/isk/art/basket/baskmenu.html>

2002



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Bristlecone Pine

Genus: Pinus

Species: longaeva



If you could imagine a living tree as old as the pyramids of Egypt, what do you think it would look like? It would look like a bristlecone pine, *Pinus longaeva*, the oldest known tree species in the world.

The bristlecone pine only lives in scattered, arid mountain regions of six western states of America, but the oldest are found in the Ancient Bristlecone Pine Forest in the White Mountains of California. There the pines exist in an exposed, windswept, harsh environment, free of

competition from other plants and the ravages of insects and disease. The oldest bristlecones usually grow at elevations of 10,000 to 11,000 feet.

The oldest known tree is "Methuselah", which is 4,789 years old. To keep Methuselah from harm, this tree isn't labeled, as the other trees are. An older tree called Prometheus was killed shortly after it was discovered in 1964. This happened when a geologist searching for evidence of Ice Age glaciers was taking some core samples from several bristlecones. Just as he realized he had found a tree over 4,000 years old, his coring tool broke. Amazingly the U.S. Forest Service gave him permission to cut down the tree. Prometheus turned out to be 4,950 years old. It was a 300 year old tree when the pyramids were being built in Egypt. After people heard about this incident, the U.S. Forest Service tightened security around the bristlecones.

The bristlecone pine is a multi-trunked tree, gnarled and twisted by the elements. Much of the pine is dead wood. Wind whipped sand and ice scour the dead wood smooth and beautiful. As a survival strategy much of the bark and tissue that conduct water

dies back after the tree is damaged by fire, drought or storms. This reduces the nutrients the tree has to supply to tissue and balances the result of the damage. The remaining parts are very healthy. A 10 inch strip of bark can sustain a large crown. This bark is red-brown in color and grooved with thick, irregular ridges.

The crown of the bristlecone pine is rounded. The branches and needles look somewhat like a bottle brush because of the closely spaced needle whorls. The needles are deep yellow-green, with blunt ends. They come in bundles of 5, and are 1 to 1.5 inches in length. Because the needles can live twenty to thirty years, the tree doesn't need to expend much energy on adding new needles. This helps the tree survive through years of stress.



The male flowers, or catkins are red-purple in color. The female cones are ovoid, or egg-shaped, and dark purple to brown when mature. Each cone is 2.5 to 3.75 inches long and take 2 years to mature. The tree is named for the long, hooked spine on the scales of the cones. Even cones from the oldest trees are able to produce a seed that will grow.

These ancient trees don't grow very tall, the tallest being 60 feet (18.3m), but usually less than that. The girth of the largest tree, the Patriarch, is 36 feet 8 inches (11.2m), but this tree is comparatively young at only 1,500 years. The average age is 1,000 years, with only some trees over 4,000 years. The trees put more energy into surviving than growing big. A bristlecone trunk may grow less than 0.01 of an inch in girth per year.

The wood of the bristle cone is very dense, and trees can remain standing for thousands of years for hundreds of years after dying. They will finally fall over when the roots decay or are worn away by erosion. The Forest Service has very strict rules concerning taking any of the dead wood from the parks.

Bristlecone pines can survive on the dolomite and alkaline layers of its habitat. Few competitive species can survive in this type of soil. Bristlecone pines grow with a lot of space between each tree. They benefit from being off by themselves because few other plant species can survive in their harsh environment. Fires caused by lightning strikes don't spread far because the spacing of the trees and the lack of ground cover halts the spread flames.

Bristlecone pines are fairly common in the regions where they grow. Only a few bristlecones in isolated, harsh environments

have been able to grow to incredibly old ages. These old trees are now protected by law and guarded carefully by the US Forest Service.

2001

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Moss Champion

Genus: Silene

Species: acaulis

Parts Used: none



Moss Champion is part of the pinks family. It is well adapted to growing in the lower, and sometimes higher Alpine regions. Moss Champion only grows about 5-15 cm tall, hugging the ground for warmth. Its leaves are very small, not exposing too much of the plant to wind and freezing temperatures found in the Alpine biomes. Its mounded cushion shape protects it from the cold, drying winds.

It looks like a soft, green cushion, sprinkled with small pink flowers. It grows in the sandy, rocky soil of the

Rocky Mountains in the United States and can also be found growing in the Alps of Switzerland.

2000

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Polylepis Forest

Genus: *Polylepis*

Species: *spp.*



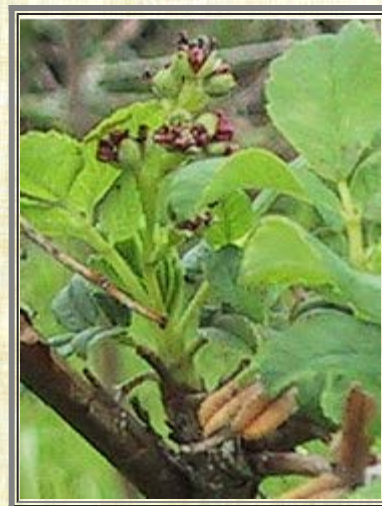
The *Polylepis* forest is located in the [Andes Mountains](#). *Polylepis* forests occur at altitudes of up to 4,500 meters in sheltered areas. Most of the original forest is in the cold Western Cordillera of Bolivia. There is only ten percent left of the original forest.

There are over 15 million trees in just the Andean zone. The exotic plants have grown close to the *Polylepis* forest causing shading

of the native trees. In the *Polylepis* forest there are 20 evergreen tree species that are characterized by gnarled shapes. The trees have a thick and dense laminated bark with small green and gray leaves. Loss of high mountain forests is considered the major cause of water scarcity in many parts of the Andes. A lot of forest birds live in the *Polylepis* forest. The *Polylepis* forest is a very bright colored forest.

Polylepis is a group of tree species belonging to the rose family. Fifteen species of the *Polylepis* genus grow in South America, from northern Venezuela to northern Chile and Argentina. The highest number of species grow in Ecuador, Peru and Bolivia.

The forest has to adapt to the unstable water supply. Birds had to adapt to the small range sizes. The Peruvian *Polylepis* forests



contain three of South America's endangered birds. Great colored parrots and toucans live in the forests, as does the Royal Cinclodes. The forests are vegetated with little-leaved plants. *Polylepis* trees are evergreens, so they begin photosynthesis as soon as the weather gets warmer. The small leaves prevent water loss (cold, dry conditions). The thick, red peeling bark on the trees protects them from animals and fire damage.

The Andean people use the *Polylepis* forest for many reasons. Fifty-six percent of the forest is used for medicines. Twelve percent is used for human food. And nine percent is used for construction and ritual purposes. Over all about thirty-five percent of the most useful plant species are only found inside the forest. The animals, like the birds use the forest for food.



The Tropical *Polylepis* woodlands are highly endangered. The forests began disappearing during the time of the Incas, when much of its wood was used for building material and firewood. After the conquistadors brought their sheep and cattle, more forests were lost to grazing. Today native peoples still use the wood for building and heat. Loss of the forests have caused landslides threatening villages and roads. Only 10% of Bolivia's original Western Cordillera

Polylepis forests remain. Only 1% of the forest survives in the Eastern Cordillera where eight out of nine of Bolivia's *Polylepis* species grow. Loss of the habitat is rapidly destroying one of Ecuador's most precious treasures: the natural diversity. There is a project going on to help the *Polylepis* forest. The project involves buying 400 acres of native Andean forest. By purchasing this land, they can replant it with *Polylepis* trees and stop water erosion.

by Amanda B. 2002

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Pygmy Bitterroot

Common Names: Alpine Bitterroot, Pursh

Genus: Lewisia

Species: pygmaea

Parts Used: sold in nurseries as a rock garden plant.



Pygmy Bitterroot is a low growing perennial with long, skinny, fat leaves that are about 4 inches long. They look sort of like the leaves of an Allium, or Ornamental Onion. The flower is small and is actually white with dark pink veins running through the petals. This makes it look pink. Its throat is green, and holds a cluster of yellow stamen on green anthers. It grows to be 4 - 6 inches tall and spreads about 8 inches wide.

They bloom in mid-summer then die down after flowering and start growing again in the autumn. They belong to the Portulacaceae family.

Pygmy Bitterroot is only found in the mountains of western North America. They like open, often gravelly, moist to dryish areas in mountains above the tree line.

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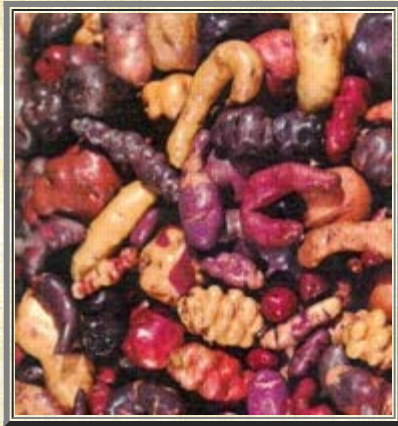
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Wild Potato

Genus: Solanum

Species: spp.



The wild potato is a relative of the cultivated potato, and is found in the alpine biome of the Andes Mountains. In Latin, the word alps means high mountains and the word alpine comes from the word alps. The weather conditions in the alpine biome are severe. Plants have to survive in extreme temperatures, heavy snowfall and strong winds. You can find the potato in places in the Andes where the the temperature ranges from 60 to 70 °F during the day, and frost at night. Most of the wild potato plants are hard to find, and grow in few places. Wild potatoes are found in thickets and waste areas.

Wild potatoes are found in 16 countries. Bolivia, Peru, Argentina, and Mexico are where 90% of the wild potatoes are found. There are about 199 species of wild potato. In the northern Andes, farmers grow potatoes in the lower Paramos. The Paramos are at 3000 and 4000 meters above sea level. The central Andes have a climate that is semi-arid. Potatoes are grown on the Puña or Altiplano which are high altitude plains. The southern Andes has a dry Mediterranean like climate, where farmers can grow potatoes easily.

The part of the potato we eat are called tubers. These tubers grow underground on their roots. The potato is also called the white potato, to tell it apart from the sweet potato. The wild potato was first cultivated by Indians near Lake Titicaca, who grew the earliest potatoes approximately 8,000 years ago. Wild potato tubers have been found in the mountains and plateaus of Peru where the climate was too cold for wheat or corn. The tubers were easy to store and transport. Frost resistant varieties were developed by the the Mochia, Chimu, and Inca. They even found ways to freeze-dry the potatoes. The potato was worshiped by the Inca people.

They prayed to potato gods to ensure the success of their potato crop because it was the only crop they could grow at the high altitude of the Andes. The name potato comes from the Indian name papa.

The wild potato plant is a member of the Nightshade family (Solanaceae). Wild and cultivated potatoes have very thin skin. Potatoes can have four different colored skins, reddish-brown, brown, white or pink. Wild and cultivated potatoes have tapering roots that grow year after year. These roots grow from two to eight feet in length. Potatoes can have as few as three tubers and as many as twenty on their roots, it depends on the kind of potato. The weather and soil conditions effect how the plants grow and how many tubers they will have. Potatoes from the Andes are oval shaped, or long and thin, and they can also be round. Potatoes have bell shaped flowers that are white, purple or pink, that grow on vines. The leaves are dark green, heart shaped and coarse with small hairs covering them. The potato plant that grows above ground can grow to four feet tall, with vines that can grow up to fifteen feet. Potato plants have small green tomato like seed balls that hold about three hundred yellowish seeds. The wild potato came to Europe after Pizarro defeated Peru and sent the wild potato culture back to Spain in ships.

Ancient Incan farmers grew potatoes at different altitudes. This gave them many varieties that adapted to the high altitudes. The harsh conditions of the alpine biome force the potato plants to grow close to the ground. Short hairs on the leaves collect water from the clouds, which is an important source of water in the arid climate of the Andes. They also insulate the leaves against sudden frosts. The tubers are used to store water, sugars and starches below the frost line.



The potato is still grown throughout the world. The wild potato is most useful as breeding stock to help create new disease resistant adaptations. Some of the diseases are bacterial or fungus such as rhizoctonia, late blight, scab, and ring rot. There are also virus conditions such as mosaic, spindle tuber, and leaf roll.

The potato is used for food, and is a popular plant because it can be grown in many countries, therefore large populations can depend on it for food. The potato is very healthy because it is high in nutrition, and is made up of mostly water. Starch, protein, vitamins, and minerals make up the rest of the potato. Potatoes are also grown world wide for use in the fast food industry.

The wild potato is an endangered species and most species are rare. There are about 93 different species in Peru and 39 in Bolivia. Scientists are trying to register many of the original strain of wild potatoes that remain before they are cross-cultivated with other varieties and disappear. Some things that harm the potato are insect pests, diseases, or late blight. These can be controlled by insecticides or fungicides.

by Madeline C. 2002

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Alpaca

Genus: Llama

Species: pacos



The alpaca is a type of llama that lives in the [Andes Mountains](#) of South America. The alpaca is part of the camelidae family and is closely related to the well-known [llama](#). The llama is a much larger animal, standing up to 4 feet at the shoulder and weighing 340 pounds. Both are semi-wild domesticated animals related to the wild guanaco. Some think the alpaca may be a cross between a llama and [vicuña](#).

Alpacas have small heads, a cleft upper lip, and big pointed ears. Their bodies are slender with long necks. They have long legs and short tails. The alpaca has 22

different shades of color for its coat, like black, gray, white, brown to name a few. They weigh 120-140 pounds on average. The alpaca is 3-3.5 feet tall at the shoulders, and measures between 4-7 feet in body length.

Of all the attributes of the alpaca, its history is the most interesting part of this animal. The oldest known recording of these charming creatures was 1,000 years before the great pyramids of Giza. The Inca nobles demonstrated their wealth by the number of alpaca's they owned, as well as showing off the beautiful fur garments. The trade in the fur of the alpaca, 2,000 years after the great pyramids, created a thriving Peruvian economy. So it continued for thousands of years with these magical animals creating wealth and prosperity for their Inca owners, until the 17th century when the Spanish Conquistadors conquered the Inca Empire.

The Incas sought refuge from the Spanish, and took a limited

number of these precious animals to the heights of the Andes. If this had not happened, there may not be very many alpacas left today.

These animals are easily domesticated. Others describe their personalities as being warm, friendly and gentle. The special charm of this mysterious breed has been a well kept secret except for the limited people who have the privilege to keep such a prize.

The reproductive periods for the alpaca are from 4-16 years. In the Andes the mating period is in August and September. The alpaca has crias [babies] about every 11 months, which weigh 15-20 pounds at birth. They live 15-25 years, with a few living up to 30 years. The alpaca live in herds. Alpacas live at elevations of 14,000 to 16,000 feet and on ranches throughout the world.

The alpaca has very thick fur to survive the cold climate of the Andes. Its long neck helps spot predators among the rocks of the mountain slopes.

The alpaca is a herbivore, which means that it eats plants. The alpaca grazes on grass and eats weeds, shrubs and trees. It has special stomach secretions that help it absorb 50% more nutrients than a sheep, allowing it to survive where there is only poor quality grass. The alpaca is prey to pumas, leopards, and other carnivores in the wild.

The alpaca were almost extinct following the invasion of the Spanish conquistadors in regions of South America. They are now plentiful in the wild at about 3.5 million strong. These animals have been domesticated for over 5,000 year.

Anthony C.2001.

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Andean Condor

Genus: Vultur

Species: gryphus



I have never liked vultures. Not too many people do. After reading about them, however, I have changed my mind.

Condors mate for life, they both take care of their chick, they don't kill animals, only eat their remains, and they look the way they do for very specialized reasons.

The condor is the largest vulture in South America. It has a wing span of up to 10 feet and more. Male condors can weigh 24 to 33 pounds, and females from 18 to 24

pounds. It has mostly black feathers, with white flight feathers on its wing. Head feathers would get dirty when they ate, so their heads and necks are naked like most vultures. The skin on the head and throat hang in loose folds, and is reddish-black, with a fleshy wattle over the beak, called a caruncle. Condors can soar to altitudes of 18,000 feet, and to keep their heads warm at that height they tuck them into a downy, white neck ruff.

Condors can live up to 50 years, and mate for life. The female will lay her egg on a cliff ledge. Because there aren't any trees or other materials to build a nest with where they live they lay their egg on bare rock. Both parents take turns incubating the egg. They have one chick every other year. Their young take a lot of time and effort to raised. They can't fly until they are 6 months old and then rely on their parents for two more years.

Andean condors roost on the face of a cliff, and use the thermal updraft of warm morning air to lift off. They spend most of the day soaring on the updrafts created by the mountains and valleys. They cover a large area while foraging. Andean condors can be found over the coasts of Peru and Chile, and the Patagonian steppe of Argentina. They can spot a carcass from several miles off. Usually they follow smaller scavenger birds to

find a carcass. This helps both scavengers, because only the condor can tear through the tough hides of some carcasses. The older condors get to eat first, and then the younger ones take turns in order of age. Condors feed mostly on the remains of mammals such as sheep, [llama](#), [vicuña](#), cattle, seals and the eggs of seabirds. Sometimes they will take newborn animals.

The Andean condor has a long life, but breeds very slowly. It takes them 6 to 8 years before they become mature. Any interference from humans quickly disturbs their pattern of breeding. Hunters kill the condor for sport, and farmers kill them because they think condors kill their animals. Because they mate for life, the death of a mate is very hard on the other partner and their chick. Condors have also died recently from pesticides that have been carried through the food chains. The number of Andean condors has gone down rapidly in recent years, but they still aren't on the official endangered list. Rescue attempts have been made through breeding captive condors and habitat research. These efforts have been moderately successful.

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Chinchilla

Genus: Chinchilla

Species: brevicaudasa



In the wild, chinchillas can be found in the Andes alpine regions, but because they are an endangered species, they are not easily found. The chinchilla has a silvery gray pelt, with black tipped hair which is very soft. There are usually 60 hairs growing from every follicle. Adult males weigh about 500 grams. The females are much larger, averaging between 600 and 800 grams. Chinchilla's have big round ears, and eyes. They have narrow hind feet that have four digits with stiff bristles around the weaker

claws. Their tails have long gray and black hairs on the dorsal or back surface. The chinchilla stands about an inch from the ground when on its four feet, and it is about half the size of a rabbit.

Chinchilla's usually live in clans of about 100 individuals. There are no dominant males or females that lead the group. The gestation period is long for a small animal, up to 111 days, but the female can still produce up to two litters each summer. The female gives birth to two to three offspring in each litter, each one weighing close to 35 grams. Lactation lasts six to eight weeks. Both males and females can become fertile at eight months of age. The lifespan of the chinchilla is about ten years in the wild.

Chinchillas are nocturnal. The colder the weather is at high altitudes, the denser the chinchilla's fur. The chinchilla's ability to jump, cling, and climb over rocks, protects it from predators and helps it to survive in the wild.

Chinchillas are herbivores. Their diet in the wild consists of plants, roots, and grasses. The chinchilla's chief predator is man.

Since chinchilla fur makes soft and beautiful coats, millions of chinchillas were killed for their pelts until they became nearly extinct in the 1940's. To make one chinchilla coat you need 120 to 150 pelts. They are now on the endangered species list, and are protected by law.

Chinchillas help the environment by distributing seeds by misplacing them. People have tried to breed chinchillas in captivity, but reintroduction into the wild has not been successful.

by Stephen G. 2001



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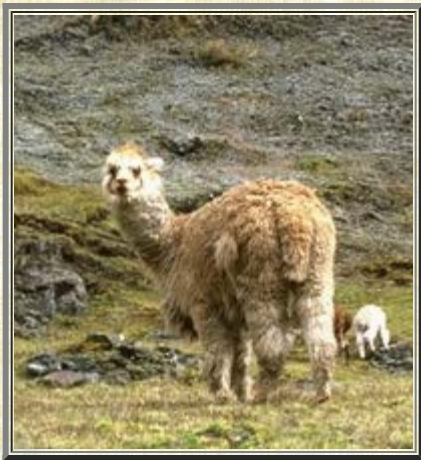
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Llama

Genus: Llama

Species: glama



Most llamas today live in the high [Andes Mountains](#) of western South America. They can be found in Argentina, Bolivia, Chili, and especially Peru. It is believed that llamas may be the domesticated descendants of the wild guanaco. They live in grassy open spaces at very high altitudes of 7,400 - 12,800 feet, where the air is so thin there is only 40% oxygen. The Alpine plains are dry and cold and the soil is not very good. The grass is difficult for most animals to digest, but the llamas are able to adapt to these harsh conditions.

Llamas are part of the camel family. They are approximately 36-47 inches wide at the shoulder and measured from the head they are 4 feet tall at the shoulders. They can weigh up to 400 pounds when they are full-grown. They have 2 toes per foot and the bottoms of their feet are padded with tough leathery soles to protect them from sharp rocks. Their feet are slender and their limbs are long. They have an unusual way of moving; they pace, which means that both legs on the same side raise together so they can run very quickly. They have long, thick, coarse hair with spots of color that can protect them from being attacked by prey. They can be different shades of brown, black, peach, white, gray and roan. They are very intelligent and learn quickly.

Unlike other hoofed animals, camels and llamas have feet with 2 toes. The bottom part of the foot is divided in 2 and is covered by a tough leathery sole. Llamas are especially sure-footed. Because of these pads, they have a good foothold on rocky and slippery ground.

Llamas have unique blood that adapts well to the poor oxygen in the high altitudes where they live. Llamas have more red blood cells per

unit volume of blood than any other mammal. The hemoglobin, which is the oxygen carrying substance of the cell, reacts faster with oxygen.

Also, llamas are able to travel long distances without water. They have 3 stomach compartments and they chew their cud. Cud is a mouthful of swallowed food that is regurgitated from the first stomach. Because of these special features the llama makes an excellent packing animal for the people that live in the remote areas of the Andes Mountains.

A female llama begins to breed when she's about a 1 year old. She's able to have 1 baby, or cria, a year until she's about 15 years old. Llamas can be bred at any time of the year. They don't have a heat cycle; they are what are called induced ovulators. This means ovulation happens 24-36 hours after breeding. She almost always gives birth to 1 baby at a time. A baby llama weighs 18 to 33 pounds when it's born. It's able to stand up on it's own one hour after it's born. The mother nurses the baby llama for 6 months. Male llamas are not used for breeding until they are about 2-3 years old.

Llamas were first domesticated by the Incas around 4,000 BC near Lake Titicaca. Their breeding was controlled by the government. The llamas were used in many ways. Male llamas were used as sacrifices. The wool from the llama was used to make coarse woolen blankets for the common people, and their meat was eaten. They were also used as beasts of burden. Llama caravans went to distant provinces to trade. They were so important to the prosperity of the Incas that llama herders were paid very well. After the Spanish conquistadors came in the 1500's, diseases killed many people as well as llamas. But the llamas were still valuable beasts of burden for several centuries and were called the "ships of the Andes".

Llamas are social animals and mainly live in herds in captivity. Most people who have llamas almost always keep the male and female in separate enclosures. This keeps the llamas from fighting and controls breeding. Young male llamas join the male herd at about a year old. In a group of male llamas, they fight each other to determine which one will be the leader of the herd. Most of the time the strongest and largest male llama will lead. The group is called a herd. The average life span of a llama is 15-20 years.

Llamas eat mainly grass, shrubs, and lichens. Lichens are moss-like plants that grow on rocks and wood. Llamas are herbivores, which means they are plant eaters. They chew their food just a little and swallow it, then bring up a wad of cud. They then finish chewing it and swallow it again and finally, digest it. Cud is partly digested food. Llamas eat mainly hay, grass, and grain when in captivity. For treats, llamas like cut-up apples, carrots, broccoli, and orange peels. Because the llamas have 3 stomach compartments, the food must pass through all the stomachs during digestion.

Enemies of the llamas are mountain lions, snow leopards, cougars, and also humans. Humans used to hunt them for their wool and meat. Most

llamas now are kept in captivity, so they are protected from most predators. If they are attacked, the male llamas sound off a warning so that the rest of the herd can run away. Since llamas are herbivores, they don't prey on other animals.

There are many llamas in the world today. They are not an endangered species. They used to be hunted for their wool but there are now laws to protect them. Llamas are not found in the wild anymore. They are in family herds and they live in captivity.

by Lauren T. 2002

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Mountain Goat -

Genus: Oreamnos

Species: americanus



Mountain Goats can be found in the mountains of northwestern regions of North America, where they seem to cling and move around on the impossibly steep slopes.

Mountain Goats have two beige colored horns that curl back and reach a length of about twelve inches. Mountain Goats weigh about 100 to 200 pounds. They are 4.5 feet long and their shoulder height is about 36 to 48 inches. The females are smaller than the males by almost 30%. They have very round

bodies which protect them from the cold.

Their legs are about 20 inches long. Their hooves are adapted to the rugged slopes by being flexible, like rubber, so they can jump from rock to rock. Their coloring is white and their fur is very fluffy and every strand of hair is about 2 inches long. The Mountain Goat has eight teeth in front so it can easily grab big patches of grass.

The Mountain Goat breeds yearly between November and January. Gestation periods last at least 150 to 180 days and the babies are usually born in the spring. This is a beneficial time for the goat's babies, or kids, to be born because it is easier to survive in the warmer weather. Also, there is more food in the summer which the mother can make milk from. When she is ready to give birth, the mother hides in the cliffs in her home territory so that she is safe from predators. The kids are very independent a couple weeks of after birth. The babies stop getting milk from their mother after 3 to 4 months and they stay with her until she reproduces again. Both sexes reach sexual maturity after 30 months.

The Mountain Goat changes its social groupings seasonally. They

live in big groups in the winter, and smaller groups, or alone in the summer. The male goats are dominant during breeding season. However during the non-breeding season, the adult females are dominant. Mountain Goat hierarchies are determined early by the kids' playing behavior. The stronger more dominant kids become the leaders of their group. The Mountain Goats' habitat also changes from season to season. They migrate between lowland winter areas, and high elevation summer ranges.

Some adaptations that help a Mountain Goat to survive are its horns, jumping ability, its hooves, and its teeth. Their horns help to defend them from predators. Mountain Goats have a lot of strength in their hind legs that allow them to jump great distances. Their hooves have a slit in the middle to make them more flexible. They have eight teeth on the top and bottom for an easier way to grab big patches of grass. Mountain Goats' diet is basically grass, woody plants, and moss. They get most of their water from their food.

Mountain Goats are prey to coyotes, mountain lions, and bobcats, so they have to be careful where they go. Mountain Goats help the environment by their droppings which add nutrients to the quality of the soil.

Mountain Goats are very close to being on the endangered species list. Biologists are trying to stop hunters from killing these herds.

by Stephen G. 2001

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Snow Leopard

Genus: Panthera

Species: uncia



The snow leopard is part of the cat family. It lives in the Himalayan alpine regions of central Asia. The snow leopard looks like a tiger. It has a gray coat with dark gray ringed spots. The snow leopard's coat is the thickest of any cat. It makes it look larger than it really is. The true length of an average snow leopard is 3-4 feet. Its shoulders are 24 inches off the ground. The thick tail of the snow leopard is 2.5 to 3 feet. When it is resting, it wraps its tail around itself like a blanket. Because of the size of the tail, it helps the snow leopard

balance when they are walking in the rugged terrain of the Himalayan mountains. The snow leopard is a strong animal, and can take down its prey with one swift pounce. The back legs are so powerful they allow it to pounce up to 20 feet.

The male snow leopard marks its territory of 4 to 40 square miles with several females inside. The snow leopard is a solitary animal. It mates from January to April. They have 2-3 young in a litter. During birth, the male brings food to the female. After birth, the male leaves the female. The babies are born blind and deaf and they cannot walk. At about three months, they follow their mother on a hunting trip. About two years later they leave their mother. They stay together for a short time and then they go their separate ways. They have babies every two years. The average snow leopard lives up to 20 years.

The snow leopard's coat allows it to blend in with the rocks. The thick fur on the soles of its feet insulate the paws against the snow in the winter. The enlarged nasal cavities help it to breathe in high altitudes.

The snow leopard eats wild sheep, wild boars, gazelles, hares, markhor, bobak, tahr, marmots, mice and deer. The snow leopard is a carnivore, which means that it eats meat. The snow leopard can eat an animal three times the size of itself. The male eats the prey it kills; if he sees his family, he will back off and leave as they eat. The snow leopard will drag the carcass of a large animal to its marked territory and eat it over several days.

The snow leopard is a predator. The snow leopard limits the population of animals so they are not over populated.

The snow leopard is endangered. There are only 4,000 to 7,000 left in the world. Hunting and the decline of its prey threaten the snow leopard's existence. There are 47 parks all over the world, which serve to protect them.

by Anthony C. 2001

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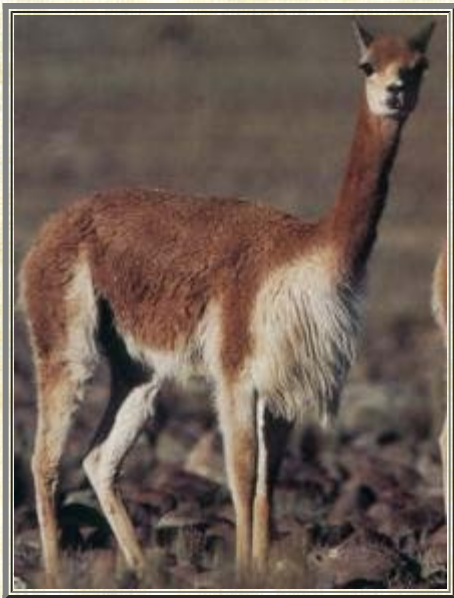
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Vicuña

Genus: Vicugna

Species: vicugna



The vicuña is a member of the camel family. It is the smallest of the six species of camel, and is thought to be the wild ancestor of the alpaca. It lives on the high, grassland plateaus of the Andes mountains which range from southern Peru to northern Chile and into parts of Bolivia and Argentina. Only tough bunch grasses and festuca grows here. The sun's ultraviolet rays burn through the thin atmosphere during the day. At night the heat of the day escapes into the atmosphere and the temperatures go down to freezing.

Although they look fragile, the vicuña is specially adapted to its high-altitude habitat. It has an incredibly thick, soft coat that traps layers of warm air close to its body and protects it from freezing

temperatures. The lower teeth of the vicuña grow constantly, like a rodent's, so they can eat the tough grasses. The vicuña also walks on the soles of its feet so it can flex its toes and grab on to the rocks and gravel-covered slopes. Vicuña milk is very rich so the babies grow quickly.

Vicuñas weigh between 75-140 pounds. They are about 4-6 feet long

and stand 2-3 1/2 feet at the shoulders. They have very long necks, round heads, and large, forward facing eyes. Their ears are long and pointed and stand up on their heads. Their fur is a rust color, with white around the muzzle, the chest, belly, and the insides of the legs. The white hair on their chests is longer than their other hair.

Vicuñas graze mostly on grasses. Their teeth are large and grow constantly like those of a rodent. They chew their cud when resting getting more nutrients out of the nutrient poor grass.

Vicuñas are very shy animals and run away very quickly. They have two territories that they defend from other herds; a feeding territory or about 45 acres, and a smaller sleeping area on higher ground where they are more protected. The vicuña live in herds of 5-10 members, which includes one dominant male and several females and their young. They mate in March and April and their young are born 11 months later. The young stay with their mother and the herd for another 10 months, when they are driven off by the herd. Young males will form bachelor groups and the young females try to find another group to join. This ensures that the herd stays the same size, which is important with their limited food supply.

The vicuña was almost hunted to extinction for its beautiful soft wool. The Incas used to round up the wild vicuñas and pen them in stone corrals, where they were sheared for their wool. In modern times they were almost wiped out for their meat and wool. By 1960 there were only 6,000 vicuñas left in the wild. Chile and Peru established protected national parks and put a halt to trade in vicuña wool. Now there are about 125,000 vicuñas, but they are still listed as threatened. The vicuña is classified as vulnerable by the IUCN, and as endangered by the USDI.

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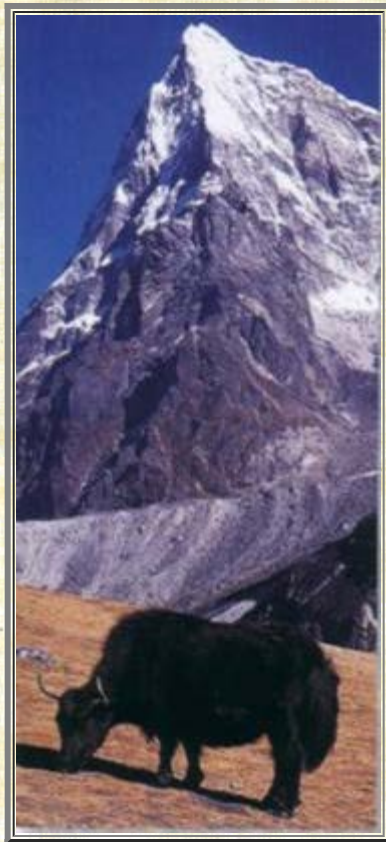
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Wild Yak

Genus: Bos

Species: grunniens



Most domestic yaks of Tibet, and central Asia have black-brown, dense, woolly, and extremely shaggy coats. The wild yak of the Tibetan Plateau has a black-brown coat with patches of white. They have horns that grow up to 20 inches long in females, and 40 inches in males. The curved horns grow out from the sides of their heads and curve upwards. They use their horns to dig under the snow for food. Their bodies can grow up to 11 feet in length, their tails can grow up to 24 inches and are very bushy. The males' weight is usually 670-1,210 pounds. The females weigh about a third as much.

Yaks are wild undomesticated ox who live in Tibet and central Asia. The wild yak has adapted to living in harsh and barren areas of the Himalayan alpine region. They are one of the few animals that live at these high altitudes. Their coats have long outer hair and dense underfur to keep in their body heat. Even their digestive tract helps keep them warm. Food in the rumen ferments at 104°F, acting like an internal furnace. Their hooves are formed from two enlarged toes and spread the yak's weight in deep snow and gives them a good grip on bare and rocky slopes.

They inhabit areas where there are lots of

lichens, grasses, and tubers. The yak's stomach can't digest grains, so herdsman have to keep moving their domestic herds to fresh pastures.

Most of the year yak travel in single sex herds. A herd can consist of 20 to 200 animals. In the fall a bull will join a herd of females and stay with them through their breeding season. The cow will be pregnant for about eight months and give birth to one calf every other year. Their babies are born around June. Female calves stay with the herd, but the bulls move away after three years to join a bachelor herd. Their average life span is about 23 years.

They spend their summers on the high plateaus above the snow line to get away from the heat. Wild yak can easily live in temperatures of -40° F because of their dense coats, but will move to the lower plains before the freezing winter weather arrives.

Yaks help to prevent grasslands from growing too tall by eating the grasses. They move around so they don't overgraze any area. Their dried dung is used as fuel, which is very important in the treeless regions where they live.

There are over 12 million yak in the world; most of them are domestic. The wild yak was domesticated about 2,000 years ago. Unfortunately, the number of wild yak is decreasing very quickly, due to uncontrolled hunting, and by their pastures being taken over by domestic yak. There are probably only a few hundred wild yak, and they have been categorized by the IUCN as endangered. Wild yak are now officially protected in China.

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Himalayan Alpine Plants

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Return to Himalayan Alpine

Rhododendron Campanulatum

Genus: Rhododendron

Species: campanulatum ssp. aeruginosum

Parts used: the wood



Rhododendron campanulata ssp. aeruginosum is a wild species rhododendron found in the [Himalayan alpine regions](#) of Northern India, Bhutan, and Nepal. It grows on the stony alpine slopes and ledges at altitudes of 12,000 to 14,500 feet. Rhododendrons are part of the heath family, like blueberries, cranberries, and heathers.

The evergreen, leathery leaves of

this plant can be as small as 1/4 of an inch, to over three feet in length. Their shapes can be very rounded or long and thin. The leaves grow alternately on the stem. The upper surface is dark green and glossy, while the undersides are fuzzy. The undersides are called indumentum, and can have many colors. Some are cinnamon colored while others are silver to white. R. campanulata ssp. aeruginosum is a low growing form of rhododendron, usually rounded in shape, and up to 4 feet tall. The leaves, which are 3 to 4 inches long, have a beautiful blueish metallic shine to them. Their indumentum starts out whitish when the leaves are young and turn a fawn color as they mature.

Rhododendron flowers grow in large trusses, or clusters, which can be up to 10 inches across. Each flower is shaped like a small bell about 1 - 1.5 inch long. They bloom from spring to early summer, and may be pink, white, red, purple, yellow, orange, or various shades of each. The flowers of Rhododendron campanulatum ssp. aeruginosum are a pink to purple color with some dark blotches.

There are over 900 different species of rhododendrons all over the world. Most of the species are found in Southeast Asia, from the Himalayas through Tibet, China, Thailand and Vietnam, to Malaysia, Indonesia, Phillipines and New Guinea.

Species rhododendrons live naturally in the wild, which means that man hasn't interfered with the way they grow or look. The wild rhododendrons are found from sea level to 19,000 feet in elevation, and grow in many different habitats, including alpine regions, coniferous, and broadleaved woodlands, and even rainforests. They can grow from a few inches high to as high as 100 feet. The first of many rhododendrons which came from Asia was discovered by Captain Hardwicke in 1799. R. campanulatum was brought to England in 1825.

All parts of this plant contain a poison called grayanotoxin, but the leaves are the most poisonous part. Eating this plant can give you a severe stomach ache. It can also cause liver damage and pneumonia. If you have grazing animals, it is important to keep them away from your rhododendrons.

In the Himalayas rhododendrons are often found at the same elevation as the summer grazing pastures. Wood from the rhododendron is used for firewood and building materials by shepherds. Large stands are often clear cut, which leads to major soil erosion. Many areas where rhododendron forests used to grow no longer exist.



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Himalayan Tahr

Common Names:

Genus: Hemitragus

Species: jemlahicus



The Himalayan tahr is one of three species of tahr. Other tahrs are the Arabian tahr of Oman, and the Nilgiri tahr of southern India. The Himalayan tahr is a relative of the wild goat and is specially adapted to life on the rugged mountain slopes and montane woodlands of the Himalayas.

The Himalayan tahr stands 26-40 inches tall at the shoulders, and is 4-5.5 feet long. They weigh from 79 to 189 lbs. It has rather short legs for its size.

The head is also proportionally small, with large eyes, and small pointed ears. The horns are triangular in shape and curve abruptly backwards, and then inwards. This prevents serious injury in head butting battles during mating season. The horns get to a maximum length of 18 inches. The female horns are much smaller.

In the winter the tahr has a dense, reddish to dark brown woolly coat with a thick undercoat, which keeps it warm. The males will grow a long, shaggy mane around their neck and shoulders, which grows down to the upper parts of their legs. In the spring they lose much of their coat, and it becomes lighter in color.

Their hooves have a flexible, rubbery core that allows it to grip smooth rocks, while a hard, sharp rim can lodge into small footholds.

The Himalayan tahr will migrate down the mountain to more protected areas in the winter. There they form mixed herds of 15 to as many as 80 animals. The old bucks usually stay off by themselves. In the spring the males will form all-male groups, before joining the females again in the autumn.

In the early morning and late afternoon they will feed, moving up the slopes. Midday they spend resting and ruminating, high enough to be safe from predators. In the afternoon move back down the mountain, eating as they go. They are very shy, and are difficult to approach. When sensing danger they will quickly run off, easily navigating the steep slopes and uneven terrain.

The tahr will eat almost any vegetation they can find, from grass

and herbs to the leaves of shrubs and trees. They will rear up on their hind legs to reach for branches which they then hold down with their front legs as they eat. The tahr is a ruminant and has a multi-chambered stomach. After feeding it needs to regurgitate the pulp and chew it over again. This allows it to get the maximum nutrition out of the tough vegetation it eats.

During the breeding season in October through January, the male Himalayan tahr will ruff up its mane to intimidate its opponents. He will try to impress females with his appearance and spend hours strutting in front of them before mating. When challenged by another male, they will try to lock horns and throw each other off balance.

The female will slip away to be by herself to give birth to a single offspring after a 7 month gestation period. The young tahr depends on its mother's milk for about 6 months, but will stay close to her for up to 2 years. In the wild the tahr will live to be about 10 years, and up to 20 years in captivity.

Although the Himalayan tahr will sometimes come down into forested areas to compete for food with domestic goats, it prefers to feed on high pastures up to 14,520 feet above sea level. Its long coat and dense undercoat, and its specialized hooves make it highly adapted to its life on the mountain slopes of the Himalayas.

The Nilgiri and Arabian tahrs are rare as a result of hunting and are listed as vulnerable and endangered by the World Conservation Union (IUCN). The Himalayan tahr is considered vulnerable by the IUCN (1996) in its home range of the Himalayas. It is considered a prize trophy for hunters all over the world. There are more sites on the internet advertising organized Himalayan tahr hunting trips than there are sites about the Himalayan tahr itself.

2001

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Himalayan Alpine Climate

[Alpine Climate \(H\)](#)

The latitude range of the Himalayan climate is about 28 degrees to about 33 degrees north of the equator. The Himalayan Alpine climate varies according to the elevation. It gets colder as the elevation increases and gets wetter as the elevation drops. Because of this, the temperature changes very quickly. There are very sudden monsoons, floods, high winds, snowstorms and other types of precipitation, which makes the climate very dangerous.

The Alpine climate is similar to the climate of the biome surrounding it. For example, there are two different types of biomes on each side of the Himalayan mountains, therefore the climate on one side of these mountains is different from that on the other side.

The winter and summer are the main seasons in the Himalayan Alpine. In the winter it is usually always snowing with very icy temperatures. In the summer conditions are much milder, but throughout all of the months it is generally snowing.

The Himalayan Alpine climate is a harsh environment, therefore few animals and plants can live there. The few plants that do inhabit the Alpine consist of rhododendrons, the tea plant and shrub type plants. They have to adapt to the freezing temperatures, high winds and to a short growing season. That is why most of the plants grow low to the ground.

The mountain animals that are found in the Himalayan Alpine are similar to the mountain animals found in the surrounding biome. Some animals have adapted, such as the mountain goat, which has a thick coat for warmth and strong hooves for running up the rocky slopes.

Koppen's climate classification letter for the Alpine or Highland climate is H. The average temperature per year is around 47° Fahrenheit. This may not sound too cold, but temperatures can change rapidly. In the winter the average temperature is around 33° Fahrenheit. The lowest temperature reached was in the month of January, at 14° Fahrenheit. In the summer, temperatures average around 56° Fahrenheit. The highest temperature was reached in June

at 75° Fahrenheit.

The average precipitation reaches around 16 inches per year. In the summer there is around 3 inches of precipitation. In the winter there is about .5 inches of precipitation. Sleet, snow and rain are some forms of precipitation that falls in the Himalayan Alpine. Because of the melting

snow more drainage occurs in the summer than in the winter. However all year round the air is filled with some form of precipitation.

2001



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Polylepis Forest

Genus: *Polylepis*
Species: *spp.*

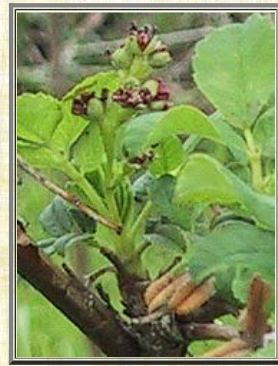


The *Polylepis* forest is located in the [Andes Mountains](#). *Polylepis* forests occur at altitudes of up to 4,500 meters in sheltered areas. Most of the original forest is in the cold Western Cordillera of Bolivia. There is only ten percent left of the original forest.

There are over 15 million trees in just the Andean zone. The exotic plants have grown close to the *Polylepis* forest causing shading

of the native trees. In the *Polylepis* forest there are 20 evergreen tree species that are characterized by gnarled shapes. The trees have a thick and dense laminated bark with small green and gray leaves. Loss of high mountain forests is considered the major cause of water scarcity in many parts of the Andes. A lot of forest birds live in the *Polylepis* forest. The *Polylepis* forest is a very bright colored forest.

Polylepis is a group of tree species belonging to the rose family. Fifteen species of the *Polylepis* genus grow in South America, from northern Venezuela to northern Chile and Argentina. The highest number of species grow in Ecuador, Peru and Bolivia.



The forest has to adapt to the unstable water supply. Birds had to adapt to the small range sizes. The Peruvian *Polylepis* forests contain three of South America's endangered birds. Great colored parrots and toucans live in the forests, as does the Royal Cinclodes. The forests are vegetated with little-leaved plants. *Polylepis* trees are evergreens, so they begin photosynthesis as soon as the weather gets warmer. The small leaves prevent water loss (cold, dry conditions). The thick, red peeling bark on the trees protects them from animals

and fire damage.

The Andean people use the *Polylepis* forest for many reasons. Fifty-six percent of the forest is used for medicines. Twelve percent is used for human food. And nine percent is used for construction and ritual purposes. Over all about thirty-five percent of the most useful plant species are only found inside the forest. The animals, like the birds use the forest for food.



The Tropical *Polylepis* woodlands are highly endangered. The forests began disappearing during the time of the Incas, when much of its wood was used for building material and firewood. After the conquistadors brought their sheep and cattle, more forests were lost to grazing. Today native peoples still use the wood for building and heat. Loss of the forests have caused landslides threatening villages and roads. Only 10% of Bolivia's original Western Cordillera

Polylepis forests remain. Only 1% of the forest survives in the Eastern Cordillera where eight out of nine of Bolivia's *Polylepis* species grow. Loss of the habitat is rapidly destroying one of Ecuador's most precious treasures: the natural diversity. There is a project going on to help the *Polylepis* forest. The project involves buying 400 acres of native Andean forest. By purchasing this land, they can replant it with *Polylepis* trees and stop water erosion.

by Amanda B. 2002

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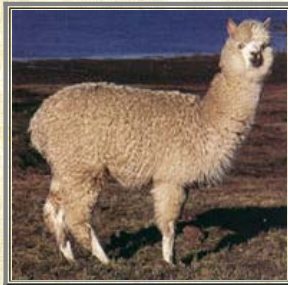
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Alpaca

Genus: Llama

Species: pacos



The alpaca is a type of llama that lives in the [Andes Mountains](#) of South America. The alpaca is part of the camelidae family and is closely related to the well-known [llama](#). The llama is a much larger animal, standing up to 4 feet at the shoulder and weighing 340 pounds. Both are semi-wild domesticated animals related to the wild guanaco. Some think the alpaca may be a cross between a llama and [vicuña](#).

Alpacas have small heads, a cleft upper lip, and big pointed ears. Their bodies are slender with long necks. They have long legs and short tails. The alpaca has 22

different shades of color for its coat, like black, gray, white, brown to name a few. They weigh 120-140 pounds on average. The alpaca is 3-3.5 feet tall at the shoulders, and measures between 4-7 feet in body length.

Of all the attributes of the alpaca, its history is the most interesting part of this animal. The oldest known recording of these charming creatures was 1,000 years before the great pyramids of Giza. The Inca nobles demonstrated their wealth by the number of alpaca's they owned, as well as showing off the beautiful fur garments. The trade in the fur of the alpaca, 2,000 years after the great pyramids, created a thriving Peruvian economy. So it continued for thousands of years with these magical animals creating wealth and prosperity for their Inca owners, until the 17th century when the Spanish Conquistadors conquered the Inca Empire.

The Incas sought refuge from the Spanish, and took a limited number of these precious animals to the heights of the Andes. If this had not happened, there may not be very many alpacas left today.

These animals are easily domesticated. Others describe their personalities as being warm, friendly and gentle. The special charm of this mysterious breed has been a well kept secret except for the limited people who have the privilege to keep such a prize.

The reproductive periods for the alpaca are from 4-16 years. In the Andes the mating period is in August and September. The alpaca has crias [babies] about every 11 months, which weigh 15-

20 pounds at birth. They live 15-25 years, with a few living up to 30 years. The alpaca live in herds. Alpacas live at elevations of 14,000 to 16,000 feet and on ranches throughout the world.

The alpaca has very thick fur to survive the cold climate of the Andes. Its long neck helps spot predators among the rocks of the mountain slopes.

The alpaca is a herbivore, which means that it eats plants. The alpaca grazes on grass and eats weeds, shrubs and trees. It has special stomach secretions that help it absorb 50% more nutrients than a sheep, allowing it to survive where there is only poor quality grass. The alpaca is prey to pumas, leopards, and other carnivores in the wild.

The alpaca were almost extinct following the invasion of the Spanish conquistadors in regions of South America. They are now plentiful in the wild at about 3.5 million strong. These animals have been domesticated for over 5,000 year.

Anthony C.2001.



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Andes Mountain Climate

Highland Climate (H)

The Andes mountain climate is one of the most interesting climates in the world, because it changes drastically throughout the region. For instance, in Ecuador there are some tropical rainforests and just a couple of miles away is Cotopaxie, a frosted peak. Another thing about the Andes Mountain climate is that the temperature changes drastically when you move to a neighboring country, such as from Colombia to Ecuador. In Colombia it rains often, but in Ecuador it is usually dry. The climate is split up in many different zones. Tierra caliente is the hot land, where jungles, fruit and crocodiles grow and live, but paramo (wasteland) is a hardy place where the only things that can survive are lichens and mosses.

The Andes Mountains have a very high snow line in Peru and northern Chile reaching an altitude of over 19,000 feet. The Andes Mountains are the longest stretch of mountains in the world. They stretch for 4,500 miles on the west coast of South America. It is one of the highest mountain ranges in the world. The peak called Anconcagua in Argentina is 22,834 feet high. The Andes Mountains, even though they are very tall, do not compare with the Himalayas, which are still more rugged and taller.

The Köppen climate classification system is a way of showing on a map where certain climates are found. Vladimir Köppen devised it in 1918. The climates, precipitation and temperature classify it month by month. The Köppen system represents each climate by one or more letters. For instance, in **Af** the **A** stands for heat and precipitation, and **f** stands for precipitation in all months, which is the climate zone for rainforests. **H** stands for highland, or mountain climates.

The following classifications are the classifications for the biomes at the base and around the Andes Mountains. As you go up the mountains the temperature goes down. The classification surrounding the Andes Mountains starting with Colombia is **Af**, which equals tropical rainforest climates. This is where you find the "cloud forests" of the Andes. Moist, warm air meets cold mountain air which creates mists or clouds most of the year. In Ecuador the classification is **Aw** which is Tropical climates and has its dry season in winter. The Andes experience a summer and winter season here. In Peru the classification is also **Aw** and that is tropical climates and desert climates. High altitude plains are found here. In Bolivia the classification is **Bwh**. That is dry climates, with desert climates and dry and hot. Chile has two classifications, which are **Csb** and **Cfb**. **Csb** is warm temperatures, dry season is in summer and warmest month is 71.6°F. **Cfb** is Warm temperatures, precipitation in all months and warmest month is 71.6°F. Argentina is **Bwk**. That means dry climates, dry season in winter and dry and cold. All of the Andes Mountains are classified as **H**.

The temperatures of the biomes around the Andes Mountains vary from place to place. In Colombia it is wet and warm, with an average temperature of 64°F. In Ecuador it is very warm in the deserts and the average is 68°F and stays that temperature through out Peru, until you get to Bolivia. In Bolivia you would find that it is dry and hot with an average of 64°F. Then you would find the last and largest country that is home to the Andes Mountains, Chile. Chile is split up into two different temperature regions; the northern part of Chile has an average of 64°F, and the southern part has an average of 71°F. In winter the temperatures usually averages about less than 52°F. In the summer it usually averages 68°F. These temperatures are mainly from biomes around and in the Andes Mountains.

The precipitation of the Andes Mountain climate changes but not drastically between two places. In Colombia there is a lot of rainfall all year round. In Ecuador there is the desert climate without much rainfall. Peru is simalar to Ecuador. In Chile there are two different climates but in both there is a sufficient rainfall all year round. The rain fall in the summer averages less than 8 in. In the winter it averages less than 4 in. These numbers are from biomes in and around the Andes Mountains.

The Andes Mountain climate extends from at latitude 10°North latitude to 50° South and longitude 65° to 80° West.

by Christian C. 2002

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Fringed Sagebrush

Common Names: Sagebrush, prairie sagewort, fringed wormwood, arctic sagebrush

Genus: Artemisia

Species: frigida



Fringed sagebrush is a woody shrub with silvery leaves and little yellow flowers.

Sagebrush has a strong odor after it rains that smells like turpentine or camphor.

Fringed sagebrush is a low, mat-forming shrub. It gets to be 4 to 16 inches (10-40 cm) in height and rarely grows taller than 24 inches (60 cm).

Soft stems grow from a woody base. It has many little leaves that grow from the stem and are finely cut. The leaves have a gray or silvery look to them. Flowers are yellow and very small.

Fringed sagebrush has a unique root system. It adapts to the conditions that it finds itself living in. It grows deep taproots where the water level is low, and lots of surface roots when the water is easy to get at. The adaptable root systems allows fringed sagebrush to survive drought periods which commonly occur in the Great Plains and the Mongolian steppe.

The sagebrush is used for livestock because it is so high in protein. Many wildlife species like to eat it during spring, fall, and winter but not during the summer. Many bird species use the sagebrush *Artemisia tridentata* for making nests. *Artemisia tridentata* is also used for fuel in places where other burnable woody plants can't be grown.

Fringed sagebrush can live in many places, but not in alkaline soil. It grows on dry open sites in the foothills, mountains, and plains from Mexico northward to Canada and Alaska, and into Eurasia. Fringed sagebrush grows especially in the high, cold plains of the United States, Canada, and Mongolia. This makes Sagebrush a steppe plant because it can grow in dry and cold climates.

2001

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Milk Vetch

Common Name: Great Wall Astragalus, or Sha Da Wang (flower that grows in desert)

Genus: Astragalus

Species: adsurgens

Parts Used: the whole plant



Milkvetch is a perennial found throughout northern and southwestern China and northern North America. It is a perfect plant for cold, and arid to semi-arid regions with poor or saline soils. It has a very long tap root and can get water deep in the ground. In China it is grown as fodder, green manure and for soil conservation. Milk vetches are part of the bean family (Fabaceae). In Latin, fab means "bean".

Each plant has a couple of stems that can grow to be 1.5 to 2 m tall. The leaves are each composed of 9 to 19 narrow leaflets, and are about 2 to 4 inches long with soft hair all over them. The main tap root is thick and has many roots growing off it. A secondary root system starts about 20

cm. under the ground and can reach out to about 150 cm in diameter. Nodules develop on the roots closer to the surface from which new plants grow.

Milkvetch flowers throughout August. The lavender or bluish-purple flowers are about 1/2 inch long and arranged in a dense cluster. The cluster grows on a short stalk and can be cylindrical and about 3 inches long. Seeds grow in a small, hairy pods that turn black. The seeds are small and black and sometimes rattle in the pod, giving some species of this plant the name Rattle Pod.

One species of Astragalus, *Astragalus lentiginosus*, contain the alkaloid swainsonine, which can cause locoism. When animals eat this astragalus their nervous systems become impaired, and they become very excited when disturbed. Sometimes they died. In the old days it used to be known as "loco weed".

A less deadly variety of vetch can be found growing along our country's highways as soil erosion control. In the spring the blue flowers of vetch will carpet the sides of roads from New Enland to California.

2000



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Sweet Vernal

Common Names: Pheasant's Eye, False Hellebore

Genus: Adonis

Species: vernalis

Parts Used: extract from the flowers



Sweet Vernal is a perennial which grows from south-east Sweden to the south of Europe and eastwards to western Siberia. It is a typical steppe plant, and it doesn't grow in too many places in Europe. Because of loss of habitat and too much of it has been collected for medical purposes, Sweet Vernal is becoming scarce there. More of it is starting to grow in eastern Europe.

This is a very special plant because it is a potent heart medicine. The plant contains something called glycoside Adonidin, which is used in remedies for chronic heart problems and as a tranquilizer. It works almost exactly like digitalin, which comes from Foxgloves, but is stronger and doesn't build up in the body. It is used especially in cases where people are also suffering from kidney disease, as well as heart problems. It does

produce vomiting and diarrhea, however and is only used when digitalis fails.

Because Sweet Vernal can't be cultivated, plants have to be collected from the wild, which make them very vulnerable. A rare plant in most of its range, it has legal protection from gathering in most countries.

Sweet Vernal is a very beautiful flower. It blooms in early spring and has a rich, golden, buttercup-like glow. Its leaves are like filigree, and very delicate. Adonis vernalis is part of the Ranunculaceae family.

2000



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Rhubarb

Genus: Rheum

Species: rhabarbarum

Parts Used: the roots and the stems



Rhubarb is a member of the sorrel family, and grows in the wild in western and northwestern provinces of China. It is grown commercially in much of Europe and the United States. The name rhubarb comes from the Medieval Latin reubarbarum, literally meaning barbarian rhubarb. It is part of the Asian buckwheat family. Rhubarb originally came from the steppes of Asia over 2000 years ago. There it was used as medicine. Its roots were ground up and used as a purgative, or an old version of ex-lax. Rhubarb didn't give people the stomach cramps of other purgatives and soon became a favorite in western countries as well.

Rhubarb is a perennial plant with large fleshy roots and large leaves with long, thick stems. The plant grows to be about 2 to 3 feet under cultivation, but doesn't grow over 1 foot in the wild. It likes climates where the spring is wet and cool.

The stems are harvested in the early spring. Only the stems of rhubarb are

used in cooking because the leaves are very poisonous. It is used by many to make deserts, like strawberry-rhubarb pie. The

different colors of the plant's stem can range from green to pink to rose to ruby red. The darker red stalks have a milder, sweeter flavor than the green. Rhubarb is very rich in vitamin C and dietary fibers.

2000

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Fleabane

Common Names: Philadelphia Daisy, Philadelphia Fleabane

Genus: Erigeron

Species: philadelphicus

Parts Used: the extract and the whole plant



Fleabane is part of the Aster family and blooms from April through June. Fleabane looks like a daisy, with about a 100 ray-like petals that can be white or pinkish. The centers are yellow. The flowers grow in clusters, with several clusters per plant. They can grow to be 4-30 inches high. They have hairy, alternate leaves that can be oval or lance-shaped with a pointed tip. They can grow up to be 6 inches long, and 2 inches wide.

When you burn Fleabane it produces an oily smoke that repels insects like fleas.

Tannins in Fleabane protect cuts

from infection and promote skin-tissue healing. Also, the weed was used to soothe sore throats.

Fleabane can be found all over the United States and Canada growing in meadows, along streams, roads and ditches. It is mostly considered a weed. You can also find it in Wales. White-tailed deer like to eat fleabane.

by Becky W. 2000.

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Japanese Black Pine

Genus: Pinus

Species: thunbergii



The Japanese Black Pine's habitat is the Northeast Asian Deciduous Forest. The countries that are in this biome are Northeast China and North Korea. It is located between 30° to about 45° North latitude and the longitude is between 130° and 145° East longitude.

Trees thrive in this habitat that has low hills and forested lower hills with many trees like the elm, ash, and firs. It is sort of rocky there. Rain mostly falls in the summer and autumn. The winters are long and cold but the summers are warm. The average temperature is around 24° to 29° Celsius. The average precipitation is between .6 and 1.5 meters. But that is counting rain and snow.

This plant lives in a moist habitat and in a mostly temperate climate. It grows in a rocky and forested area.

The Japanese Black Pine can be 40 meters tall. The crown is dome shape or like an irregular pyramid. The tree grows in an upright manner. The needles grow in pairs of two, and are 7-12 cm long and 0.7-1.2 mm wide. They are a dark green color.

There are two different colored flowers on this tree. The male flowers are yellow and the female flowers are purplish-red. The cones are shiny light brown. They are 3-6 cm long and grow singly or in clusters. The seeds are dark brown to black and are 6 mm long.

This tree can grow in sand at the seashore. The roots can grow in salty areas. It can also withstand drought for a while.

This plant is very plentiful in its natural habitat and in the temperate zone. But it is vulnerable to the pollution in Korea because it makes the needles fall off and causes it to die. People try to protect it by spraying it with insecticides to keep the bugs from killing it. One of the organizations trying to help it is called The New York State Department of Conservation.

Hopefully we can figure out a way to stop the air pollution so it will stop killing the trees and not just this tree but also many of our trees.

by Holly R. 2003



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Lebanon Cedar

Common Names: Lebanese Cedar, Cedar of Lebanon

Genus: Cedrus

Species: libani



The Lebanon cedar is originally from Asia Minor. It is native to Lebanon, Syria and southern Turkey. It can be found in the Jebel Alaonite Mountains in Syria and Lebanon, and the Taurus Mountains of Syria and southern Turkey. Rare in Lebanon, only 5000-7000 acres (2000-3000 ha) of forest remain in small patches across the country. However, it is still plentiful in Turkey. There are only three species of Cedars in the world: the Lebanon cedar, the Deodar of the Himalayas and the Mount Atlas Cedar

Large forests of Lebanon cedars of ancient days no longer exist. But because of its beauty and history the Lebanon cedar has been planted throughout the world. A large and beautiful tree grows on Martha's Vineyard in the Polly Hill Arboretum.

Lebanon cedars grow at elevations of 4,264-6,888 ft. (1300 –2100 m). They grow best in deep soil on slopes facing the sea. The trees require a lot of light and about 40 inches (1000 mm) of rain a year. They form open forests with a low undergrowth of grasses.

The first thing you notice about the Lebanon cedar is the large wide-spreading horizontal branches. The top of the tree is broad and flattened in a mature tree. In dense stands of trees they grow straight and narrow, but when standing alone, its lower branches spread out horizontally over a large area and rest on the ground. The cedars can grow 80 feet (20 m) tall and spread out from 30-50 feet

(9-15 m). They grow very slowly. The oldest tree is more than 1000 years old.

The needles of the Lebanon cedar look like those of the Larch, except that they are evergreen. The needles are grouped in tufts of 30-40. They are about 1/2-1 1/2 inches (1.5-3.5 cm) long, stiff, and four-sided, tapering towards their points. They are a dark blue-green color, and stay attached to the tree for 2 years. When they fall to the ground they don't decay for several years. The leaf litter on Mount Lebanon is 1 foot (.3 m) thick.

The Lebanon cedar doesn't flower until it is 25-30 years old. The flowers, or catkins are unisexual, with both male and female flowers on the same tree. The 2-inch catkins are reddish in color.

The cones become 4-5 inches (10-12 cm) long and stand up straight on the branch. Young cones are light green in color. Female cones are barrel-shaped and dull brown. They mature in their second year. The scales are broad but thin, and each scale has 2 broad-winged seeds. The wings allow the seeds to be carried away from the parent tree by the wind. The seeds ripen in August to October, but are not shed until spring. When the scales fall off, a slim, central candle is left on the tree.

The history of the Lebanon cedar's decline is a long one. About 4,700 years ago, the Epic of Gilgamesh's Forest Journey tells the story of Gilgamesh's need for timber to finish his magnificent city. He turned his attention on the forest near southern Mesopotamia, which was protected by the deity Enlil. Enlil had forecast that once humans entered the forest, they would destroy all the trees, the 'divine beauty'. A great battle broke out between the demigod guarding the forest and the humans. Human greed won and the forest was completely stripped of its trees, leaving nothing but bare ground.

The fate of the cedar forests was sealed. The Phoenicians needed timbers for their ships, which made them the first sea-trading nation in the world. The Roman Empire's expansion into Syria had more harmful effects on the cedars. It wasn't until the Emperor Hadrian put up boundaries around the remaining forests and declared them his Imperial Domain, that the destruction of the forests was slowed.

According to the IUCN Red List of Threatened species, *Cedrus libani* is listed as LR/nt. It is at a Lower Risk, meaning that it doesn't fulfill the criteria for any of the categories of Critically Endangered, Endangered or Vulnerable. The designation "nt" means it is near threatened, and is close to qualifying for Vulnerable. It is not threatened in Turkey, although it is heavily threatened in Lebanon and extremely restricted in Syria.

Today the large cedar forests of the past are gone, replaced by a barren, dry land. When climax forest are cut, they are replaced by

scrubby growth, most of the soil is lost, and water can't be retained. The Cedrus libani in Lebanon is limited to only twelve, separate stands. One of these stands is in Jabal el-Barouk, located on the slopes of the central section of the Mount Lebanon chain. It is the largest self-regenerating stand in Lebanon and supports some wolves and wild boar.



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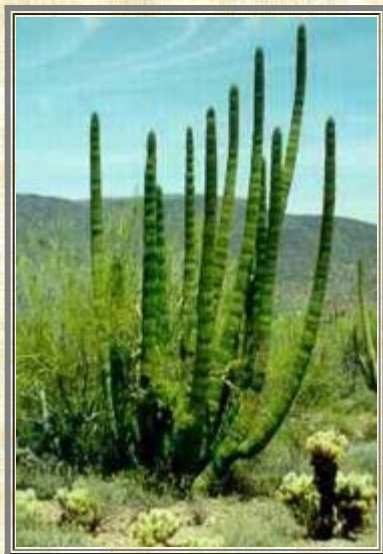
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Organ Pipe Cactus

Genus: *Stenocereus*

Species: *thurberi*



The organ pipe cactus grows only in the Sonoran Desert. It is found from southwestern Arizona south to Sonora, Sinaloa and Baja California in Mexico. Organ Pipe National Monument in Arizona was created to protect the cactus in its northern most range.

Organ pipe cacti are very sensitive to frost. Because cold air settles in valleys and the desert floor, the heat loving organ pipe cactus grows on southern facing slopes below elevations of 3,000 feet.

The organ pipe cactus gets its name from the many slender, curving vertical stems which resemble the large pipes of an old-fashioned organ. Growing from a base just above the ground, the column-like stems can

grow 25 feet tall, but usually grow to a height of 15 to 20 feet. The stems are about 6 inches in diameter, and rarely branch out. They have 12-17 dark-green ribs. Nine to ten brown 3/8 inch spines grow from close-set areoles on the crest of the ribs, and turn gray with age. The stems continue to grow from their tips, marking each growing season with a slight constriction around the stem.

Like the saguaro, the organ pipe cactus needs shade and protection for a few years during its seedling stages. It depends on "nurse plant" like the desert ironwood, palo verde and triangle-leaf bursage to develop. When the organ pipe cactus matures, its root system will eventually absorb any rain that falls. This deprives the nurse plant of the water it needs, and as a result it becomes stunted or dies.

The organ pipe cactus stores water in its stems to survive the heat and drought of the desert. It has fibrous ribs running vertically up the stem to help keep it upright. When the cactus dies it leaves behind its bleached ribs.

The flower buds of the organ pipe cactus grow from the tip of the stems. The flowers are white or pale lavender in color. They mostly bloom at night and are pollinated by nectar feeding bats, and by morning they close up again. The cactus has many buds which open up on different days so that the flower season can last for many weeks. They bloom annually from May to July.



The red fruits are large and spiny, and ripen in late summer. When they mature, they lose their spines and open to show an edible, red pulp.

They are sweet and fleshy, and are eaten by a variety of desert wildlife. It is a favorite with people also, who eat it raw, dried or turn it into jelly. It is also made into syrup and fermented into a wine-like drink.

Native Americans ate the fruit raw or dried it for storage. The wood of the ribs was used for building and turned into torches.

The organ pipe cactus is not endangered in its range, although it is protected in the USA, where it grows only in a small section of southwestern Arizona.

2002

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Pampas Grass

Common Name: Silver Pampas Grass, Uruguayan Pampas

Grass Genus: Cortaderia

Species: selloana



Pampas Grass is a sort of grass that dwells mostly in the Pampas of South America. It is a very pretty, large and unique kind of grass.

The habitat of Pampas Grass is mostly moist areas in the South American grassland biome. The climate of this biome is pretty hot with grassy plains. Pampas Grass grows the best in sun filled places with somewhat damp ground. It also grows well along a small stream bank or in a shallow moist

ravines. An amazing feature about Pampas Grass is that it can live in almost any habitat. This amazing grass can grow in hard, rocky areas, flooded areas, dry and damp ground plus its normal habitat. The leaves die during frosts in northern climates, but grow back in the spring. The habitat it flourishes in is a damp, warm environment like that of the South American Pampas.

Pampas Grass can grow to an impressive size for grass, about 8-12 feet tall. Its leaves are only .5 inches to .75 inches wide but can be 10 feet long. It grows in large clumps called tussocks. Each tussock is about 12 feet tall with many plants in it. The leaves are razor sharp and could slice you open just by rubbing against them. The leaves are a deep green color. The Pampas Grass has large pink plume like flowers that give the grass an ornamental sort of look. It also has oval shaped seeds growing off of it, which are .25 inches long. Its seed has a tan crusty shell. The female plants are prettier and their flowers are fuller.

Pampas Grass can adapt to most places and can adapt fairly

quickly. This quick adaptation is the product of a deep root system that digs down and finds water so it can survive in the driest areas.

Pampas Grass is used in many ways. A common use is as a hedge because of the razor sharp leaves and stiff stems. It is used mainly as a decoration. Pampas Grass makes a nice ornamental plant because of its large plume-like flowers. The only setback to having it as an ornament is the sharp leaves because just brushing against it can give you a cut that becomes inflamed. Many people put this plant in garden beds or on lawns. It is not farmed for any purpose because there is no value in it for farmers.

The Pampas Grass is not an endangered plant. These plants are very common in the South American Pampas. This plant has an incredible seed output. Each plant puts out over 1 million seeds in its life time. This large seed output results in Pampas Grass being a very prolific plant. California has listed them as an invasive weed that pushes out native plants. They are banned in New Zealand and Hawaii and are on their noxious weed list.

by Augie W. 2002

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Prince of Wales Heather

Genus: Erica

Species: perspicua



A lovely plant commonly known as the Prince of Wales Heath with the genus of Erica and the species perspicua makes its home in the Fynbos Mediterranean biome. This biome is found on the southwest tip of South Africa at latitudes 33° to 35° South, and longitudes 17° to 20° East.

The Fynbos Mediterranean biome is not full of thick underbrush and forest, even though the forest-like evergreen tree is the most common plant in this biome. Fires burn throughout the biome, which is an important reason that Fynbos plants survive. Fire clears any thick underbrush that may stop small plants from growing. These fires are naturally and humanly made. Plants need the space to grow where the underbrush would be. This biome's plants also grow in acidic soil.

January is the hottest month in the Fynbos biome, because it is in the

Southern Hemisphere. The Prince of Wales Heath blooms and grows from January to May. May is one of the wettest months, November is the other. Rain normally falls in the colder, winter months, May through July. Summers are long and dry. The average temperature in January is twenty-two degrees Celsius and in July is thirteen degrees Celsius. The average precipitation in the biome is six hundred fifty-two millimeters per year.

The Prince of Wales Heath likes to grow in sandy, acidic and mostly poor soil that has excellent drainage. It cannot grow in heavy clay soil, yet may tolerate damp soil. It does best in full sun. The Prince of Wales Heath grows in large groups. The plant prefers a warm, dry climate. The Prince of Wales Heath also grows when it is hot. It is frost tender, which means that it is unable to grow in the cold weather and cannot survive through frost.

The Prince of Wales Heath can be from twelve inches tall to six feet tall and is a bush like tree shrub. It grows upright and out to the sides like a bush. It can be up to three feet wide.

The leaves of *Erica perspicua* are a lot like an evergreen's. They have a needle like width and are one eighth to one half of an inch long. The leaves are gray green, hard and prickly.

Flowers on the Prince of Wales Heath are tubular and flared out at the tips, shaped somewhat like a bugle. They are one half to three fourths of an inch long and have a thin width. The flower's color can be rose pink, white, pink and white, and red and white. These translucent flowers grow in spike like, loose bunches at the end of stems. They can be up to three inches

long. The flower bunches are scattered around the plant on the ends of many of the stems. When the seeds are in the ground, not all of them will grow into a flower. These seeds can grow at any time of year.

The Prince of Wales Heath cannot stand up straight when there is too much water on the roots. The roots are shallow and fibrous. They never run very deep.

The Prince of Wales Heath has adapted so that it can live in an area with naturally occurring and controlled fires, dry summers, and winter rain. Other adaptations are in the root system in that they can survive dry summers by storing water. The plant will not take total dryness or extreme ground wetness such as flooding.

The species *Erica* are the most common in the Fynbos Mediterranean Biome, so the Prince of Wales Heath is most likely not endangered. Other reasons why the Prince of Wales Heath is not endangered are that the plant has adapted to the biome. Bees are attracted to this plant, so they pollinate it and help it to grow and reproduce. Also, not many hungry, trampling, large game

animals live in the Fynbos biome, so the plant has a very slim chance of being eaten or trampled upon. The plant is also protected. The plant's protectors are people, who watch its

growth, learn more about it, and are aware of the Prince of Wales Heath's needs. Special areas are reserved for biome plants such as this one. Three organizations involved in its protection are Mont Eco Nature Reserve, Nautilus Bay Coastal Reserve and Fernkloof Nature Reserve.

This beautiful, flowering plant in the Fynbos Biome deserves to be protected and has many unique characteristics that are important to its survival and its hardiness. We should learn more about the Prince of Wales Heath in order to understand how it grows and enjoy its beauty.

by Bethany P. 2003

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Rhododendron Campanulatum

Genus: Rhododendron

Species: campanulatum ssp. aeruginosum

Parts used: the wood



Rhododendron campanulata ssp. aeruginosum is a wild species rhododendron found in the [Himalayan alpine regions](#) of Northern India, Bhutan, and Nepal. It grows on the stony alpine slopes and ledges at altitudes of 12,000 to 14,500 feet.

Rhododendrons are part of the heath family, like blueberries, cranberries, and heathers.

The evergreen, leathery leaves of

this plant can be as small as 1/4 of an inch, to over three feet in length. Their shapes can be very rounded or long and thin. The leaves grow alternately on the stem. The upper surface is dark green and glossy, while the undersides are fuzzy. The undersides are called indumentum, and can have many colors. Some are cinnamon colored while others are silver to white. R.

campanulata ssp. aeruginosum is a low growing form of rhododendron, usually rounded in shape, and up to 4 feet tall. The leaves, which are 3 to 4 inches long, have a beautiful blueish metallic shine to them. Their indumentum starts out whitish when the leaves are young and turn a fawn color as they mature.

Rhododendron flowers grow in large trusses, or clusters, which can be up to 10 inches across. Each flower is shaped like a small bell about 1 - 1.5 inch long. They bloom from spring to early summer, and may be pink, white, red, purple, yellow, orange, or various shades of each. The flowers of Rhododendron campanulatum ssp. aeruginosum are a pink to purple color with some dark blotches.

There are over 900 different species of rhododendrons all over

the world. Most of the species are found in Southeast Asia, from the Himalayas through Tibet, China, Thailand and Vietnam, to Malaysia, Indonesia, Phillipines and New Guinea.

Species rhododendrons live naturally in the wild, which means that man hasn't interfered with the way they grow or look. The wild rhododendrons are found from sea level to 19,000 feet in elevation, and grow in many different habitats, including alpine regions, coniferous, and broadleaved woodlands, and even rainforests. They can grow from a few inches high to as high as 100 feet. The first of many rhododendrons which came from Asia was discovered by Captain Hardwicke in 1799. *R. campanulatum* was brought to England in 1825.

All parts of this plant contain a poison called grayanotoxin, but the leaves are the most poisonous part. Eating this plant can give you a severe stomach ache. It can also cause liver damage and pneumonia. If you have grazing animals, it is important to keep them away from your rhododendrons.

In the Himalayas rhododendrons are often found at the same elevation as the summer grazing pastures. Wood from the rhododendron is used for firewood and building materials by shepherds. Large stands are often clear cut, which leads to major soil erosion. Many areas where rhododendron forests used to grow no longer exist.



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2001

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Common Saltbush

Common Names: All-scale, Alkali Saltbush, Common Saltbush, cattle spinach.

Genus: *Atriplex*

Species: *polycarpa*

Parts used: seeds were cooked, twigs and leaves were used for making yellow dye by Native Americans.



The common saltbush is often mistaken for "sagebrush". It is actually related to the "tumbleweed", or Russian thistle and is part of the "goosefoot" or "pigweed" family. Other members of this family considered weeds include arrowweed and kochia. Spinach, Swiss chard and sugar beets are actually cultivated members of the same family.

Common saltbush is a grayish-white shrub that grows to be about 2 to 3 feet tall. It has many branches sprouting from the base of the plant. They aren't very pretty to look at, but they are very well adapted to living in dry, alkaline environments, such as the Mojave desert. The stems and leaves are covered with small white scales called scurf, that help the plant conserve water. As a matter of fact, the common saltbush doesn't like lots of water. The leaves are sharp spines alternately clustered around the stem of the plant. In extreme droughts it will drop all of its leaves.

*Atriplex*es have yellow flowers which grow directly from the stem. A cup is formed by five fused sepals, with five stamens rising from the center. While the male flower is tiny, the female flowers grow in long open clusters two to sixteen inches long. They bloom from the middle of spring to the middle of summer.

It gets its name from the salty deposits on its leaves. When the saltbush takes up water from the salty, alkaline soil of the desert, it removes and deposits the excess salt in bladders on its leaves.

This keeps the salt away from the plant cells and also attracts moisture in the air for the plant to absorb. When the leaves are eaten or fall off, the extra salt is removed from the plant.

Common saltbush is sometimes called "cattle spinach". It is very important as a browse plant for cattle and sheep because it is a great source of minerals, especially salt, which they need. This plant is a good source of food and shelter for many desert animals. Barn Owls and Northern Harriers use its branches to perch on. Pronghorn, deer, and many desert rodents eat the leaves.

The Pima Indians used to eat the seeds. Native Americans of the Southwest cooked the seeds of the four-wing saltbush like oatmeal, and they would eat the leaves either raw or cooked. The plant is rich in niacin, so it was very important to their diet. Navajos made the twigs and leaves into a yellow dye.

The common saltbush grows in cold desert shrub and salt desert shrub habitats with gravelly or sandy soils. It is a dominant plant in the Mojave desert.

2001

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Sphagnum Moss

Genus: Sphagnum

Species: andersonianum



Peat moss is a dead form of Sphagnum moss that grows in the North American taiga. It is the early stage of coal and can hold up to twenty times its dry weight in water, in just its stem and leaf cells! It also has no true root system, and is part dead and part alive.

Peat moss is mainly found in bogs in the North American taiga. The North American taiga is also known as the boreal forest. It covers areas in Canada and the northern part of the United States. The taiga spans from a latitude of 58° to 63° North. Its longitude is 50° to 160° West. The taiga has a winter that is 7-8 months long and a summer that is 2-3 months long. During the winter temperatures range from -65° F to 30° F. In the summer the low is 20° F and the high is 70° F. For six months of the year the taiga is below freezing.

The average rainfall in the taiga is 12-33 inches a year. Peat moss grows in wet swampy bogs. It likes cold temperatures, even below freezing.

Peat moss can grow up to 50 centimeters tall. Peat moss grows the most during summer months. It grows close together and forms a thick mat. Its leaves are spear or cup shaped some are thick and swollen with water others are thinner. Leaves can be clear, green, reddish, or yellowish. Peat moss has no flowers or roots.

Instead of roots peat moss has large dead cells in its stem and leaves that can hold 20 times its dry weight in water. Calcium and

magnesium are absorbed by its cell walls from rainwater. Peat moss takes in more nutrients than it needs, leaving the rest of the bog with little nutrients. So it is hard for other plants to grow in bogs. Peat moss also gets nutrients from photosynthesis.

Peat moss can reproduce in two ways. It reproduces by forming capsules filled with spores. In dry conditions these capsules burst and the spores are spread. New plants can grow from the spread spores. Peat moss can also reproduce by growing from broken off pieces of bigger plants.

Peat moss adapts to its environment by creating its own habitat. It holds rainwater so it cannot drain and that creates a bog. Peat moss is not endangered because it can grow in a variety of places and does not need to have a lot of water to survive. Peat moss is also dead and alive at the same time. It is alive on the top but on the bottom, under the water, it is dead because there is so little light and it is even partially decayed.

Peat moss is an early stage of coal, but peat transforming into coal can take up to 400 million years. If peat moss is covered with thick sediments and is not disturbed for millions of years the moisture is squeezed out and the peat gets hard. The hardened peat changes into lignite, which is the softest form of coal. After a hundred million years or more if the lignite is still not touched and is still being pressed down by more sediments, it changes again, this time into bituminous coal. Bituminous coal is soft and black it is the most common coal in the United States of America. After even more time being pressed down by sentiments the bituminous coal changes into anthracite. Anthracite is really hard and gives off very little smoke when it is burned. Anthracite is an extremely rare form of coal; anthracite is often buried extremely deep into the ground so it is hard to mine.

Peat moss is an important plant in agriculture. It's often added to soil to help hold moisture around plants. Peat moss is also important in nature, without it there would be no bogs or coal.

by Kim C. 2003



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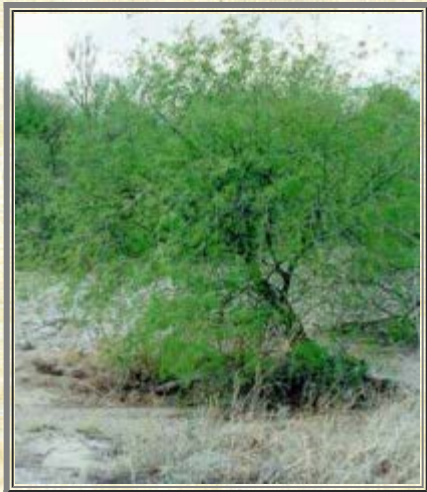
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Velvet Mesquite

Common Names: Common Mesquite, Arizona Mesquite

Genus: Prosopis

Species: velutina



Velvet mesquite is one of the most common, and important plants of the southwestern deserts of the North American continent. It is useful to humans and essential to the survival of wildlife in the desert. Birds, insects, and mammals eat the beans, seek shelter under its canopy, and benefit from the leaf litter and nutrient rich soil under the tree.

It grows at elevations below 4,000 to 5,000 feet in desert washes and grasslands. It is the dominant tree species along streams and river beds. There the velvet mesquite forms dense thickets and woodlands, or *bosques*, from the Spanish word for

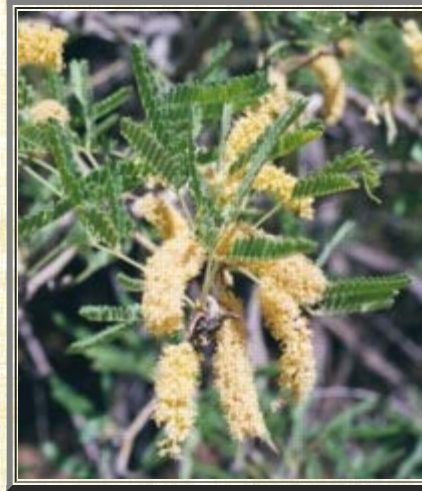
forests. Velvet mesquite ranges from central and southern Arizona, extreme southwestern New Mexico, and adjacent northern Mexico. It can be found growing in the Chihuahuan, [Sonoran](#), and [Mojave](#) deserts. The only desert it doesn't occur in is the Great Basin Desert because the temperatures are too cold.

There are three common species of mesquite; the honey mesquite (*Prosopis glandulosa*), screwbean mesquite (*Prosopis pubescens*), and velvet mesquite. The velvet mesquite is the largest of the mesquite species. It is a low-branched, broad spreading thorny shrub or small tree with a well-developed crown. It can grow as a single-trunked tree about 30 feet tall, and just as wide, with a two feet diameter trunk. When young growth is damaged by frost, fire, or browsing, it will sprout multiple trunks from dormant buds on its stem under the ground and form a shrub.

The bark of velvet mesquite is reddish-brown and smooth when young.

On older trees the bark becomes gray-brown, rough, thick, and shredded into long, narrow strips. Young, green branches grow in a zig-zag pattern and may be photosynthetic. Two inch-long yellow thorns grow in pairs at the base of each leaf on the young branches.

Leaves grow alternately on the branch. The leaves themselves are bipinnate, **compound**, about 3-6 inches long, and pointed. The leaf has two sets of compound leaves, usually with four major leaflets and 10-20 narrow minor leaflets 1/3 to 1/2 inch long, which grow opposite each other on the stem. The leaves are dark to dusky green with a gray, hairy surface and paler undersides.



The flowers are yellow-green, drooping catkins about 2-3 inches long. The flowers have bell-shaped calyces, and 5 petals. The flowers are tiny, but there are hundreds in a catkin. The velvet mesquite is pollinated by insects. The seeds are contained in straight or slightly curved, flat seed pods about 3-8 inches long. They grow singly, or in drooping clusters. Seed pods are straw colored, and are covered in short, velvety hairs when young. They mature 7-9 weeks after flowering. In Arizona they mature in July and drop in September. The beans are sweet to the taste. The seed pods are a nutritious source for wild life. Wild turkeys, ground squirrels, **jackrabbits**, woodrats, **javelinas**, **coyotes** and mule deer all benefit from the leaves, flowers and seeds of the velvet mesquite. Studies have shown that when available, 80% of a coyotes diet is made up of mesquite pods.

Mesquite are members of the legume, or Fabaceae family. Like most legumes they restore nitrogen to the soil. Nitrogen-fixing bacteria in the soil form a mutualistic relationship with nodules on the mesquite's roots, which frees nitrogen for plant consumption.

The velvet mesquite is winter deciduous. This means it loses its leaves during the winter months of December through February. Because of its large root system it can keep most of its leaves through summer drought periods. In warmer regions the leaves stay on until just before new leaves grow in the spring.

Velvet mesquite has a massive root system which can grow down as far as 50 feet to reach the water table. The taproot can be as big around as the

trunk itself. A second, lateral root system, spreads out beyond the crown 6-12 inches below the soil surface to catch and absorb any rain that may fall. Small pinnate leaves reduce the surface area exposed to damaging ultraviolet rays from the sun. Small fuzzy hairs on the leaves and young pods deflect the sun's rays, and further protect them. Large thorns on young branches protect the tree from over eager browsers.

Mesquite, along with desert ironwoods are considered to be "nurse trees" to other desert plants like the saguaro, organ pipe cactus, and many succulents and forbs. Its nitrogen-rich soil feeds young seedlings while the canopy provides shelter and shade. Its foliage provides cover for large animals like javelinas and mule deer as well. Many species of rodents dig their burrows under the mesquite tree. The temperature under the tree can be 15° F cooler than the surrounding desert.



bosque

Native Americans used mesquite pods as a staple food. They made tea, syrup, and ground meal called pinole from various parts of the tree. Mesquite bark was used to make baskets, fabrics and medicine. The wood of the mesquite tree burns slowly and is used as firewood, and to make an aromatic charcoal for barbecuing.

The velvet mesquite is abundant in its habitat, although mesquite bosques are in decline because of falling water tables and invasion by tamarisk trees. The shrubby form of mesquite has been invading grasslands throughout the southwest. Velvet mesquite is a tough desert plant, well adapted to the harsh conditions of its desert habitat.

2002

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Corsac Fox

Common Names: Cosac Fox, Steppe Fox

Genus: Vulpes

Species: corsac



The Corsac fox is a long legged, reddish gray fox with large ears and a short, pointy face. Its coat is grayish-red with silver undertones, and the under parts are white with yellow undertones. Its chin is also white. They have small teeth compared to other foxes. The Corsac Fox is slightly smaller than the red fox, about 50-60 cm, and as tall as an average sized dog.

Corsac foxes like to live in burrows on steppes and semi-deserts, and are originally from the steppes of Mongolia. You would not find them in areas that are used for agriculture. They are omnivorous so they eat small animals, birds, reptiles, insects and plants. They have some competition in getting their food, but they're good hunters.

The corsac fox is found throughout the southeast area of the former USSR and a large area of central Asia. They are also found in Turkestan, Afghanistan, Mongolia, Transbaikalia, and northern Manchuria.

Corsac fox mate between January and March with a gestation time that lasts 50-60 days. Typically between 2 and 6 young are born at a time, but there are some reported cases of a litter of up to 11 young. It is thought that the dog fox probably helps rear young but this is not known for certain. Males will fight with one another during the breeding season but then remain with the family pack. They live for 3 to 12 years.

They are more social than other foxes and some Corsac foxes go with others in burrows and form hunting packs. They can hear, smell and see very well. The hardest way for the Corsac Fox to escape an enemy is to run, because they run so slowly that a slow dog could catch them. They don't seem to have a home range that

they protect from other foxes and migrate south when the food gets scarce.

The Corsac Foxes are not well spread around the steppe. Although hunting by humans has eliminated large groups, there are no conservation program for the Corsac Fox. Very little is known about the Corsac Fox but hunting and the plowing of land have significantly reduced their numbers. The fox has disappeared over much of its range.

Chantal G. 2000.



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Mongolian Gerbil

Genus: Meriones

Species: unguiculatus



The Mongolian Gerbil is light brown with black tipped hairs and its under fur is gray. They are the size of any pet gerbil. They live in burrows with sandy soil and a little bit of grass, herbs and shrubs. They eat seeds, roots, vegetables and drink water. When they eat seeds, they spread them to different areas and make new plants in that area.

In the gerbil family there are 2 to 17 gerbils, but there are more males than females. They live together by age. For example, the older ones live with the older ones and the younger ones

live with the younger ones. In the family, older gerbils take care of the younger gerbils and males take care of the females.

Mongolian Gerbils live in harsh conditions but do not have many enemies. When ever they come across an enemy, they use their strong legs so they can jump really high to escape the enemy or they can use their strong legs to help them dig really fast to escape the enemy.

They do not have much competition with getting their food because all the other animals that eat what they eat are smaller than them.

They are not well spread around the steppe, but they are not endangered.

Chantal G. 2000.

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Saiga Antelope

Common Name: Mongolian Saiga

Genus: Saiga

Species: tatarica



The Saiga antelope once roamed from western Europe, across the Eurasian continent and into Alaska. It now only lives in areas of the dry steppes and semi deserts of Mongolia, Kazakhstan, and Kalmykia.

The Saiga is a very curious looking animal. Most remarkable about it is its huge nose. This inflatable, humped, and movable nose looks very similar to the noses of tapirs or dik-diks, and makes the head look unusually large, and bulging. The Saiga's nose is actually an adaptation to the extremely cold and dusty environment in which it lives. Its internal structure is composed of an intricate network of

bones, hairs, and mucous-secreting glands. During summer migrations it helps filter out dust kicked up by the herd and cools the animals blood. During the winter it heats up the frigid air before it is taken into the lungs, thereby reducing heat loss in its body. The Saiga's large eyes are set at the end of bony knobs on either side of its head, giving it a bug-eyed look. Their eyesight is keen, and they can see up to .6 miles away.

The short, round body, which can reach from 3.8 to 4.8 feet in length, is supported by thin legs. They are, however, very good runners and can run up to 48 mph for short periods. They stand 2 to 2.6 feet high at the shoulders. The short tail is 2.4 to 5.2 inches in length. Saigas can weigh from 46 to 112 lbs. The females are slightly smaller and don't have the male's horns. These wax-colored horns are almost translucent, and are

tapered, heavily ridged, and very sharp. They can grow 10 inches long.

The Saiga has a woolly undercoat and an outercoat of coarse, bristly hairs which protect it from the cold environment it lives in. In the summer it has a cinnamon-buff coat which is rather thin compared to their winter coats. Their winter coat is almost entirely white and twice as long, and 70% thicker than their summer coat. The hair under its neck tends to be longer. The hair on their legs stays short.

Saigas are harem breeders and breed in late November to late December. Males will herd together a group of about 12 females, and mark a breeding territory. While defending it against other males, fierce fights break out. Sometimes they end in the death of one of the saiga males. Huge amounts of energy are spent defending territories, and because of the extreme winters, 97% of the sexually mature males will not survive.

Those males that do survive start off on their spring migration in April, forming herds of 10 to 2,000 animals. The females in the meantime collect in large herds to an appropriate breeding area, where they give birth to one or two calves each. Eight to ten days after giving birth, they set out northwards after the males. Once at their summer pastures they break up into smaller groups. Large groups form again in the fall, when the southward migration takes them back to the winter grounds.

Gestation in a Saiga lasts 140 days. Young females will usually give birth to a single calf the first year, but then have two calves the following years. Calves are born at the end of March, beginning April, when all the females in a herd drop their calves within a few days of each other. The calves are weaned at 3 to 4 months. Sexual maturity is 8 months for females and 20 months for males. Saigas live for 6 to 10 years.



Saiga antelope are herbivores and eat grasses, prostrate summer cypress, saltworts, sagebrush, and lichens. They are ruminants and will rest to chew their cud after eating in the early morning and late afternoon. Cud is food that is regurgitated and chewed again. This helps the Saiga extract the maximum nutrients from the food they eat. Their natural predators are wolves, and foxes, which prey on newborn calves.

The Saiga's horn has been used in traditional Chinese medicine for centuries. Whole herds were slaughtered for their horns, and the Saiga populations declined rapidly. In the 1980s the Saiga had made a sizable recovery after nearly being driven into extinction earlier in the century.

With the breakup of the Soviet Union, illegal trade in Saiga horns is once again on the increase. The Saiga was classified as vulnerable by the IUCN in 1996. An animal is considered vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the near future. It is also listed in the CITES Appendix II. A permit is necessary to trade in Saigas and Saiga parts. Law enforcement, however, is difficult in the areas where Saigas can still be found.

2001



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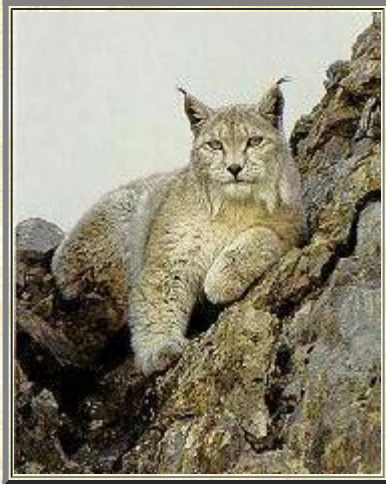
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Northern Lynx

Common Names:

Genus: Felis

Species: lynx



The northern lynx is basically a very large cat with a powerful body, short sturdy legs, and a very short tail. They have large heads, and long tufted ears which stand straight up. Their coats are usually yellowish-brown and white on its undersides. The average weight of the northern lynx is 30 to 65 pounds. Their tails grow up to 7 inches.

The northern lynx can be found on the steppes of Asia. They also like to live in forests and rocky places of Canada, the northern United States and in fragmented areas of Europe.

The northern lynx always hunts for rodents, birds, fish, small deer, goats,

or sheep. They usually live and hunt alone, and are nocturnal hunters. Sometimes northern lynx will hunt in pairs. Their mating season may be in January, but is normally in late February or in early March. They give birth to 2 or 3 kittens at a time. The females stay pregnant for 68 to 72 days, and give birth in a lair in a hollow tree, rock cleft, or a similar site. The kittens stay with their mother until the next mating season. Siblings usually continue to stay together after they leave their mother.

Northern lynx can climb well and are good swimmers which help them when hunting. They have very good vision, which helps them to stalk their prey over long distances. Northern lynx may jump 7 feet into the air to catch birds and they use their broad and long feet as snow shoes to keep them from sinking into the snow.

They help in their environment by keeping the rodent population down which is important because they multiply very quickly. They also eat large sick and almost dead animals.

There are not many northern lynx left in the world, partly because hunting the lynx is still permitted in the United States and Canada. People continue to hunt them for their fur and also for sport.

by Naomi R. 2000.

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Saker Falcon

Common Names: Saker Falcon, Altai Saker, Steppe Saker

Genus: Falco

Species: cherrug



The saker falcon is a big, strong bird of prey with large feet and pointed wings. It is larger than the peregrine falcon, and has a very wide wingspan for its size. There are several subspecies of saker falcons; the steppe Saker (*Falco cherrug cherrug*), the mountain Saker (*Falco cherrug milvipes*), and the Altai Saker (*Falco cherrug altaicus*). The saker falcon has a large range of color, from dark brown to grey, to almost white. Saker falcons are also thought to breed with gyrfalcons and form a hybrid falcon.

The saker falcon originated in southeast Europe and Asia. Their preferred habitats are the open plains and forest steppes. They can be found on the steppes of Mongolia and of southern Siberia, and the Russian Altai mountains.

The saker falcon is about 18 inches tall. They have large eyes and a short, hooked beak. Steppe saker falcons use the nests of Black Kites (*Milvus migrans*) and Imperial Eagles (*Aquila heliaca*). The mountain saker build its nest on cliffs. Saker falcons lay 2 to 5 eggs. In the winter they migrate south to Kazakhstan and the Middle East.

They spent most of their time hunting for mammals like voles, rats, stoats, weasels, northern pikas, Siberian chipmunks, and birds. They dive for their prey at 200 mph. The saker falcon are ferocious hunters and often attacks prey that is bigger than itself. Female saker falcons are more ferocious than the males



and are preferred by falconers.
In the wild they have no natural enemies, except man.

The larger, dark brown and gray barred Altai Saker falcons are the favorite bird of Arab falconers. Many of the birds are trapped in Arab countries when they are on their migration to the Middle East. In the past it was the custom to capture juvenile female sakers and train them to hunt because they were easier to train than adult birds.

Because the birds have become scarce, both adult and juvenile birds are now being caught throughout Asia and sold to the Middle Eastern falcon market. Without breeding adults in the wild, the saker falcon's population is in danger of declining.

There are no accurate figures for the population of Saker falcons, but it is believed that there are only 1,000 pairs of birds left in Russia, and 130 pairs in the rest of Europe. Some scientists think the decline of the steppe Saker is caused by the regional extinction of their preferred prey, the Red-cheeked Souseliks (*Citellus erythrogenys*), which is a type of ground squirrel. Global temperature changes has brought about changes in the vegetation on which the souseliks survived. Because the climate changed, the plants which Souseliks ate died, which caused the Souseliks to die off in that region, which is causing the Steppe Saker falcon population to decline. There are only about 200 pairs of Steppe Saker falcons left and they may become extinct in the next 10 to 15 years.

2000

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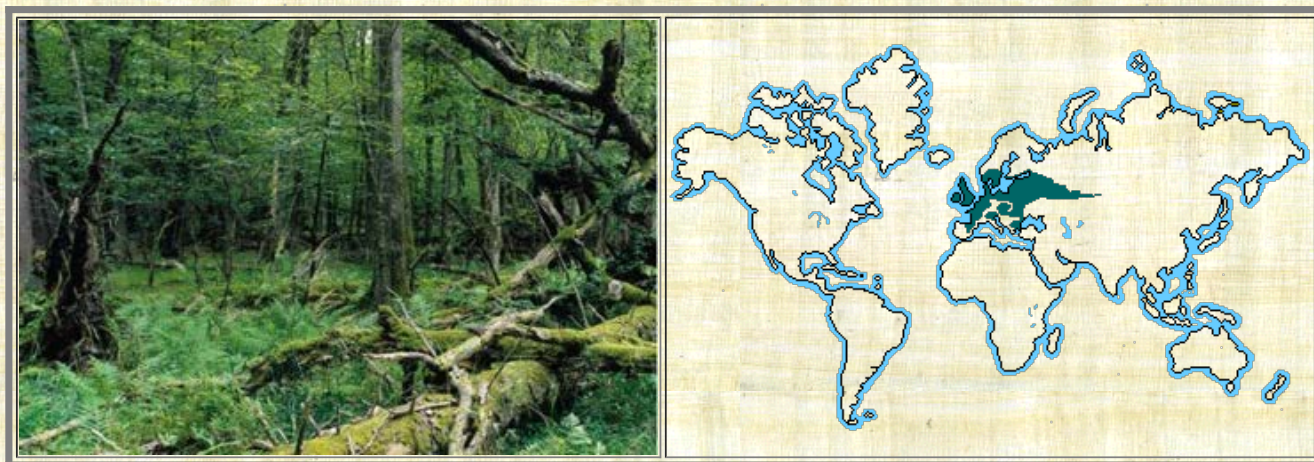
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European Deciduous Forest



Bialowieza Forest, Poland

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Very little of the deciduous forest biome of Europe is left. Long ago most of the forests were turned into agriculture and pastures. At one time Europe was covered with closed deciduous forests of oaks, elms, birch, lime, and alders from as far north as Scotland, Ireland, down to France, most of Germany, and eastward to the Urals. During the times of the Romans, small groups of Germanic tribes cut clearings in the forests to grow crops and raise livestock. In the Middle Ages people began to cut down more of the forest for fuel, agriculture, and fortifications for castles and towns. Huge expanses of the old forests were cut to build cities and ships during the Age of Exploration, when Columbus and Cortez discovered the new world. Today the only natural forests that survive are in royal hunting preserves, like the Bialowieza Forest. The Bialowieza Forest, located on the border of Poland and Belarus, is one of the largest and best preserved forests in Europe, and still contains much old-growth forest stands. Here trees join to form a continuous canopy, and animals like the European brown bear, foxes, wild cats, wolves and the last remaining herds of European bison can still be found.

The deciduous forest biome of Europe has four seasons. It experiences mild weather, with warm to cool summers, and moderately cold winters. This is due largely to the moderating effects of the Atlantic Ocean. The clockwise current of the Atlantic sweeps warm water from the Gulf Stream past its coastline, and westerly winds, warmed by the water, flow over the land. The climate is therefore moderate and mostly humid.

The Atlantic Mixed Forest, with its dunes and heathlands, is located on the western coast of the continent. Mean annual temperatures are between 9° and 12° C from north to south. Its annual precipitation ranges from 70 to 100 cm. Natural and planted forests of maritime pine (*Pinus pinaster*) grow here as well as mixed forests of oak. Heathlands have replaced many of the original forests. Many of the animals here are widespread throughout Europe, like the red, fallow and Roe deer, badgers, and martens. Only fragments of the natural vegetation remains here. Most of the land has been converted into intensive agriculture, and include some of the most fertile lands in Europe.

Central Europe is dominated by mixed broadleaf and conifer forests. It consists of large plains in the middle, hilly lake regions in the north, and upland areas in the south. Most of the area lies between 100 to 300 m above sea level. Average annual temperatures are steady throughout the region, ranging between 7° and 9° C, with milder climates in the west, and continental climates in the east. Annual precipitation is between 50 and 70 cm, with most of it falling during the spring and summer. It snows for about three months in the winter, but the snow cover isn't very high. Winters are usually overcast with rain. There are some cold days in January and February with occasional snow.

Europe has been populated and developed for such a long time that it is rare to see wild life species in their natural environments. Much of the region has been cleared for agriculture and urban areas, but meadows and pastures support many of the original plant and animal communities, although none of the larger carnivores and grazers from days past are to be found here. Mixed oak and hornbeam forests, and pine forests to the north can be found here. The forests cover about 30% of the region, most of it being secondary forests or plantation forests. It also is the most densely populated and altered part of Europe. This area had many large wetland habitats of wet forests, peat bogs, and fens. They have mostly disappeared when the marshes and river valleys were drained to provide land for people and agriculture.

Between 20-25% of mammals and 15-40% of forest birds are listed as threatened in central Europe. The European bison (*Bison bonasus*) was down to 12 animals when it was rescued from extinction, but today its population is still too small to sustain itself. The lynx (*Lynx lynx*) is also endangered because it needs a large home range in a remote habitat. Some of the other threatened mammals are the wolf (*Canis lupus*), steppe polecat (*Mustela eversmannii*), and spotted sousek (*Spermophilus suslicus*). Two eagles of the region, the white-tailed eagle (*Haliaeetus albicilla*), and the greater spotted eagle (*Aquila clanga*) both need large tracts of undisturbed forests, lakes or rivers, and wetlands. They are threatened by the loss of their habitats, and poaching along their migration routes in the southeastern part of Europe. Other threatened birds include the corncrake (*Crex crex*), lesser kestrel (*Falco naumanni*), and aquatic warbler (*Acrocephalus paludicola*).

About 75% of the original mixed forests of Central Europe have been lost, with only 6.3% of the remaining forests under protection. Ninety five percent of these forests are smaller than 10 sq. km. Although more trees are being planted today, they tend to be fast growing Scots pine plantations. These forest can only sustain a small number of plant and animal species, and endemic species are forced out.

Although there is legal protection in many areas, logging is a common practice in many European national parks. Clear cutting large tracts of land, which are then reforested with one type of fast growing conifer, is another a threat to plant and animal life. Forests habitats are often split by highways and railroads, which create barriers for the movement of wildlife. Hunting also takes place within protected areas. Air, soil and water pollution are other threats to the European deciduous forest biome.

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Animals

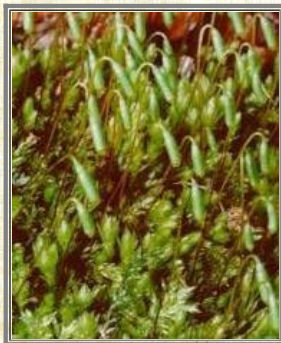
Climate

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Carpet Moss

Genus: Mnium

Species: hornum



Mosses are simple, rootless evergreen plants. They can live in a wide variety of habitats, but are most often found covering the ground, growing on stream beds, and on the base of trees in deciduous woodlands. Carpet moss grows in eastern North America and Europe.

Carpet Moss, like its name, carpets the ground. In the spring the carpet moss is golden green, and turns dark green as it gets older. It looks almost velvety. Its leaves grow parallel to each other and taper off to a point at the end. The edges of the leaves have long, narrow cells which grow in pairs and make the margins look serrated.

Mosses originated from aquatic plants and still have a lot of things in common with them. [Arctic moss](#) actually survives the bitter cold of the arctic by growing under water. They absorb water through pores which always stay open, and require constant moisture. They don't have true roots, stems or leaves. They reproduce through spores and not through seeds.

Carpet moss reproduces both sexually and asexually. When producing sexually, depending on weather conditions, mosses produce small female structures that produce egg cells, or male structures that produce sperm cells. These can grow on different parts of the same plant. The sperms fertilize the eggs and develop into a spore-plant, or sporophyte. The sporophyte begins to grow from the female plant, taking nutrients from its parent because it can't produce its own food. This sporophyte is the long stalk with a small capsule on the end that you often see growing out of carpet moss. The capsules produce the spores. When conditions are dry, the capsules open and release the spores. These spores grow into the leafy male or female mosses.

Moss can also reproduce asexually when bits of stem or leaves are separated from the plant and develop into new plants.

Many people use Carpet Moss as a ground cover in gardening. Many years ago, people used to stuff their beds with Carpet Moss because they thought it made them sleep better.

2000

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European Deciduous Forest Animals

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European Bison

Common Names: Wisent, Zubr, Zubor

Genus: Bison

Species: bonasus



The story of the European bison, or wisent, is a story of an amazing return from the brink of extinction by a species. At one time, the bison roamed the temperate European deciduous forest biome from British Isles, through most of Europe into Siberia. By the Middle Ages, in the 15th century, the bison had become all but extinct in many countries, and had died out entirely in Czechoslovakia. They survived in the wild into the 20th

century only in Poland and Caucasia, where they lived protected and fed in royal hunting forests well into the 18th century. A poacher shot the last wild Polish bison in 1919, and last wild Caucasus bison was killed in 1925. Only 54 bison remained in zoos and private parks. Almost immediately, a drive was organized to bring the bison back. In 1929, Poland bought two cows and a bull from Sweden and Germany and brought them to a breeding station in the Bialowieza forest. During World War II the bison were protected by both the Germans and the Russians, when killing one became punishable by death. The first two bulls were released into the Bialowieza National Park in 1952, with several cows following soon after. In 1957 the first calf was born into the wild. Since 1980 more than 20 herds have been reintroduced into Poland.

Today the largest concentration of European bison can be found in Poland's Bialowieza National Park. The park is a 20 square mile area located inside the 220 square mile Bialowieza Forest, and borders Belarus' Beloveskaja Pusca National Park. A large fence divides the forest along the border of the two countries, and separates the herds from each other. Currently their range includes Belarus, Kyrgyzstan, Lithuania, Poland, Ukraine, and the Russian Federation. The bison prefers flat, moist deciduous or mixed forests. Temperatures in January average 25° F in the Bialowieza Forest, and the average snow cover lasts 92 days a year. Traditionally the bison have been fed during the winter, a practice that survives today.

There are two subspecies of *Bison bonasus*. The lowland bison (*Bison bonasus bonasus*) consists of about 1,000 animals. Of these about 69% range freely in Poland, Belarus, Russia, Lithuania, Romania, and the Ukraine. The highland or

Caucasus bison (*Bison bonasus caucasus*) has been interbred with lowland bison, and no true line remains of this species. About 2,200 survive, of which about half live in the wild.

The bison is the largest and heaviest mammal on the European continent. They are smaller, and have longer legs than the American bison. The hair on the back of the neck is shorter, which also making them look smaller than their American cousin. Even so, the bulls can stand over 6 feet tall, and be over 9 feet long. Males are larger than females. A thick, dark brown, shaggy mane covers the head, neck, and front legs. In the autumn their coat becomes thicker in anticipation of winter. Both males and females have short horns that curve inward on the males, but are straighter on the females. These horns are permanent and don't branch off at any point.

In the winter, the bison form large mixed herds that stay close to feeding stations. In the spring they break up into smaller maternal and male groups. Maternal groups consist of adult cows, calves and juveniles, while the male groups consist of bachelor males. Older males will often go their own way. The same set of cows tend to stay together from year to year. The bulls will stay in separate groups during the calving season, and rejoin the mixed groups during the rut, or mating season.

During mating season, which lasts from August to October, a bull will move between groups looking for cows in estrus. He will attend her for several days before mating. During this time he will try to prevent any other bull from getting near her. Some bulls are severely injured during these head-butting bouts. After mating, the bull will leave the cow to look for another cow ready to mate. The pregnancy lasts for about nine months, and the calves are born from May to July. The mother leaves the herd to give birth to her calf, which is able to run only hours after it is born. The calf will nurse for about a year, or until its mother has another calf. Cows usually have a calf every year. bison reach sexual maturity in three to four years. Their life expectancy is up to 25 years.

Unlike their American cousins, who live on the open grasslands of the Midwest, the European bison is a woodland animal. It browses on deciduous trees, leaves, twigs, young shoots, bark, and berries. Favorite foods include willow, aspen, ash, mistletoe, and blackberry. They will also eat mushrooms, ferns, lichens, mosses, and acorns. In the winter, the park personnel feed them oats, hay, and sugar beets.

According to the 2000 IUCN Red Data List the European bison is an endangered species, and is protected. One of the largest threats to the European bison is further reduction of their range. Another significant threat is inbreeding. Since all the bison alive today come from a small surviving core group, there is not a great variety in the makeup of their genes. This makes the bison susceptible to diseases, decreases their life span, increases juvenile mortality, and the intervals between the birth of calves. The bison are also susceptible to the diseases of domestic cattle, like hoof and mouth disease, pasteurilosis, and parasites.

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Sonoran Desert Climate

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Sonoran Desert Climate

Dry Tropical Climate (BW)

The sunlight of the Sonoran desert changes during the day and it gets hotter. Seasonal temperatures range from an average of 52° F in the winter, to 86° F in the summer. In some seasons the temperatures can reach 32° F at night. In some portions of the desert, near the tip of Mexico, the temperature can reach a high of 134° F in the shade.

The Sonoran desert is one of the wettest deserts in North America and averages from 3 to 16 inches of rain a year. It has two rainy seasons, one in the summer and another in the winter. The summer rains are short and heavy and are often followed by a rainbow. The winter rains are longer and lighter and are more widespread.

There are a lot of sand dunes and grasses in the desert. There are also a lot of cacti, herbs, thorny and thornless shrubs. The creosote bush is the most common plant, and the saguaro cactus is the largest and the most conspicuous plant in the desert.

Many desert animals, such as bighorn sheep, pocket mouse, and pronghorn antelope (an endangered species) use cacti and other vegetation as a shelter from harsh weather and as a source of water. The bighorn sheep has adapted to the desert, because it has big feet, good for the rough terrain, and only needs to drink every few days. The pocket mouse has adapted to the desert, because it is very small, is sand colored, and can run fast from predators. It also doesn't need to drink because it gets all the water it needs from the food it eats and retains its urine.

The latitude of the Sonoran Desert ranges from 25° to 33° North, and the longitude ranges from 105° to 110° West.

The Köppen classification of this climate is **BWh**, where **B** stands for a dry climate, **BW** stands for an arid climate with annual precipitation usually less than 15 inches (40 cm.), and **h** stands for a dry and hot climate with a average annual temperature over 65° F.

Even though the Sonoran desert is one of the hottest North American deserts, it has lots of diverse vegetation and wildlife due to its two rainy seasons.

by Daniel F. 2003

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Sonoran Desert Climate

Dry Tropical Climate (BW)

The Sonoran Desert has many different climates and plants. This desert gets 120 to 300 mm of precipitation each year, mostly as rain. Daytime temperatures can reach or go over 40° C during the summer months of May through September. The rain falls during two wet seasons. One rainy season occurs from December through March and the other from July through September.

Winter rainfall is higher in the western part of the desert, and lowest in the southeast. The Upland Sonoran Desert has regular amounts of winter and summer rainfall. Although winter frosts are common there, they are not extreme. Where the Sonoran desert merges with the Mojave desert in the northwest, summer rainfall is usually scarce. The Arizona Upland has five seasons. There is the summer monsoon from early July to mid-September. Autumn exists from October to November with warm temperatures and low humidity. Winter is from December to February and has mostly sunny, mild days, with some storms with wind, rain and cool temperatures. Spring is from late February to late April. The temperatures are mild with little rain. The fore-summer drought occurs in May and June. The temperature is high and the humidity low. There is no rain in most years.

The Lower Colorado Valley region of the Sonoran desert is the hottest and driest. Annual rainfall is 50 mm or less. Summer temperatures are usually around 50° C. Sand dunes and drought tolerant shrubs with some succulents are found in this region. One of the driest areas in North America lies in the western Sonoran near the Desierto de Altar. The region gets less than 9 cm of rain per year and droughts can last for more than 2 years.

In Sonora, Mexico the desert has a wetter summer rainy season with a drier winter. Drought deciduous plants are common in this area.

The Sonoran desert on Baja has cool moist weather in the winter. Summer isn't quite as hot as most of the Sonoran desert because of the cooling effect of the Pacific Ocean. Moisture from fog and dew allow epiphytes to grow on the desert plants. Many different types of agaves and yuccas grow in this region.

The Köppen classification for the Sonoran Desert is **BWh**. The **B** stands for a dry climate where rain evaporates before it falls on the desert floor. There is no water surplus in this type of desert, therefore no permanent streams originate from this zone. **W** stands for an arid climate. **BW**, therefore, is an arid climate with an annual precipitation usually less than 40 cm (15 in.). The **h** designates that the average annual temperature is over 18° C (64.4° F)

2002

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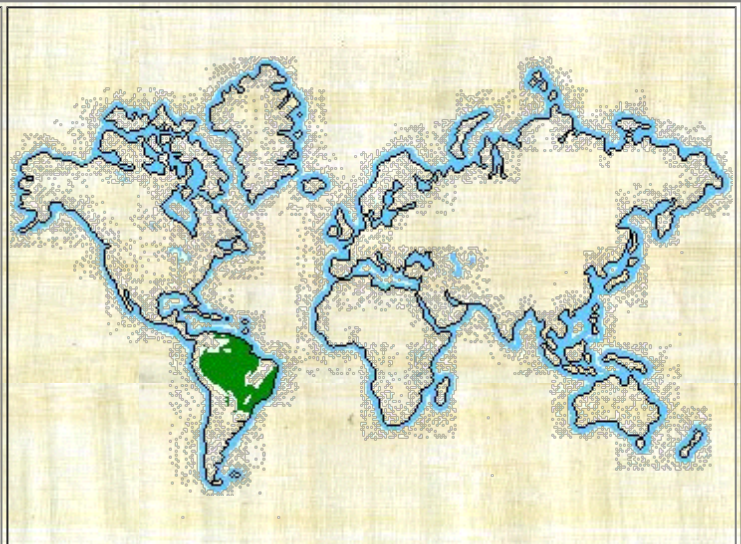
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Amazon Rainforest



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The Amazon rainforest, also known as Amazonia, is one of the world's greatest natural resources. Because its vegetation continuously recycles carbon dioxide into oxygen, it has been described as the "Lungs of our Planet". About 20% of earth's oxygen is produced by the Amazon rainforest.

The Amazon rainforest gets its name from the Amazon River, the life force of the rainforest. The Amazon River begins in the Peruvian Andes, and winds its way east over the northern half of South America. It meets the Atlantic Ocean at Belem, Brazil. The main river is about 4,080 miles long. Its drainage basin covers 2,722,000 million square miles, and lies in the countries of Brazil, Columbia, Peru, Venezuela, Ecuador, Bolivia, and the three Guyanas. Sixteen percent of all the world's river water flows through the Amazon delta. Twenty eight billion gallons of water flow into the Atlantic every minute, diluting the salinity of the ocean for more than 100 miles offshore. The Amazon rainforest watershed is home to the world's highest level of biodiversity.

Amazonia receives about 9 feet of rain every year. Fifty percent of this returns to the atmosphere through the foliage of trees. Most of the

Amazon River's water comes from the annual snowmelt high in the Peruvian Andes. Between June and October, the water level rises by 30 to 45 feet. Tens of millions of acres of rainforest are covered by water as the flood advances, reaching as far inland from the main channel as 12 miles.

Some 15 million years ago, the Amazon River flowed westward into the Pacific Ocean. When the South American plate moved into another tectonic plate, the Andes Mountains slowly rose up and blocked the flow of the river. As the river system backed up, freshwater lakes were formed, and the environment of the Amazon basin changed drastically. Then about 10 million years ago the river found its way eastward towards the Atlantic.

The Amazon rainforest is the drainage basin for the Amazon River and its many tributaries. The northern half of the South American continent is shaped like a shallow dish. About 1,100 tributaries, seventeen of which are over 1,000 miles long, drain into this depression. Whenever rain falls in the river basin, it all drains into Amazon rainforest and into the Amazon River. The Amazon is the largest river system in the world. At some points, the Amazon River is one mile wide, while at other points it can be thirty-five miles wide. At Belem, where the river flows into the Atlantic Ocean, it can be 200 to 300 miles across, depending on the season. Some of the animals that make their home here are river otters, freshwater river dolphins, turtles, piranha, manatees, electric eels, and a remarkable, giant air-breathing fish called the piraracu.

The world's largest tropical rainforest, Amazonia covers more than half of Brazil. The canopy of Amazonia is less studied than the ocean floor. Scientists believe that the canopy may contain half of the world's species. Over 500 mammals, 175 lizards and over 300 other reptiles species, and one third of the world's birds live in Amazonia. It is estimated that about 30 million insect types can be found here. Competition for survival is fierce. This may explain why over millions of years of evolution so many highly adapted species have evolved in the canopy of Amazonia. The most intense competition is between animals and plants. Both plants and animals have made adaptations to defend themselves from being eaten, and to overcome these defensive systems. Plants trap sunlight and turn it into energy for themselves and the herbivores of the canopy.

Some animals found in the canopy are the harpy eagle, which preys on monkeys, kinkajous, sloth, reptiles, and other birds. Sloths spend most of their lives in the treetops. Their diet of low nutrition leaves forces them to conserve energy, causing the sloth to spend 80% of its life resting. A large portion of a howler monkey's diet consists of leaves, which are hard to digest. Their metabolism is so low that they need to warm themselves up in the sunlight after a chilly night. Leaf-cutter ants are responsible for harvesting a sixth of the area's leaves, bringing leaf fragments to their underground nests. They play a critical role in the rainforest's ecosystem by pruning the vegetation, which stimulates new growth, and breaking down the leaves to renew the soil.

The Amazon rainforest consists of four layers or communities. Each layer has unique ecosystems, plants, and animals adapted to that system. The emergent layer is the tallest layer, where trees can be as tall as 200 feet, and rise well above the canopy. Here they are exposed to fluctuation of temperature, wind, and rainfall. The leaves are small and covered with a thick waxy surface to hold water. They take advantage of the wind by developing winged seeds that are blown to other parts of the forest. Trunks can be up to 16 feet around and braced by massive buttress roots. Some of the animals find everything they need to survive in the emergent layer and never leave it.

The main layer of the rainforest is the canopy. Most canopy trees have smooth, oval leaves that come to a point, known as a drip tip. This allows water to flow off the leaf quickly and prevents the growth of fungi, mosses, and lichens. The canopy's leaves are very dense and filter out about 80% of the sunlight. Many flowers and fruits grow in this layer. Epiphytes cover every available surface and bromeliads provide drinking water for the many canopy creatures, and breeding pools for tree frogs.

The understory only gets about two to five percent of the available sunlight. The plants find unique ways to adapt to this shadowy existence. Their solar-collecting leaves grow large, and are dark green in color. They don't often grow more than 12 feet in height. Because there is very little air movement, they rely on insects and animals to pollinate their flowers. Some grow large flowers and fruits low on their trunks to allow larger, non-climbing animals to eat and disperse their fruit. The largest concentrations of insects inhabit this layer.

The forest floor is the lowest layer and almost no plants grow here. Only about 2% of the sunlight filters through. The floor is littered with decomposing vegetation and organisms that are broken down into usable nutrients. Many nutrients are locked into this biomass. Tree roots stay close to the surface to access these nutrients. Large animals forage for roots and tubers, while insects like millipedes, scorpions, and earthworms use the litter as a source of food.

Despite all of its abundant richness, Amazonia's giant trees grow in the poorest of soil. The top two inches of the acidic soil contains 99% of the nutrients. Nine tenths of the forest's energy is stored in the leaves and tissues of the trees themselves. The forest floor is a porous mass that prevents minerals and nutrients from being washed away and lost. As soon as a tree falls, or a creature dies, decomposers begin to turn it into a food source and mulch. The vegetation to renew the cycle quickly absorbs the nutrients that are released. This is the tightest, most efficient ecosystem in nature. The destruction of one part of the system can spell the destruction of the whole system.

High temperatures and the amount of rain are the same throughout the year in Amazonia. The climate is warm and humid, with average temperatures around 79° F. The difference between day and night time temperatures is greater than those between seasons.

Today, more than 20% of the Amazon rainforest has been destroyed and is gone forever. The land is being cleared for cattle ranches, mining operations, logging, and subsistence agriculture. Some forests are being burned to make charcoal to power industrial plants. More than half of the world's rainforests have been destroyed by fire and logging in the last 50 years. Over 200,000 acres are burned every day around the world, or over 150 acres every minute. Experts also estimate that 130 species of plants, animals, and insects are lost every day. At the current rate of destruction, it is estimated that the last remaining rainforests could be destroyed in less than 40 years.

Native peoples of the Amazon rainforest have used different plants for centuries as cures and potions for their health and survival. Scientists are now discovering that many of the plants are sources for new drugs for AIDS, cancer, diabetes, arthritis, and Alzheimer's. Quinine, muscle relaxants, steroids, and cancer drugs have already been discovered. Today 121 prescription drugs sold around the world come from plant-derived sources. Although 25% of all drugs are derived from rainforest ingredients, scientists have tested only 1% of tropical plants.

Another concern for Amazonia is the fate of its indigenous people. An estimated 10 million Indians were living in Amazonia about five hundred years ago. Today there are less than 200,000 indigenous peoples left in Amazonia. More than 90 tribes have been destroyed since the 1900's. Most of the shamans and medicine men remaining are 70 years old or more. With them goes a wealth of knowledge of medicinal species of plants and organisms.

2003

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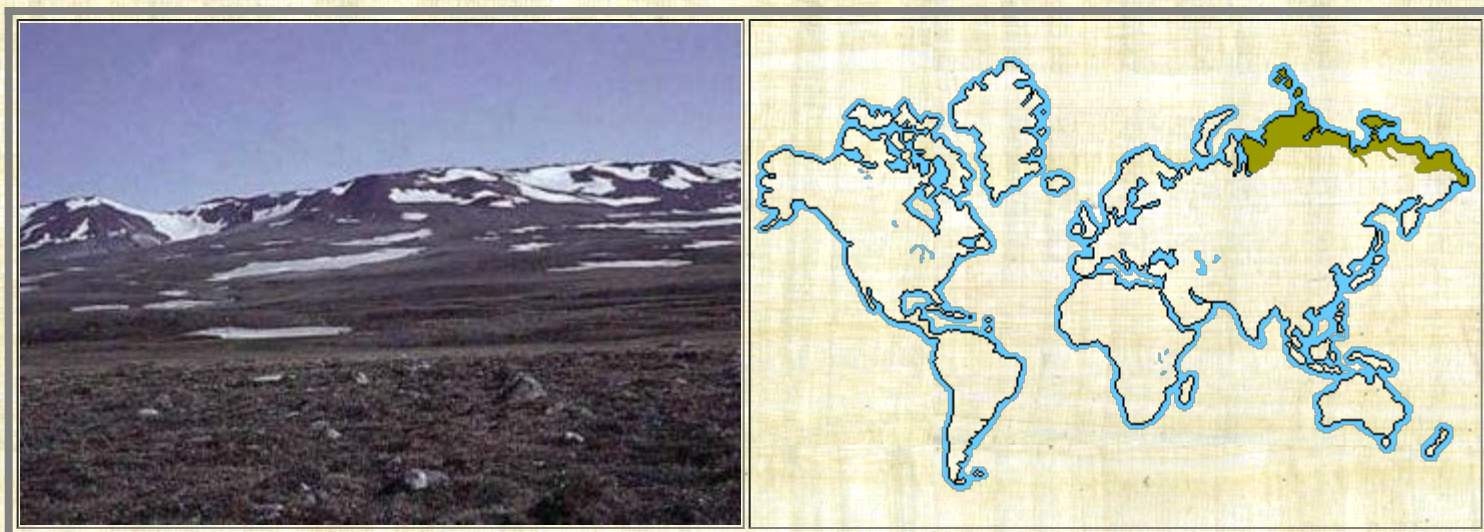
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Siberian Tundra



Plants

Animals

Climate

The tundra is located at the top of the northern hemisphere in Europe, Asia and North America. It covers 20% of the earth's surface just below the polar cap. The Siberian Tundra is located in the northeastern part of Russia between 60° to 80° North latitude, and 70° to 180° East longitude.

In the tundra, winters are long and summers are short. During the winter temperatures are usually below freezing and the ground is covered with snow and ice. Summers are marshy from puddles called thermokarsts formed from melted snow and ice. The Lena, Ob and Yenisei are all permanent rivers that flow into the Siberian Tundra. Pingoes are formed from pools of water freezing under the ground and pushing the ground up into a hill. Some pingoes are 3 to 300 feet tall and a half mile wide.

The tundra is located 1,000 to 4,000 feet above sea level. In the tundra, there are two levels of soil. The first layer is called the active layer because it freezes and thaws. It is 10 inches to 3 feet deep. The second layer is called the permafrost. It stays frozen throughout the winter and summer. The permafrost in Russia can be as deep as 1,968 feet.

The climate in the Siberian Tundra in the winter is very cold. The temperature may reach -40 degrees Fahrenheit. Summers are cool with temperatures of 37 degrees to 54 degrees Fahrenheit. Precipitation is only 6 to 10 inches per year including melted snow.

The tundra is very windy. It has winds from 30 to 60 miles per hour. The windchill is so bad in the tundra, bare skin can freeze in 30 seconds.

The plants of the Siberian Tundra include fungus, grasses and shrubs growing low to the ground to be protected from the wind and the cold. They group together to keep warm. Plant roots spread out on the surface to take in water. They don't grow deep because the soil is always freezing and thawing which breaks up roots. One of their adaptations to the cold climate is tiny hairs on their leaves to help keep in moisture.

The animals of the tundra include fish, birds, mammals and insects. The animals survive with extra fat and thick fur to keep them warm. Most animals are low to the ground and their arms, legs, tails and ears are small to keep from losing heat. Hundreds of types of birds stay for the summer only.

The Yakut people inhabit the northeastern part of Siberia. To survive, they hunt, trap and fish animals.

Ruts from trucks have caused the permafrost to melt and some of those areas have become as large as lakes. There has been lots of pollution from mining. More people are moving to the tundra, which creates more waste. Because of the cold weather, the waste does not break down. With the permafrost frozen solid, they can not bury the waste either. With the rising temperature from global warming, the permafrost may begin melting which will cause flooding to the tundra. This could destroy the world's greatest biome.

In the tundra, animals are being over hunted with guns. Many animals are being hunted almost to extinction. Now there is a limit to how many animals can be killed in one year.

In Russia, areas of land have been set aside for national parks. These parks will protect the wildlife and the tundra. There are now ways to build highways across the tundra without damaging the permafrost.

By Evan S. 2002

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Caribou

Common Names: Caribou, Reindeer

Genus: Rangifer

Species: tarandus



The caribou lives in the arctic tundra, mountain tundra, and northern forests of North America, Greenland, Scandinavia, and Russia. It is estimated that there are about 5 million caribou in the world. They were first domesticated in Norway and northern Asia and known as reindeer. People used them to pull their sleds, provide milk, meat and skins to build their tents. When it was seen how valuable they were, they were brought to Alaska in 1887. Later they were brought to parts of Canada. These North American

reindeer became known as caribou. Although they are called by different names, they are both considered to be a single species.

The caribou is actually a large members of the deer family. Unlike deer, both the male and female have antlers. The antlers of the male are long, branched and massive, and they are a little flattened at the ends. The antlers of the female are much shorter, simpler and more slender and irregular. Sometimes they are completely missing.

The caribou is a sturdy animal with short legs. Its coat is brown and becomes darker in the summer and lighter in the winter. It has a ruff of long hairs under the neck, and the fur above the hooves and around the tail are almost white. The Alaskan caribou is clove-brown with a white neck and hindquarters.

Adult bulls average 350-400 pounds, but can weigh as much as 700 pounds. Mature females average 175-225 pounds. They can range anywhere from 34 to 55 in height at the shoulder.

They are well adapted to living on the tundra. Their large, spreading hooves support the animal in snow in the winter and marshy tundra in the summer. Caribou are also great swimmers and use their feet as paddles. They can also lower their metabolic rate and go into a semi-hibernation when conditions get very harsh.

When it looks like there is nothing to eat on the winter tundra, caribou will scrape the snow away with their wide feet or antlers and eat lichens, dried sedges and small shrubs. In the summer they the will eat leaves of willows, sedges, flowering tundra plants, and mushrooms.

Caribou are social animals and live in huge herds. Males are often

loners, until its time to mate, which begins in late September and October. The herds will often have several thousand animals in it. They will migrate more than 400-500 miles to reach winter or summer feeding grounds, and can travel up to 50 miles a day. The caribou's leg tendons make crackling sounds when it walks, which would make a migrating herd an noisy bunch indeed.

Pregnant females will lead the migration to the calving grounds in May, where they will give birth to a single calf. Most females don't breed until they are 28 months old, and will give birth every year. They weigh an average of 13 pounds and grow very quickly, doubling their weight in 10-15 days. Their hair is a reddish-brown. Newborns can walk within an hour and in a few days can run with the herd. Still, wolves, grizzly bears, and golden eagles kill a large number of newborn calves.

Although some people are moving into the caribou's habitat, they seem to have adapted. Only one herd lost its calving grounds when the Alaskan oil pipeline was built, but they seem to have migrated elsewhere. The caribou is not endangered, thanks to its ability to tolerate climates people would rather not deal with.

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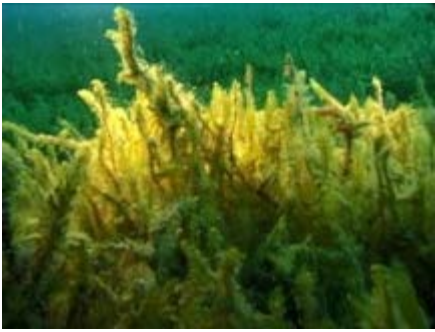
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Japanese Macaque

Common Names: Snow Monkey, Nihon zaru

Genus: Macaca

Species: fuscata



Many of us are familiar with images of monkeys soaking up the watery warmth of a hot spring in the midst of a bone chilling, wintery landscape. These are the Snow Monkeys, or Japanese macaques of Japan, living at latitudes of 41° to 31° north of the equator, the only monkeys to live that far north in the world.

The Japanese macaque lives throughout Japan, with a range covering subtropical lowlands to sub alpine regions. The great differences in habitats have made it necessary for the macaques to adapt to large seasonal changes. In the central and northern areas of Japan the temperatures can range from 5° F (-15° C) and snow more than 1 meter deep in the winter, to 73.4° F (23° C) in the summer.

Although they can be found in forested hills, highlands and mountains, there are four different areas in Japan that the Japanese macaques are located. Their northern limit is on the Shimokita Peninsula in the northwest part of Honshu Island. Conifers and deciduous trees are the dominant vegetation here. In the central region of Japan the monkeys can be found in the Nagano Mountains near a number of natural hot springs heated by the Shiga Kogen volcano. The third area is on the seaside of the island of Oshima, just off the Hanto Peninsula. In these northern areas they experience both winter and summer seasons and the macaques will travel to different home regions in the different seasons. The southern most limit of their habitat is on the southern island of Yaku-Shima. Subtropical and temperate plants and broad-leaved evergreen forest can be found here. More macaques are found here than anywhere else in Japan.

The Japanese macaque has a very human-like, naked, red face, and expressive eyes. It is a medium sized, stocky monkey, about 2

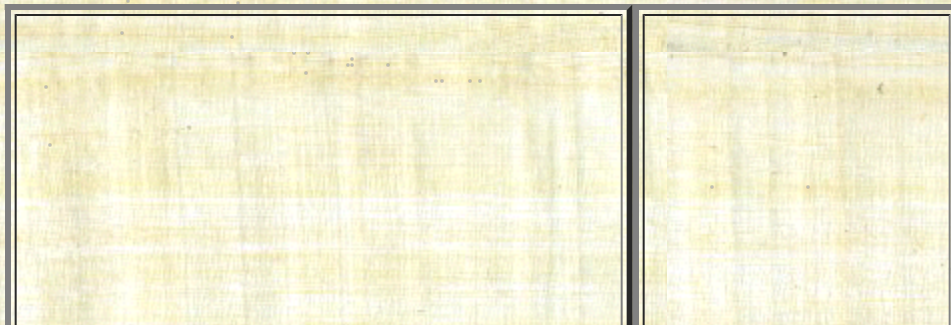


to 4 feet long, and weighs from 22 to 66 pounds. It has a relatively short tail, less than a quarter of the head and body length. The males are on the average much larger than the females, which is something called "sexual dimorphism". It has a thick, furry coat ranging from gray to brown or mottled in color. In the winter the northern tribes of macaques will grow a heavy insulating coat to maintain their body temperature. During the summer they will have a lighter coat. Like most monkeys, the Japanese macaques have a fully opposable thumb. They use all four legs to get around, but will also walk just on their hind legs when they're holding something with both hands. It has large cheek pouches for storing food in when it forages.

A troop of macaques consists of about 20 to 30 individuals, and is usually led by a dominant male who decides where the group goes and defends it against intruders. Two or three male sub-leaders help him out by keeping order in the group. Troops will have several males and females in it. Rank among males in the troop is very stable and has to do with the age of the males. High-ranking males tend to be more sociable than lower ranking males, who live on the outskirts of the troop. Males will leave the troop they were born into when they reach sexual maturity, and travel between different troops throughout their lives. The troop will spend its days foraging for food and sunning themselves. Young macaques spend a lot of time playing. In the winter they will sleep in deciduous trees to prevent accumulated snow from falling on top of them.

There is a strong social bond between the members of a troop, especially among the females. Females remain in the same troop, usually their entire life. There is a strict dominance hierarchy in both males and females. The offspring of high-ranking females will often inherit their mother's rank as they get older, with daughters gaining the same rank as their mothers. Interestingly, an alpha male will sometimes gain his rank because his mother was a high-ranking female. Younger offspring are ranked higher than older siblings, so it doesn't pay to be the first-born of a high-ranking mother. Macaques are very sociable, and will groom each other and share the job of raising their young.

Females become sexually mature at around 3.5 years, and males at 4.5 years of age. Both males and females have many partners in a breeding season, but interestingly enough, it's the female who picks who she wants to mate with. She tends to make her selection according to the rank of the male and how long he has been in the troop. She avoids choosing males whom she has mated with in the past 4-5 years, thereby avoiding inbreeding.





Macaques throughout Japan have a peak birth period from April through July, and May through September. A female is pregnant for about 5 to 6 months. She will spend less time grooming, moving and foraging, and more time resting on the day of the birth. She will have one baby at a time, forming a strong mother-infant bond that lasts for a lifetime. The infant depends on its mother for a very long time, not being weaned until well into its second year, which is very stressful for the mother. Older siblings will still be dependent on their mother while she nurses the infant, learning what to eat, where to sleep and how to raise infants from her.

An infant will begin to toddle at about 20 days, and start climbing at about one month. At this time it will also begin to ride on its mother's back instead of clinging to its mother's abdomen. It's rather difficult in the beginning but the infant soon is able to balance on its mother's back with her help.

The Japanese macaque are omnivorous, but primarily frugivorous. Their diet consists mainly of fruits, seeds, young leaves and flowers, insects, and tree bark. The variety in their diet is mostly due to the seasonal changes and their large habitat range. In the spring and summer, young leaves, flowers and shoots are eaten. In the fall they eat mostly fruit. Their winter diet consists mainly of buds and bark. They will also eat crabs, and bird eggs. Most of their foraging is done on the ground.

Scientists have begun to rethink their ideas on culture within monkey society in a large part because of the Japanese macaques. It has been observed that the macaques invent new behaviors and pass them on by imitation. In 1963 a young female named Mukubili waded into a hot spring in the Nagano Mountains to retrieve some soybeans that had been thrown in by the keepers. She liked the warmth and soon other young monkeys joined her. At first the behavior caught on only with the young macaques and their mothers. Over the years the rest of the troop took up the behavior, which now finds shelter in the 109° F (43° C) hot springs to escape the winter cold. Young monkeys have also learned how to roll snowballs, which doesn't have any survival purpose, but with which they have a lot of fun, much like human children.



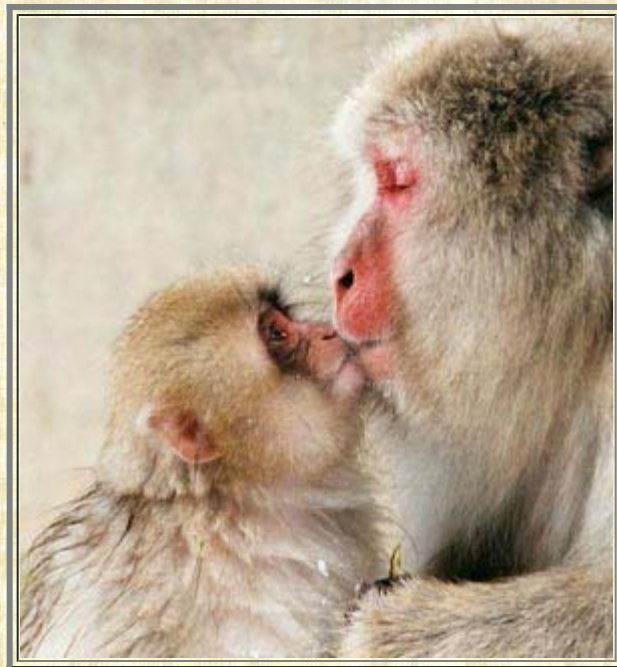
Potato washing by a troop in Koshima was first started by a one and a half year

old female named Imo. Researchers would put sweet potatoes along the beach to bring the monkeys out in the open. Imo found that she could get the sand off the potato better by dipping it into the river water, rather than brushing it off with her hands, like the other monkeys were doing. Her brothers and sisters imitated her first and then their mother. Over time the entire troop took to washing sand off potatoes with river water. At first they simply washed the sand off, but Imo soon found that the potatoes tasted better if seasoned with salt water from the ocean. They began to bite into the potato then dip it into the sea water to season it and bite again. Imo was a bit of a genius for a monkey because she also discovered wheat washing. She would make a ball of wheat and sand and throw it into the water. The wheat would float up to the top where she could pick it up and eat it without the sand.

The Japanese macaque is listed as threatened by the U.S. ESA. The subspecies *Macaca fuscata yakui* from the island of Yaku-Shima, is listed as endangered by the IUCN. In 1990 there were estimated to be around 35,000 to 50,000 Japanese macaques, with the numbers declining.

The main cause for the decline of the Japanese macaque population is the destruction of their habitat. This forces the adaptable monkey to find its food outside of its habitat where it can. An estimated 5,000 macaques are killed each year, despite being a protected species, because they raid nearby farms for food and thereby destroy the farmer's crops. Troops of macaques have invaded villages and terrorized its inhabitants by chasing after them and snatching food from children's hands. It was decided to build the Nagano macaques their own hot springs when they began to invade nearby hot tubs and human spas. Creating feeding stations in an efforts to save the macaques and prevent them from raiding nearby farms, has backfired to a certain extent, as the macaque populations in those areas have artificially soared.

The Japanese macaque, or Nihon zaru (Japanese monkey) have a long history in Japanese arts and history. The Japanese are very fond of their monkeys and do everything within their power to keep them wild and save them from extinction.



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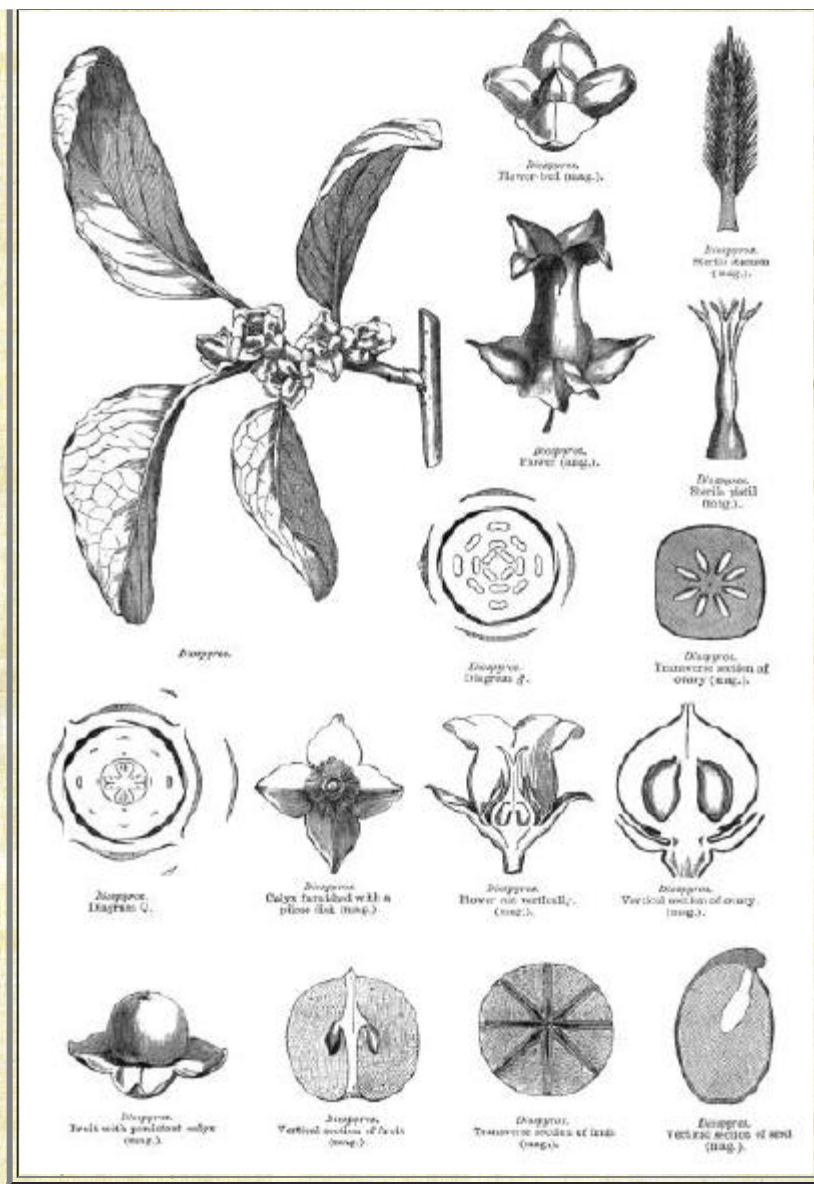
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Jackal Berry Tree

Diospyros mespiliformis





Bontebok

Genus: Damaliscus

Species: dorcas



The Bontebok is a very unique animal. Bontebok and the Blesbok were considered to be the same species, but it has been discovered that the Bontebok and the Blesbok are each different subspecies of *D. dorcas*. Over time a dry strip of land called the Karoo in the Fynbos has isolated the Bontebok from the Blesbok.

The Bontebok is a type of Antelope. Its head and body are 4.6 - 5 feet in length together. Its tail is 12-18 inches long. Males weigh one 135 pounds; females are lighter and slightly smaller. The Bontebok have deer-shaped bodies. Their hind legs are shorter than their

front legs so their back slopes down to the tail. They have a short coat, which is purple - brown. The hair is soft and has an iridescent sheen. They have a white belly and rump and white stockings. Their face is white too. The head is long and narrow with a pointed white muzzle. The eyes are located on the side of its head, like horses. The ears are long, narrow and pointed at the end. The horns are well - developed and are angular and ringed for most of their length. The Bontebok has scent glands on its front feet. Its gait is a lumbering canter about 43 miles an hour. Early morning and early evening are their active times of the day.

The Bontebok lives in grasslands and sparsely timbered regions. They are only found in protected areas of South Africa. The Mediterranean climate is one of dry summers and cool wet winters. There are a large variety of plants and woody shrubs with small leathery leaves. They live in a narrow sector of coastal plains at an altitude from 6200 meters above sea level within the Cape Fynbos zone. The Bontebok need grass, shelter and permanent water.

Two to three males compete for females with posturing displays and ritualistic sparring with the horns. The mating seasons for the Bontebok are March and April (start of the long rains). The gestation period is 7-8 months. The female Bontebok gives birth to a single young. The baby Bontebok can stand and walk in minutes after birth. Young Blesbok lack the white blaze on their foreheads. The mother only raises the lamb and the father leaves after mating season. The young Bontebok and Blesbok follow their mother rather than hide while she forages. The young are weaned at about 4 months but remain with the herd for some time after. When the young males reach about 2 years of age, they join larger, more fluid groups of juveniles. The female Bontebok stays with the mother's group. The birth interval is one year. The adult female Bontebok wanders the territories in groups. They are also found in large herds containing both sexes. The adult male Bontebok has small territories, possibly occupied for life. They feed in the early morning and evening, seeking shade during the hottest part of the day.

The Bontebok is a herbivore; it eats plants, grass, leaves and wild grass. Not many predators are in protected preserves; Caracals, Jackals and Feral Dogs kill some lambs. The Blesbok lives in an artificial environment and doesn't have a niche. The Bontebok was unable to cross the Karoo and adapted to the coastal plain of the Cape Fynbos. It uses markings to communicate with the other members of the herd. The male Bontebok has small territories, possibly occupied for life. They are also found in large herds containing both sexes. The female herds consist of a small number of adult females, with their young in a total numbering up to about 8, which are non-territorial and wander at will over the home ranges of the territorial males. They have seasonal migrations in some areas.

The Bontebok is endangered. It became extinct in most of its range in the 1800s and is considered to be the rarest antelope in the world. They are endangered because of excess hunting, agricultural encroachment and competition with domestic stock for forage and water. They are kept on protected preserves in Cape region of South Africa. None of them are found in the wild. About 15,000 survive in South Africa. The organizations involved in its protection are CITES (Convention on International Trade in Endangered Species) and Bontebok National Park.

The most interesting thing about the Bontebok is that it was separated from the Blesbok thousands of years ago when a very dry strip of land developed called the Karoo. That way they were unable to cross the Karoo and were isolated in the Fynbos.

by Annie W. 2003

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Mediterranean Chaparral Climate Mediterranean Climate (Cs)

The Mediterranean Chaparral has a very interesting climate. It has four seasons. These are spring, summer, fall, and winter. The chaparral has significantly hot and dry summers. It has cool and moist winters. Spring and fall are usually a mix between both summer and winter. There are moderate amounts of rain, and mild temperatures.

The vegetation is mostly made up of shrubs and small trees. These include evergreen shrubs and most deciduous forms of shrub. The trees, like cork oak, live oak, stone pine, and olive, usually have low branches, are very gnarled and have thick bark.

Some of the adaptations of the vegetation are that the yucca rosette shape defends the growth in the inside of the bulbs from ruin except from extremely hot fires. Another adaptation of the vegetation is that the pinecone resin, which coats the closed-cone pines melts and allows the cones to open and spread their seeds. Also, the small leaves of thyme, oregano, and rosemary keep the moisture from the precipitation in the leaves.

The fauna is very interesting. Some of the adaptations of the Mediterranean chaparral fauna are that they don't need a lot of water and they have learned to live in their biome.

What I find interesting about my biome's climate is its natural forest fires. These are caused by two things. One is the shortage of rain in the chaparral in the summer. Another is that many types of shrubs and flora are aromatic, like sage, thyme, rosemary, and oregano. These hold highly flammable oils. Did you know that the chaparral burns out every 30-40 years?

There is very little precipitation in the Mediterranean chaparral. The average annual precipitation is 10-20 inches. The kind of precipitation is rain. The average rainfall for the entire winter is 6.8 inches. The average rainfall for the entire spring is 2.2 inches. The average rainfall for summer is .2 inches. The average rainfall for fall is 4.2 inches.

The average annual temperature is 59 ° F. The highest temperature is 91.5 °F. The lowest temperature is 37°F. The average temperature for winter is 46°F. The average temperature for spring is 56°F. The average temperature for summer is 71.7°F. The average temperature for fall is 64.75°F These readings are for the entire

months and seasons. In the summer it feels dry and hot . In the winter it feels somewhat cool and moist.

The latitude range for the climate that you are reading about is between 30 to 50 degrees north and south latitude.

Köppen's climate classification letter code for the chaparral is Cs. This means a hot grassland, like the chaparral. Also this letter code describes an area with little rain.

2001

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Lebanon Cedar

Common Names: Lebanese Cedar, Cedar of Lebanon

Genus: Cedrus

Species: libani



The Lebanon cedar is originally from Asia Minor. It is native to Lebanon, Syria and southern Turkey. It can be found in the Jebel Alaonite Mountains in Syria and Lebanon, and the Taurus Mountains of Syria and southern Turkey. Rare in Lebanon, only 5000-7000 acres (2000-3000 ha) of forest remain in small patches across the country. However, it is still plentiful in Turkey. There are only three species of Cedars in the world: the Lebanon cedar, the Deodar of the Himalayas and the Mount Atlas Cedar

Large forests of Lebanon cedars of ancient days no longer exist. But because of its beauty and history the Lebanon cedar has been planted throughout the world. A large and beautiful tree grows on Martha's Vineyard in the Polly Hill Arboretum.

Lebanon cedars grow at elevations of 4,264-6,888 ft. (1300 –2100 m). They grow best in deep soil on slopes facing the sea. The trees require a lot of light and about 40 inches (1000 mm) of rain a year. They form open forests with a low undergrowth of grasses.

The first thing you notice about the Lebanon cedar is the large wide-spreading horizontal branches. The top of the tree is broad and flattened in a mature tree. In dense stands of trees they grow straight and narrow, but when standing alone, its lower branches spread out horizontally over a large area and rest on the ground. The cedars can grow 80 feet (20 m) tall and spread out from 30-50 feet (9-15 m). They grow very slowly. The oldest tree is more than 1000 years old.

The needles of the Lebanon cedar look like those of the Larch, except that they are evergreen. The needles are grouped in tufts of 30-40. They are about 1/2-1 1/2 inches (1.5-3.5 cm) long, stiff, and four-sided, tapering towards their points. They are a dark blue-green color, and stay attached to the tree for 2 years. When they fall to the ground they don't decay for several years. The leaf litter on Mount Lebanon is 1 foot (.3 m) thick.

The Lebanon cedar doesn't flower until it is 25-30 years old. The flowers, or catkins are unisexual, with both male and female flowers on the same tree. The 2-inch catkins are reddish in color.

The cones become 4-5 inches (10-12 cm) long and stand up straight on the branch. Young cones are light green in color. Female cones are barrel-shaped and dull brown. They mature in their second year. The scales are broad but thin, and each scale has 2 broad-winged seeds. The wings allow the seeds to be carried away from the parent tree by the wind. The seeds ripen in August to October, but are not shed until spring. When the scales fall off, a slim, central candle is left on the tree.

The history of the Lebanon cedar's decline is a long one. About 4,700 years ago, the Epic of Gilgamesh's Forest Journey tells the story of Gilgamesh's need for timber to finish his magnificent city. He turned his attention on the forest near southern Mesopotamia, which was protected by the deity Enlil. Enlil had forecast that once humans entered the forest, they would destroy all the trees, the 'divine beauty'. A great battle broke out between the demigod guarding the forest and the humans. Human greed won and the forest was completely stripped of its trees, leaving nothing but bare ground.

The fate of the cedar forests was sealed. The Phoenicians needed timbers for their ships, which made them the first sea-trading nation in the world. The Roman Empire's expansion into Syria had more harmful effects on the cedars. It wasn't until the Emperor Hadrian put up boundaries around the remaining forests and declared them his Imperial Domain, that the destruction of the forests was slowed.

According to the IUCN Red List of Threatened species, *Cedrus libani* is listed as LR/nt. It is at a Lower Risk, meaning that it doesn't fulfill the criteria for any of the categories of Critically Endangered, Endangered or Vulnerable. The designation "nt" means it is near threatened, and is close to qualifying for Vulnerable. It is not threatened in Turkey, although it is heavily threatened in Lebanon and extremely restricted in Syria.

Today the large cedar forests of the past are gone, replaced by a barren, dry land. When climax forest are cut, they are replaced by scrubby growth, most of the soil is lost, and water can't be retained. The *Cedrus libani* in Lebanon is limited to only twelve, separate stands. One of these stands is in Jabal el-Barouk, located on the slopes of the central section of the Mount Lebanon chain. It is the largest self-regenerating stand in Lebanon and supports some wolves and wild boar.

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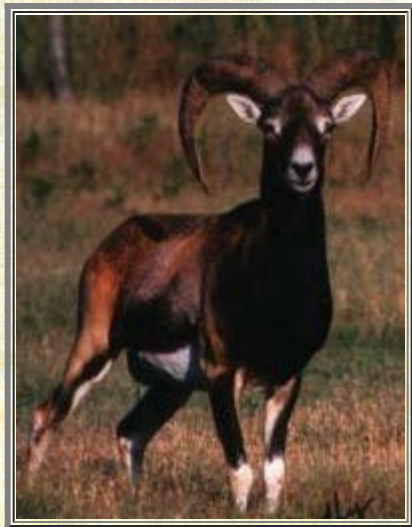
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Mouflon

Common Names: muflone (Italian), Corsican mouflon, European mouflon, musimon, musmon, Sardinian mouflon

Genus: Ovis

Species: musimon



The mouflon is thought to be one of two original ancestors of all modern day sheep. It originated on the islands of Corsica, Sardina, and Cyprus, but has recently been introduced in much of Europe. Like most wild sheep, the mouflon lives in mountainous terrain, usually above the tree line or in mountain meadows. In Corsica it lives on steep-sided rocky peaks, where it is protected from predators.

It has a red-brown color with a dark area along its back, and lighter colored side patches. Its underparts are white as well as the bottom half of their legs. It has a white muzzle and white circles around its eyes.

The males and females have horns, but those of the males are larger. The curved, spiral horns are usually around 25 inches in length and are arch back over its head. The mouflon's horns don't flare out at the end as most wild sheep's do. The size of a male mouflon's horns determine his status in the group.

A mouflon is about the size of a medium sheep with a weight range of 55-120 pounds. They are 4-5 feet long, and stand about 2-4 feet tall at the shoulders. They have a rough coat, and during the winter grow a woolly under coat that keeps them warm.

The males and females live in separate groups and only come together during mating season. The ewes will usually have the better foraging grounds because their health is more important for reproduction. Mouflon mate, or go through a rut, in late

autumn to early winter. The rams' dominance is determined by his age and the size of his horns. They will crash their horns together to re-enforce dominance. The ewes don't mate until they are about 2-3 years old. Males don't mate until they are about 7 years old because they have to establish a strong social standing before being allowed to mate with a female. The ewes are pregnant 210 days and can give birth to either one, or twin lambs. The ewe will go into cover to have her lamb which is up on its feet within minutes after birth.

The mouflon's diet is tough. Being a herbivore, it grazes on short grasses, heather, and shrubs. It has a multi-chambered stomach with special microbes that break down the cellulose of the plant cell walls. After it has eaten its fill, the mouflon will lie down somewhere, and regurgitate its food, chewing it a second time to soften it some more. It then swallows it again for the last time.

Natural predators like bears and wolves have all but disappeared from the mouflon's range. Eagles can pose a problem for young lambs, and the mouflon is still hunted for their trophy horns. The mouflon is a shy animal which feeds mostly at night and doesn't stay long in one place.

Over the last 50 years the mouflon numbers have fallen due to habitat loss, hunting, and interbreeding with domestic sheep. Sardina population dropped to 700 in 1975, but appears to be making a low comeback. Corsica has about 200-500 mouflon and Cyprus has even less. These island populations are listed as vulnerable by the World Conservation Union (IUCN). This means that there are restrictions on hunting, or trapping the mouflon to sell in the wild. Introduced herds on the mainland are thriving, however.

2001

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Wrentit

Common Names: Wrentit, Camea (Spanish)

Genus: Chamaea

Species: fasciata



The wrentit is a little native bird of California. Its head, beak, and eyes resemble those of a tit, but its long tail is held at almost a right angle to its body like a wren. It is the only American member of the mostly Asian family of babblers (Timaliidae). How it got here is a mystery.

Found from northern Oregon to Baja California, the wrentit is a common resident west of deserts, along the coast and in the western foothills of the Sierra Nevada. Its

habitat is the low, dense, stiff brush of the chaparral, coastal sage scrub, and forests with dense shrub understories. It can also be found in the mesquite thickets east of the Anza-Borrego Desert.

The wrentit is a small brown song bird with fluffy olive-brown or dark brown feathers on its back, and paler or pinkish brown feathers with faint streaks on its underside. Standing out against its pale gray face, its eyes have a pale whitish-yellow inner area with a darker outer rim. The brown bill is stubby and straight like that of a chickadee. The wings are short and rounded, and the long tail is rounded as well, often held up at an angle. Males and females, as well as immature birds look alike. They get to be about 6 inches (14-15 cm) in length and weigh about 0.46 to 0.56 ounces (13-16 g)

Not easily spotted in the dense growth of the chaparral, the wrentit is usually heard before its seen. It has very clear and sharp, whistled "pit" notes that repeat and become more and more rapid, followed by a descending trill. The song has been

compared to the sound a bouncing ping pong ball makes. Males and females sing all year to advertise their territory and to communicate with each other. When another wrentit comes on their territory, the owners will quickly fly up to them, their head feathers erect, and sing or scold. They also make a catlike purr.

Wrentits mate for life and are known as monogamous. They keep in close contact with each other, preening each other, and huddling close together when roosting. They spend all of their adult life within the territory they choose in their first year, and rarely move farther than 1312 feet (400 m) from the site where they were born. They will fly from bush to bush with short, choppy flights due to their small wing size, and hesitate to cross open spaces more than 30 to 40 feet (9 to 12 m).

Their nests are built in dense shrubbery like Ceanothus, Manzanita, coastal sage or Coyote Brush. Shaped like an open cup, it is made of grasses and bark strips held together with insect silk, and lined with soap plant or grass. The outside is sometimes decorated with lichen to camouflage it. The nest is built in the crotch of coastal sage or coyote brush. Old nest materials are often reused to make new ones.

Wrentits usually lay 3-5 whitish blue or green eggs in the summer months. Both parents will incubate the eggs for 15-16 days, which is considered long. The chicks are born naked, blind and helpless, like most song birds, but are old enough to leave the nest in 12-22 days. Both parents feed the fledglings for almost 30 days. The young birds will stay in their parents territory until the following spring. A wrentit can live as long as 12 years.

Wrentits are omnivorous, and forage for insects and spiders that it gleans from bark of shrubs and trees. It also eats berries, small fruits and seeds. The young seem to be fed only insects. Wrentits rarely forage on the ground.

Threats to the wrentits come from jays and snakes, which feed on the young, and feral cats and domestic animals. Another threat is habitat destruction as more people move into the chaparral. As chaparral and underbrush is cut down, the wrentits habitat is segmented into isolated areas. Hesitant to fly over open spaces make the wrentit populations vulnerable to extirpation (local extinction).

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Swift Fox

Common Names: Senopah (Blackfeet Native American), Mee Yah Chah, ("the lousy one", Oglala Sioux), Prairie Fox

Genus: *Vulpes*

Species: *velox*



The story of this beautiful, delicate swift fox is the story of an animal, which almost didn't make it back from the edge of extinction. The swift fox was considered so common on the Great Plains of Canada and the United States, that its gradual disappearance was almost overlooked by conservationists and governments. The last swift fox was sighted in Saskatchewan in 1930, and in the space of a few decades, it had disappeared from most of its range in Canada. In the United States it had been wiped out of 90% of its range by the 1990s.

The swift fox is a small, delicate fox, the smallest wild canid of the North American Continent, and a cousin of the western desert [kit fox](#). It is about the size of a cat, standing 12 inches (30 cm) in height, and 31 inches (79 cm) in length from head to tail. It weighs approximately 5 lbs (2.3 kg). The male, or dog fox, is larger than the female, known as a vixen.

They are a dark buff gray in color with a yellow-tan color across their sides and legs. Their throat, chest, and belly are pale yellow to white. They have black patches on their muzzles and a black tip to their tail. Their ears are noticeably large. The swift fox gets its name because it can reach speeds of 25 miles (40 km) per hour.

Swift foxes are considered nocturnal, doing most of their hunting in the evening, through the night and into the early morning hours. Although they are very sociable, they keep one mate throughout their lifetime. They don't appear to be

territorial, with many of their home ranges overlapping. Their dens are used daily, all year long.

The swift fox is omnivorous and has a varied diet of rabbits, mice, birds, reptiles, insects, berries, and seeds. Its main source of food consists of prairie dogs and ground squirrels. Predators of the swift fox are coyotes, eagles, hawks, and man. Coyotes are the primary predator of the swift fox.

Swift fox pairs get together and breed from February to early May. The pregnancy lasts about 52 days. Litter size is about 4 to 5 pups. The pups stay inside the den and don't come out for about 3 to 4 weeks. At 6 to 7 weeks they are weaned and accompany their parents on the hunt. They will stay with their parents until they are about 4 to 5 months old. In September they all go their separate ways.



Swift foxes can live up to 10 years in the wild. In captivity they have been known to live for 14 years.

When settlers first moved west onto the Great Plains, the swift fox could be found ranging north to south from central Alberta, Canada, to central Texas, and east to west from western Iowa and Minnesota through New Mexico, Colorado, Wyoming and Montana.

The swift fox occupies a specialized niche in its environment, relying on the open, rolling short and mixed-grass prairies on which buffalo range, prairie dog burrows, and the prairie dogs and ground squirrels on which they feed. After the near annihilation of the bison, the grasses grew tall and the little swift fox was unable to scan for predators. Mass poisoning of prairie dog towns to make way for agriculture eliminated the swift fox's main prey of prairie dogs and ground squirrels. Most devastating was the loss of prairie dog burrows used by the swift fox for their whelping dens and escape from predators. Without the safety of the burrows, the swift fox became easy prey for coyotes and golden eagles. Slowly the swift fox was sighted less and less.

Today they are considered to be "endangered" by the Committee on the Status of Endangered Wildlife in Canada. Private and government efforts are making gradual progress in reintroducing the swift fox to some of their natural range.

In the United States the swift fox was not considered endangered under the federal Endangered Species Act, although only 10% of its original population survived in isolated areas. In 1995 the U.S. Fish and Wildlife Service said that the swift fox should probably be listed, but that the listing could put restrictions on the way the land was used. Ranchers and farmers were afraid they could no longer use the land designated to the swift fox. The Swift Fox Conservation Team was established to look into ways to slow down the decline of the existing swift fox populations.

Northern Prairie Wildlife Research Center is helping in the reintroduction of swift foxes on the Blackfeet Tribal lands in Montana, and giving advice in the re-introducing the swift fox into Badlands National Park and the Bad River Ranch in South Dakota.

In 1998 the Blackfeet Nation of Montana, together with the Cochrane Ecological Institute and the Defenders of Wildlife began a restoration project of the swift fox to Montana. The Institute had the only swift fox captive-breeding facility in the world. While the Defenders of Wildlife provided the funding for the project, the Blackfeet Nation provided the land. By the year 2002, 10 dens had been documented, and the population was growing. In addition to returning the swift fox to the land, efforts were also made to re-establish the swift fox's food source of prairie dog and black-footed ferret populations. Their goal is to establish a self-sustaining population of swift foxes in the region.

After determining that re-establishing the swift fox would not have an adverse effect on nearby ranchers, The Badlands National Park in South Dakota released 30 swift foxes from Colorado into the park in August of 2003. Their aim is to release 30 swift foxes a year into the park and the surrounding Buffalo Gap National Grasslands until 2005. There are already large prairie dog towns and other rodent populations that will provide shelter and food for the swift fox to get established.

Private efforts are also proving very successful. Ted Turner, the owner of several large bison ranches in South Dakota and a member of the Swift Fox Conservation Team, set up the Turner Endangered Species Fund. In 2002 swift foxes were introduced to his 138,000-acre Bad River Ranch, just east of the Badlands National Park. Studies showed that the ranch could support a self-sustained population of 200 swift foxes.

The Livestock Advisory Board approved the return of the swift fox to the Bad River Ranch. The South Dakota Stockgrowers however, have voiced concern that approving the plans could set a precedent for the later introduction of larger carnivores like wolves and grizzly bears. Biologist Mike Phillips, who oversaw the reintroduction of wolves to Yellowstone Park in the 1990s, says, "Badlands and Bad River are the first beach heads, but for this to work, you've got to have more than beach heads. You need human cooperation. You can have all the habitat in the world, yet unless people are willing to consciously make room for wildlife in their daily lives, we'll continue to repeat the old patterns that caused problems."



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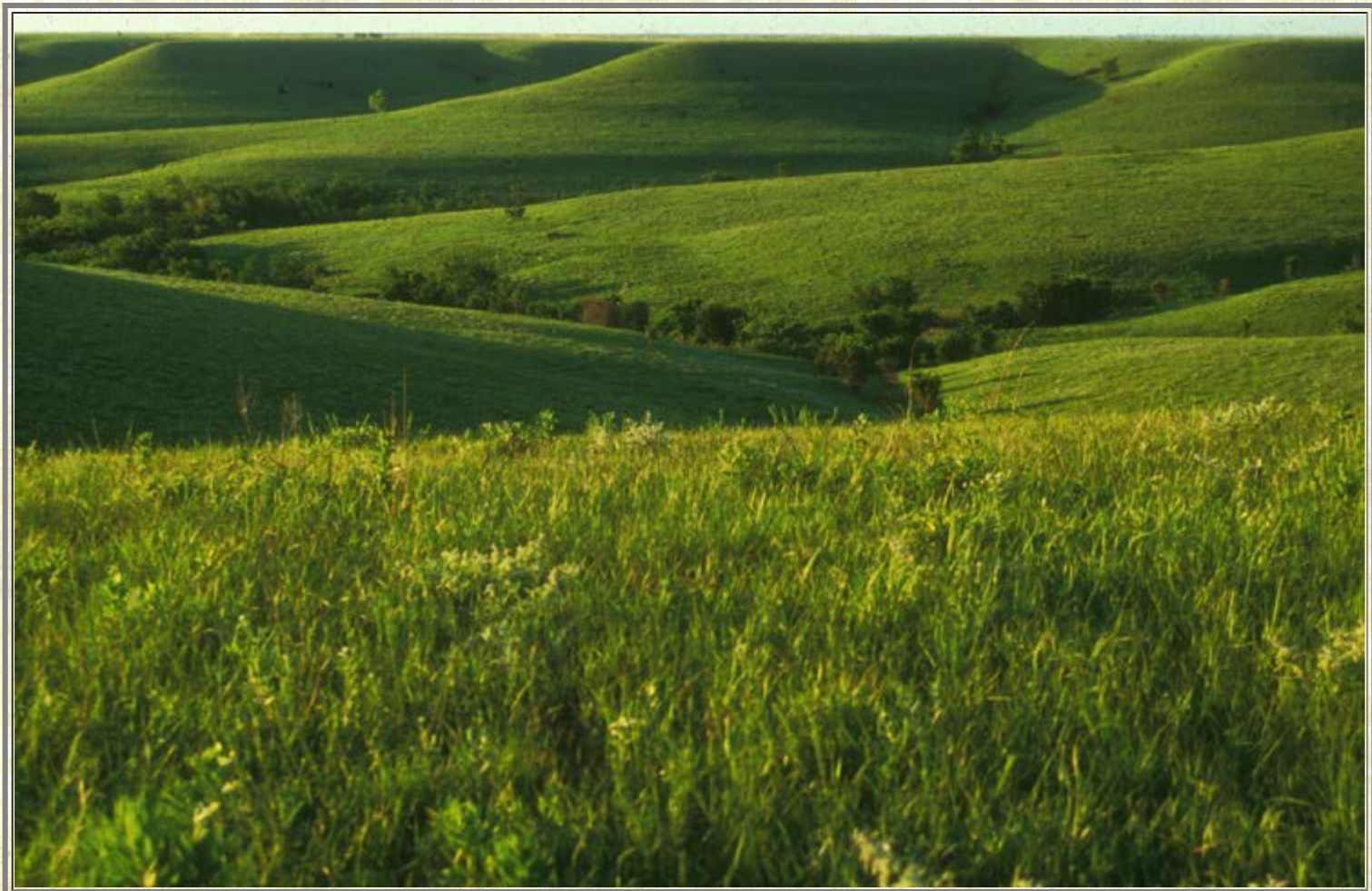
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Prairie fires promote growth of grasses and keep woody plants from taking hold









Creosote Bush

(Larrea tridentata)

Click on image for larger version

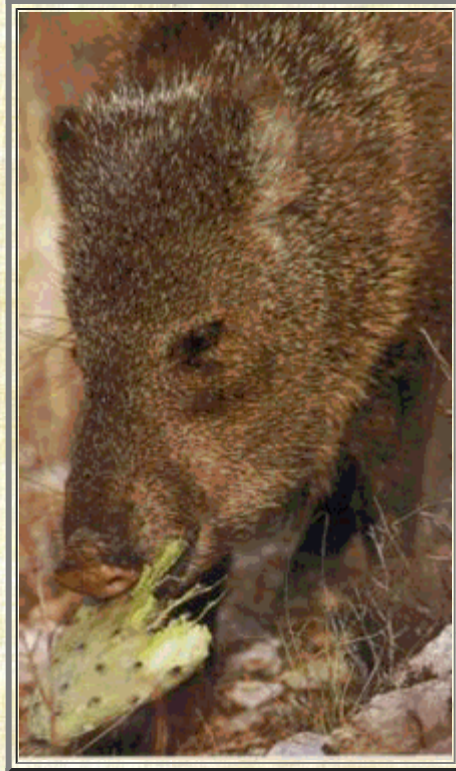


Javelina

(Tayassu tajacu)



Javelinas in a sand bath



Cactus provides javelina with necessary water



Piglets following mother



Javelinas squabbling



Mojave Rattlesnake

Genus: Crotalus

Species: scutulatus



click on pict for larger view

As the name says, this snake lives in the [Mojave Desert](#) of California. It can also be found in the extreme western part of Texas, and Southern Nevada to Puebla, near the southern edge of the Mexican plateau.

The Mojave Rattlesnake lives mainly in the high desert and lower mountain slopes. Its habitat may vary from the dry desert to

grasslands and bushes. It is most commonly found in scattered scrubby growth like creosote bush and mesquite, and is rarely found in rocky, hilly terrain.

Adults can reach lengths of 2 to 4 feet, making it a medium-sized rattlesnake.

The Mojave rattlesnake can easily be mistaken for the Western Diamondback rattlesnake (*Crotalus atrox*), which inhabits an overlapping range. They both have well-defined light-edged diamonds down the middle of their backs. The diamond pattern fades towards the last third of the Mojave Rattlesnake, whereas the diamonds continue to the tail in the Western Diamondback. The tail of the Mojave has contrasting light and dark rings. The white rings are much wider than the black rings, while the Diamondbacks have thick black rings.

Some Mojave rattlesnakes are greenish, but can be colored greenish gray, olive-green, or occasionally brownish or yellowish.

This rattlesnake has a very potent venom which is considered ten times more toxic than other North American rattlesnakes, a fact that makes the Mojave rattlesnake one of the most dangerous poisonous snakes in the United States. Their venom works as a neurotoxin and is called Mojave toxin. Strangely, the bite of a

Mojave Rattlesnake is usually not as painful as other rattlesnake bites.

The Mojave Rattlesnake does not lay eggs but gives live birth to several 9 to 11 inch young. It eats Kangaroo rats and other rodents. It is primarily nocturnal, hiding under crevice or in burrows during the hot day.

The Mojave Rattlesnake is not listed as endangered or threatened.

For a great educational website on poisonous animals and toxins, visit:

http://www.calacademy.org/exhibits/venoms/education_resources

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Bristlecone Pine

Pinus longaeva



The Patriarch



Polylepis Forests



from www.sacha.org/famil/a_to_m/ros.htm

Rhododendron campanulata ssp aeruginosum



Rhododendron campanulata ssp aeruginosum



Rhododendron campanulata ssp aeruginosum



Himalayan Tahr

Common Names:

Genus: Hemitragus

Species: jemlahicus



The Himalayan tahr is one of three species of tahr. Other tahrs are the Arabian tahr of Oman, and the Nilgiri tahr of southern India. The Himalayan tahr is a relative of the wild goat and is specially adapted to life on the rugged mountain slopes and montane woodlands of the Himalayas.

The Himalayan tahr stands 26-40 inches tall at the shoulders, and is 4-5.5 feet long. They weigh from 79 to 189 lbs. It has rather short legs for its size.

The head is also proportionally small, with large eyes, and small pointed ears. The horns are triangular in shape and curve abruptly backwards, and then inwards. This prevents serious injury in head butting battles during mating season. The horns get to a maximum length of 18 inches. The female horns are much smaller.

In the winter the tahr has a dense, reddish to dark brown woolly coat with a thick undercoat, which keeps it warm. The males will grow a long, shaggy mane around their neck and shoulders, which grows down to the upper parts of their legs. In the spring they lose much of their coat, and it becomes lighter in color.

Their hooves have a flexible, rubbery core that allows it to grip smooth rocks, while a hard, sharp rim can lodge into small footholds.

The Himalayan tahr will migrate down the mountain to more protected areas in the winter. There they form mixed herds of 15 to as many as 80 animals. The old bucks usually stay off by themselves. In the spring the males will form all-male groups, before joining the females again in the autumn.

In the early morning and late afternoon they will feed, moving up the slopes. Midday they spend resting and ruminating, high enough to be safe from predators. In the afternoon move back down the mountain, eating as they go. They are very shy, and are difficult to approach. When sensing danger they will quickly run off, easily navigating the steep slopes and uneven terrain.

The tahr will eat almost any vegetation they can find, from grass and herbs to the leaves of shrubs and trees. They will rear up on their hind legs to reach for branches which they then hold down with their front legs as they eat. The tahr is a ruminant and has a multi-chambered stomach. After feeding it needs to regurgitate the pulp and chew it over again. This allows it to get the maximum nutrition out of the tough vegetation it eats.

During the breeding season in October through January, the male Himalayan tahr will ruff up its mane to intimidate its opponents. He will try to impress females with his appearance and spend hours strutting in front of them before mating. When challenged by another male, they will try to lock horns and throw each other off balance.

The female will slip away to be by herself to give birth to a single offspring after a 7 month gestation period. The young tahr depends on its mother's milk for about 6 months, but will stay close to her for up to 2 years. In the wild the tahr will live to be about 10 years, and up to 20 years in captivity.

Although the Himalayan tahr will sometimes come down into forested areas to compete for food with domestic goats, it prefers to feed on high pastures up to 14,520 feet above sea level. Its long coat and dense undercoat, and its specialized hooves make it highly adapted to its life on the mountain slopes of the Himalayas.

The Nilgiri and Arabian tahrs are rare as a result of hunting and are listed as vulnerable and endangered by the World Conservation Union (IUCN). The Himalayan tahr is considered vulnerable by the IUCN (1996) in its home range of the Himalayas. It is considered a prize trophy for hunters all over the world. There are more sites on the internet advertising organized Himalayan tahr hunting trips than there are sites about the Himalayan tahr itself.

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Himalayan Alpine Climate

Alpine Climate (H)

The latitude range of the Himalayan climate is about 28 degrees to about 33 degrees north of the equator. The Himalayan Alpine climate varies according to the elevation. It gets colder as the elevation increases and gets wetter as the elevation drops. Because of this, the temperature changes very quickly. There are very sudden monsoons, floods, high winds, snowstorms and other types of precipitation, which makes the climate very dangerous.

The Alpine climate is similar to the climate of the biome surrounding it. For example, there are two different types of biomes on each side of the Himalayan mountains, therefore the climate on one side of these mountains is different from that on the other side.

The winter and summer are the main seasons in the Himalayan Alpine. In the winter it is usually always snowing with very icy temperatures. In the summer conditions are much milder, but throughout all of the months it is generally snowing.

The Himalayan Alpine climate is a harsh environment, therefore few animals and plants can live there. The few plants that do inhabit the Alpine consist of rhododendrons, the tea plant and shrub type plants. They have to adapt to the freezing temperatures, high winds and to a short growing season. That is why most of the plants grow low to the ground.

The mountain animals that are found in the Himalayan Alpine are similar to the mountain animals found in the surrounding biome. Some animals have adapted, such as the mountain goat, which has a thick coat for warmth and strong hooves for running up the rocky slopes.

Koppen¹'s climate classification letter for the Alpine or

Highland climate is H. The average temperature per year is around 47° Fahrenheit. This may not sound too cold, but temperatures can change rapidly. In the winter the average temperature is around 33° Fahrenheit. The lowest temperature reached was in the month of January, at 14° Fahrenheit. In the summer, temperatures average around 56° Fahrenheit. The highest temperature was reached in June

at 75° Fahrenheit.

The average precipitation reaches around 16 inches per year. In the summer there is around 3 inches of precipitation. In the winter there is about .5 inches of precipitation. Sleet, snow and rain are some forms of precipitation that falls in the Himalayan Alpine. Because of the melting

snow more drainage occurs in the summer than in the winter. However all year round the air is filled with some form of precipitation.

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Alpine Climate

Highland Climate (H)

The Alpine biome is one of the coldest biomes in the world. It is so cold because of its high altitudes. Summer temperature range between -12 degrees Celsius to 10 degrees Celsius. The average precipitation is 30 cm a year.

It is very much like the Tundra biome. Both the alpine and the tundra biomes are cold and dry throughout the year. The Alpine biome is also similar to the arctic biome.

Alpine biomes are located all around the world in high altitudes. The Alpine and Arctic biomes cover 16% of the earth's surface area.

Alpine biomes are located on mountains where trees can't grow. The growing season (for plants) is about 180 days. The night temperature is almost always below freezing. Unlike the arctic tundra, the alpine soil is well drained.

The problem of light is quite different in alpine biomes than in other biomes. The little amount of atmosphere at high altitudes exposes the Alpine area to sunlight, especially UV, at a dangerous level.

Some of the plants in an alpine biome are tussock grasses, dwarf trees, small-leafed shrubs, and heaths. Some animals in the alpine biome are; mountain goats, sheep, elk, beetles, grasshoppers and butterflies.

by Grace Murphy, 2000

African Rock Python

Genus: Python

Species: sebae



The African rock python lives in the tropical African savanna that stretches through Africa like a belt. Savannas have rolling plains of tall grasses and scattered trees. Winter begins in December and ends in February; summer starts in May and ends in December. In the summer savannas have 6-8 months of heavy rainfall, and very dry months in the winter. It has a constant, warm climate and is mostly 70°F. The African rock python likes to be near water and the edges of forests.

At 30 ft. in length, it is the third largest snake in the world. The African rock python is the only large snake found on the African continent. It is very bulky and has a dark arrowhead shape on its head. Brown blotches outlined by black on tan background surround its body. They can get to be over 250 lbs. They look like they would be slimy, but they are dry and smooth to the touch. Like all snakes, the African rock python moves by slithering its body over the ground.

All pythons kill by constricting their prey. The African rock python can live for up to a year without food if the animal it eats is big enough to sustain it. Starch ligaments hold the jaw together, which stretches out like a rubber band allowing it to eat prey as big as an antelope. Small teeth surround its jaw. The teeth are used to hold prey as the python coils its body around it.

The African rock python is dependent on water and becomes dormant during the dry season. It can lay up to 100 eggs. Their mother incubates

them for 2-3 months and aggressively defends her eggs. The hatchlings are 18-24 inches in length. The newly hatched pythons have brighter colors than their parents. They live up to 30 years. This animal lives alone and hunts alone. The python stops eating during their dormant period.

The African pythons are carnivores which means they only eat meat. They eat crocodiles, pigs, goats, birds, gazelles, and cats. They don't chew their food but have strong acids in their stomach that digests their food well. Normally they eat small animals but if hungry enough they will eat very large animals. Farmers think the rock python is useful because they eat large cane rats.

When the snake is small, predators, such as monitor lizards, crocodiles, birds of prey, cats, and pigs hunt the python. It's funny that when this snake is all grown up, it hunts these animals for food. It has few predators as an adult, except for man.

The African python is not endangered but it is on CITES App II and listed as vulnerable. This means you need a special permit to capture it. The rock python is killed for its skin and meat. Rock python's skin is made into hand bags and shoes.

by Cody G. 2002

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American Black Bear

Genus: Ursus

Species: americanus



The American black bear has a powerful build and a thick fur. Its face is long and narrow, its external ears are round, and its tail is short. The snout of the black bear is usually a dark brown color. It can be black, chocolate, brown, or cinnamon. There is even a cream-colored Kermodes bear that lives on the Pacific coast of British Columbia. It does not have a shoulder hump like the grizzly bear. Its claws are long and curved. The canines and molars of the black bear are not very large. The molars are used for grinding up the plants it eats.

The average black bear is about 35 to 40 inches tall at the shoulders, and 4 1/2 to 6 feet long. Their weight varies between 125 to 600 pounds. Male bears are about one third larger than females. Black bears can run very fast for a short distance. They have been recorded running at 25 miles per hour.

The black bear lives in the deciduous forests of eastern North America, and the pine forests of Canada. They don't live in the central areas of North America. There are about 400,000 and 750,000 black bears in North America.

Females reach sexual maturity in four to five years, and the male reaches sexual maturity in five to six years. The Black Bear mates during the summer. This is the only time that the black bears come together.

The cubs are born in the winter during hibernation. They are born blind and helpless. They develop quickly and are ready to follow their mom within five weeks after her long hibernation. The cubs stay with their mom for one year, and after their second hibernation with her, they leave. The cubs sometimes stay with

each other for a while after they are on their own.

To get ready for hibernation the black bear can eat as much as 30 pounds of food per week. Most black bears hibernate between four and seven months. This lets them save energy during the cold winter months. During hibernation the black bear loses a lot of weight. Males can lose 15% to 30% of their weight. Females can lose almost half their body weight. In the wild the black bear can survive up to twenty-five years, and sometimes longer.

The powerful build of the black bear allows them to go where they want to in the thick forest. Their fur is very thick. It keeps them warm during the long winter months. It also protects them from the undergrowth of the forest.

The claws of the black bear are very long, sharp and curved. The claws are sometimes used to climb trees in times of danger. The male bear can be dangerous because it can kill the cubs so it can breed with their mother. Other predators of the black bear cubs are mountain lions, wolves, bobcats, eagles, and packs of dogs who will kill the cubs if they become separated from their mother.

During hibernation the black bear will not urinate or defecate. It recycles its waste to use all the proteins.

The black bear is an omnivore. It eats both animals and plants. In the spring it eats grasses, flowers, sedges and herbs. In the summer it eats berries, tubers, roots, fruits. In the fall it eats nuts and acorns. They will also eat fish, ants, other insects, and honey. Sometimes they eat elk and moose calves. They will also eat ground squirrels and marmots. The black bear will also eat any dead animal it comes across.

Black bears prefer to eat in the cool of the evening or early morning. During the hot days. Bears will try to find shade to keep them cool. The black bear is a predator but the cubs are prey to some animals. The black bear is a scavenger, and helps the environment by eating dead animals.

The American Black bear is not yet an endangered species, but is listed as a threatened species with similarity of appearance to a threatened species. For example, the Asian black bear, which looks a lot like the American black bear, is hunted for its gallbladder. The American black bear is listed as a look alike species to protect it from extinction. It is still doing well in most of its ranges.

June V. 2001

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Arctic Ground Squirrel

Genus: Spermophilus

Species: paryii



This ground squirrel might be small but it is very interesting how it is able to survive in the severe elements of the North American tundra. The North American tundra biome is found from 57° to 80° North latitude, and 85° to 160° West longitude. The vegetation in the North American tundra consists of cotton grass, sedge, dwarf heath, and moss. During the summer months the sun shines all day long. The average temperatures in the summer are 3° Celsius to 12° Celsius. During the winter the regular temperatures are &endash;34° Celsius. The only kind of tree that grows in the North American tundra is the dwarf willow.

The arctic ground squirrel's main habitat is the arctic tundra. The squirrels live in the sandy soil for easy digging and good drainage. The arctic ground squirrel's main habitats are on mountain slopes, river flats, banks, lakeshores and tundra ridges.

The arctic ground squirrel's over all length is 1-1.3 feet long and the tail length is 3-5 inches. Their average weight is 23-28 ounces. The arctic ground squirrel is oval shaped. The color of the arctic ground squirrel's coat is gray, spotted with white and is light brown with touches of cinnamon. The head is shaped like an oval and the eyes are oval shaped also. The ears are small and the muzzle is very flat. The legs of the arctic ground squirrels are stubby and they have four toes. The arctic ground

squirrel walks on all four legs.

The sexual maturity of an arctic ground squirrel is eleven months. Arctic ground squirrel mating season starts in April and goes to May. The gestation period is 23-31 days and there are five to ten young. The birth weight of an arctic ground squirrel is 1 ounce. The young are blind and hairless for a period of time. The young cannot get their own food so their mothers provide milk for them. An arctic ground squirrel's newborn has no hair and its eyes don't open for twenty days. Only one of the parents raises the young. The mothers move their offspring to at least four different natal burrows to protect them. Closely related mothers will gather their young after they leave their natal burrows for extra protection. The arctic ground squirrel is dependent on its parent for six weeks. The birth interval of an arctic ground squirrel is one year. Arctic ground squirrels are social animals. Groups of arctic ground squirrels are called colonies and a male leads the group. Arctic ground squirrels do not migrate but males will some times immigrate to different colonies. The life span of males is six years and the life span of females is eleven years. Arctic ground squirrels are diurnal creatures.

Arctic ground squirrels are omnivores with a typical diet of seeds, leaves, stems, roots, flowers, and fruit; they also eat insects, small vertebrates and carrion. Arctic ground squirrels are opportunistic feeders so if they are starving they will eat almost anything, if necessary.

The arctic ground squirrels predators are grizzly bears, hawks, owls, falcons, eagles and ermine. They benefit from the tundra environment of tall grass meadows because their small size, and the color of their fur allows them to hide. Another benefit of the tundra vegetation allows them to store enough seeds, grasses, leaves, etc. to survive the harsh winters. Finally the lack of trees allows them to spot predators and alarm the colony.

To minimize detection the arctic ground squirrel will do something called the "tundra glide"; where it presses its body against the ground. Arctic ground squirrels have different warning calls for different ways they are being attacked, such as from the sky or from the land. Arctic ground squirrels have strong claws so they can dig tunnels. The arctic ground squirrel gains a grayer and thicker coat before enduring the coldness of hibernation.

The arctic ground squirrel are not endangered because they don't have much economic value and are still in balance with their predators. Arctic ground squirrels aren't hunted that much by humans compared to how much they used to be. The arctic ground squirrel could evolve into the perfect creature to live in the North American tundra considering all of their adaptations.

by Ben Hopkins

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Babirusa

Common Name: Babi rusa

Genus: Babyrousa

Species: babyrussa



The babirusa is a wild pig with curly tusks found only on the islands of Sulawesi, Toga and Molucca of the Indonesian archipelago. Their habitat is the rainforests and canebrakes, near rivers and lowland forests.

The babirusa is a very strange looking member of the pig family. They are only distantly related to other pigs, and have been given their own subfamily, the Babirousinae. There are three subspecies of the Babirusa corresponding to the areas where they are found; the Sulawesi,

Togian, and Moluccan babirusa. These subspecies have different hair covering, hair color, and tusk and body sizes. Fossil studies seem to show that the babirusa may be more closely related to hippopotamuses than pigs.

The name babirusa in Malay means "pig deer". It got this name from its bizarre tusks. The upper canines actually grow up through the skin of its snout from the inside. These 12 inch long tusks then grow up and curl over towards the forehead, sometimes touching the snout again. The lower canines are also very long and protrude from the sides. The two sets of tusks give the appearance of the antlers of a deer. Only the bottom tusks are used offensively. The top tusks can't be used for foraging or as weapons because they are very fragile and lose in their sockets. Females have shorter tusks, or none at all.

Babirusa are smaller than domestic pigs. They are 2.8-3.6 feet in length, and 2.1-2.6 feet at shoulder height. The tail is 8-12 inches long and not twisted. Babirusas weigh from 95-220 pounds.

This curly-tusked pig has a rounded body with almost hairless, bristly skin. The sparse hairs are yellowish in color. Their skin is gray to brown,

with a lighter colored underbelly. Their legs are thin and longer than on most pigs. Mature babirusas have large folds near their necks and bellies.

Babirusa reach sexual maturity from 1 to 2 years. After mating the pregnancy lasts 150 to 157 days. The babirusa only gives birth to 1 to 3 young at a time, unlike other pigs who will have 7 to 9 piglets. The mother babirusa will lie down to nurse her piglets. Although the young will begin to forage within the first week after birth, they aren't weaned until they are 6 to 8 months old. The babirusa has a life span of 24 years.

The babirusa is usually a solitary animal, although it will sometimes live in small groups. Its habits are diurnal, and it tends to feed in the morning. Its diet consists of fruits, nuts, mangos, mushrooms, leaves, and insects found in rotting wood. Unlike other pigs it doesn't root around the dirt for food with its snout. It moves along well-worn trails along the rainforest floor within their territories. It is a fast runner and a good swimmer, and has been seen swimming to off-shore islands. It has a good sense of smell and makes grunting and moaning sounds. When it gets excited it chatters its teeth. Like most other pigs it loves to wallow in mud baths to rid itself of parasites.

In the past babirusa were kept by rulers in Sulawesi and given as gifts to visiting diplomats. Masks of Balinese demons often resemble the stangely tusked babirusa.

Unfortunately the future doesn't look good for this amazing creature. They have always been scarce, but are an endangered species today. Although the babirusa avoids farmlands, and isn't persucuted by farmers, it is a favorite target for poachers. Their limited and small pockets of rainforests are also being converted into agriculture. Their wild population is estimated at around 4,000 to 5,000 animals. The IUCN put them on their vulnerable list in 1996, and the U.S. ESA considers them endangered They are on CITES Appendix I.

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Coastal California Gnatcatcher

Genus: Polioptila

Species: californica californica



The coastal California gnatcatcher is an endangered bird which only lives in the narrow coastal strip of sage scrub of the California chaparral. It can be found from southern Ventura County down to Baja California, Mexico. The California coastal chaparral is an endangered ecosystem. The winters can be cold and humid, while the summers are hot and dry. The average annual rainfall is between 6 and 20 inches.

The coastal California gnatcatcher is a small blue-gray songbird which measures only 4.5 inches (11 cm) and weighs 0.2 ounces (6 grams). It has dark blue-gray feathers on its back and grayish-white feathers on its underside. The wings have a brownish wash to them. Its long tail is

mostly black with white outer tail feathers. They have a thin, small bill. The males have a black cap during the summer which is absent during the winter. Both males and females have a white ring around their eyes. It belongs to the old-world warbler and gnatcatcher Sylviidae family.

California gnatcatchers breed from February to late August, but most of the breeding occurs between mid-March and mid-May. It protects a territory of 5 to 49 acres (2 to 20 hectares) during breeding season. Most of the nests are built less than 3 feet (1 meter) off the ground. It takes about 14 days to incubate the eggs. The young birds fledge, or leave the nest, at 8 to 13 days. They are dependent on their parents for three to four weeks, but may stay with them for several weeks more.

About 94% of the coastal California gnatcatcher live below elevations of 787 feet (240 m) along the coastal areas of the sage scrub chaparral. They are insectivores and feed on arthropods found in the vegetation of the sage scrub. They require large areas of sage scrub to maintain their diet. They prefer open growth which has been burned about 8 to 9 years before, and avoid older, denser stands of sage scrub.

With populations of the coastal California gnatcatcher declining rapidly, it was listed as threatened in 1993 under the Endangered Species Act of 1973.

The coastal California gnatcatcher is known as an "umbrella species". In order to save the coastal California gnatcatcher, the coastal sage scrub chaparral needs to be saved. When the sage scrub chaparral is saved, countless plants and animals that live in that habitat will also be saved. Some scientists disagree with whether this conservation tactic is working.

2002

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European Bison

Common Names: Wisent, Zubr, Zubor

Genus: Bison

Species: bonasus



The story of the European bison, or wisent, is a story of an amazing return from the brink of extinction by a species. At one time, the bison roamed the temperate European deciduous forest biome from British Isles, through most of Europe into Siberia. By the Middle Ages, in the 15th century, the bison had become all but extinct in many countries, and had died out entirely in Czechoslovakia. They survived in the wild into the 20th

century only in Poland and Caucasia, where they lived protected and fed in royal hunting forests well into the 18th century. A poacher shot the last wild Polish bison in 1919, and last wild Caucasus bison was killed in 1925. Only 54 bison remained in zoos and private parks. Almost immediately, a drive was organized to bring the bison back. In 1929, Poland bought two cows and a bull from Sweden and Germany and brought them to a breeding station in the Bialowieza forest. During World War II the bison were protected by both the Germans and the Russians, when killing one became punishable by death. The first two bulls were released into the Bialowieza National Park in 1952, with several cows following soon after. In 1957 the first calf was born into the wild. Since 1980 more than 20 herds have been reintroduced into Poland.

Today the largest concentration of European bison can be found in Poland's Bialowieza National Park. The park is a 20 square mile area located inside the 220 square mile Bialowieza Forest, and borders Belarus' Beloveskaja Pusca National Park. A large fence divides the forest along the border of the two countries, and separates the herds from each other. Currently their range includes Belarus, Kyrgyzstan, Lithuania, Poland,

Ukraine, and the Russian Federation. The bison prefers flat, moist deciduous or mixed forests. Temperatures in January average 25° F in the Bialowieza Forest, and the average snow cover lasts 92 days a year. Traditionally the bison have been fed during the winter, a practice that survives today.

There are two subspecies of *Bison bonasus*. The lowland bison (*Bison bonasus bonasus*) consists of about 1,000 animals. Of these about 69% range freely in Poland, Belarus, Russia, Lithuania, Romania, and the Ukraine. The highland or Caucasus bison (*Bison bonasus caucasus*) has been interbred with lowland bison, and no true line remains of this species. About 2,200 survive, of which about half live in the wild.

The bison is the largest and heaviest mammal on the European continent. They are smaller, and have longer legs than the American bison. The hair on the back of the neck is shorter, which also making them look smaller than their American cousin. Even so, the bulls can stand over 6 feet tall, and be over 9 feet long. Males are larger than females. A thick, dark brown, shaggy mane covers the head, neck, and front legs. In the autumn their coat becomes thicker in anticipation of winter. Both males and females have short horns that curve inward on the males, but are straighter on the females. These horns are permanent and don't branch off at any point.

In the winter, the bison form large mixed herds that stay close to feeding stations. In the spring they break up into smaller maternal and male groups. Maternal groups consist of adult cows, calves and juveniles, while the male groups consist of bachelor males. Older males will often go their own way. The same set of cows tend to stay together from year to year. The bulls will stay in separate groups during the calving season, and rejoin the mixed groups during the rut, or mating season.

During mating season, which lasts from August to October, a bull will move between groups looking for cows in estrus. He will attend her for several days before mating. During this time he will try to prevent any other bull from getting near her. Some bulls are severely injured during these head-butting bouts. After mating, the bull will leave the cow to look for another cow ready to mate. The pregnancy lasts for about nine months, and the calves are born from May to July. The mother leaves the herd to give birth to her calf, which is able to run only hours after it is born. The calf will nurse for about a year, or until its mother has another calf. Cows usually have a calf every year. bison reach sexual maturity in three to four years. Their life expectancy is up to 25 years.

Unlike their American cousins, who live on the open grasslands of the Midwest, the European bison is a woodland

animal. It browses on deciduous trees, leaves, twigs, young shoots, bark, and berries. Favorite foods include willow, aspen, ash, mistletoe, and blackberry. They will also eat mushrooms, ferns, lichens, mosses, and acorns. In the winter, the park personnel feed them oats, hay, and sugar beets.

According to the 2000 IUCN Red Data List the European bison is an endangered species, and is protected. One of the largest threats to the European bison is further reduction of their range. Another significant threat is inbreeding. Since all the bison alive today come from a small surviving core group, there is not a great variety in the makeup of their genes. This makes the bison susceptible to diseases, decreases their life span, increases juvenile mortality, and the intervals between the birth of calves. The bison are also susceptible to the diseases of domestic cattle, like hoof and mouth disease, pasteurellosis, and parasites.

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Fallow Deer

Genus: Dama

Species: dama

Sub-species: Dama dama dama, Dama dama mesopotamica



Fallow deer are one of the prettiest deer in Europe. Even mature Fallow deer look like young fawns, with dark chestnut coats covered in white spots. The bucks carry beautiful, impressive, flattened antlers. They are a popular park deer, and can be found in deer parks and preserves throughout the deciduous woodlands of Europe and Britain.

Before the last Ice Age, Fallow deer were found throughout the British Isles and Europe. However, as the ice advanced, they became extinct in the regions as they were driven south to the Mediterranean and North Africa. Fallow deer were

reintroduced to northern and western Europe by the Romans, and brought to Britain by the Normans after their invasion in 1169.

There are actually two subspecies of the Fallow deer, the European Fallow (*Dama dama dama*), and the Mesopotamian Fallow (*Dama dama mesopotamica*). Mesopotamian Fallow deer are restricted to Iraq and Iran, and have almost been hunted to extinction. It is thought that the Fallow deer evolved from the Sika deer.

Medium sized, thin, and rangy, Fallow deer are slightly larger than a domestic goat. They have long heads, with large eyes and ears, and a black nose. The bucks weigh about 55 to 70 kg, and can stand about 90 to 95 cm at the shoulders, while the females

weigh about 40 to 45 kg, and stand 80 to 85 cm high at the shoulders. Fallow deer have several varieties of coat colors. Their coats can vary from black, white, brown, and yellow. The most common is deep chestnut, with white spots in the summer that darken to grey in the winter. The underbelly is white, and the rump patch is white with a black outline. A black line runs down the back and onto the upper surface of the tail.

Fallow deer belong to their own genus, the Dama, because of their palmated, or flattened antlers. These antlers can reach a total length of 39 cm, depending on the age and condition of the buck. The tines of the antlers are club shaped. Around the base of the antlers a pearly crown, or coronet about 5 cm in diameter forms. Bucks will grow their antlers in late spring. A soft, blood-rich skin covering called velvet supplies blood to the growing antlers. Antlers fully develop in about 12 to 17 weeks. By August, the velvet dries and is scraped off against bushes and trees. The fully developed and shiny antlers are used as a display to attract female and repel other bucks during the mating season. The antlers are shed in March or April.

Fallow deer are herd deer. They don't have territories, but will have a home range over which they will travel, foraging for food. Ranges will overlap those of other herds. The make-up of the herd varies according to the season. For most of the year Fallow deer live in two different herds, adult females with fawns and yearlings, and bucks living alone, or in bachelor herds of three to five animals. The female herd is led by a dominant female. The two groups will come together during mating season.

The rut, or mating season, occurs in October. The bucks will join the female herds, looking for a female in estrus, or ready to mate. When they find a ready female, they will keep other males from getting near her by locking horns and engaging in pushing matches. A buck reaches sexual maturity at 18 months, at which time they leave the female herd. They won't be ready to mate however for another 5 or 6 years, when they reach physical maturity, and can challenge other mature males for rights to a female. Does can breed at a year and a half. Pregnancy lasts 33 weeks with single fawns born in May and June. The newborn fawn weighs about 4.5 kg at birth. It doesn't follow its mother around for about 2 weeks after its birth, but lies in hiding while she feeds nearby. Fawns will suckle until the next fawn is born.

Fallow deer are mainly grazers, but will browse herbs, leaves, acorns, young deciduous shoots, and crops like sugar beets. Most of the water they need they get from what they eat.

They were considered "Beasts of the Forest", and therefore belonged to the King. Permission from the King was needed by a nobleman to keep and hunt deer on his estate. Noblemen therefore enclosed their estates to control the deer, and be the

only ones able to hunt them. Deer parks and preserves are the ideal habitat for the Fallow deer. They need the glades and open woodlands that parks have to offer. They use the forest's tree cover and undergrowth for shelter and winter food, and the meadows for feeding. Many Fallow deer have escaped the parks and live wild throughout the region. Today they are the most common deer species in the United Kingdom, with more Fallow deer in Ireland than their native Red deer.

The European Fallow deer are not an endangered species. They are a protected game species throughout most of their range. They have been kept in game parks for hunting purposes almost from the time of the Romans. The Mesopotamian Fallow deer are considered endangered, and are on the CITES Appendix I. Some of the Fallow deer's predators in the wild are wolves, lynx and bear. Fawns are occasionally be taken by foxes.

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Goliath Bird Eating Spider

Genus: Theraphosa

Species: blondi



The Goliath bird-eating spider is, as its name suggests, large enough to eat a bird. This giant spider is found in the northern South American countries of Suriname, Brazil, Guyana and Venezuela. Its habitat is the wet swamps and marshy areas deep within the primary rainforest. The Goliath bird-eating spider was named by explorers from the Victorian era who first reported them to the western world, and witnessed one eating a humming bird.

Goliath bird-eaters are the world's largest species of tarantula. Tarantula is a generic name for hairy spiders. This hairy spider has a leg span of 12 inches (30.5 cm) across, or about the size of a dinner plate or small pizza, and they can weigh 2.5 ounces (70 g). Their bodies are dark and light brown in color. Like most spiders they lack antennae and have four pairs of legs. Their bodies are made up of two external parts; the cephalothorax, or head and neck combined, and the abdomen. Their eyesight is weak even though they have 8 eyes. They can only see differences in the level of light. They rely instead on sensory hairs that feel the slightest vibrations on the ground and in the air, and allows them to detect movement.

Like most tarantulas, the Goliath-bird eater is a deep burrowing species. They live in burrows in the ground dug by the spiders themselves, or abandoned by rodents. The female spends most of her life in her silk-lined burrow. They are nocturnal spiders and don't travel more than a few feet from home, resting in their burrows during the day.

The Goliath bird-eating spider is a solitary arachnid, and only associates with other spiders of its species when mating or guarding its young. Males can be identified by the mating hooks on the first set of legs. The male will come to the entrance of the female's burrow and try to entice her out. He will use his mating hooks when she comes out to restrain her fangs while he tries to mate with her. Afterwards he has to make a fast getaway or be injured or killed by the female. About 50% of the males are killed or maimed while trying to mate.

The female deposits about 50 eggs in a silken egg sack about 1 inch (3 cm) in diameter, and stores it in her burrow. She guards it for 6 to 7 weeks, even taking the sack with her when she leaves the burrow. After the young spiders hatch they stay in the nest until their first molt, and then go out on their own.

The Goliath bird-eating spiders are considered to be very aggressive and do not make good pets. Unlike other spiders, who are noiseless, the Goliath bird-eating spider can make a hissing noise to frighten off threats by rubbing bristles on its legs together. They will also rear up on their hind legs in a threat position. Their two fangs have poison glands at their base. Although they are not very toxic to humans, they can cause severe pain, nausea and sweating. The venom works on the nervous system and paralyzes its smaller victims. A more painful way of defending itself is to flick off the hairs on its abdomen with its legs. These microscopically barbed hairs can be irritating to the skin and lungs. They will cause swelling for a few hours like a nettle rash. It is most serious when the hairs get into your eyes or mouth.

The life expectancy for a female Goliath bird eater is about 25 years. Most require about 10 years to mature to adults. Males live for only one year or less after mating. The spiders continue to molt after reaching maturity and are able to regrow any limbs they might lose.

The size and power of the Goliath bird-eater makes it possible for them to eat larger prey. They rarely eat birds, although they may eat hatchlings. Its usual diet consists of frogs, small snakes, beetles, insects, lizards and even bats and pinky rats. They don't have any special hunting technique, like building webs or leaping on their prey. They will sneak up on their prey and pounce on their victim, injecting them with venom which paralyzes them. They will often carry their prey back to their burrow or a safe location to eat it at leisure. They don't have teeth to tear or chew their food, but regurgitate digestive juices onto their victim. The juices break down the soft tissue making it possible for the spider to suck up the liquid and eat its meal.

Although it is not threatened in the wild, it does have natural enemies like certain spider wasps, some snakes, and other

tarantulas. The spiders are most vulnerable during molting when they are fragile and can't move very well. Smaller insects can easily kill a tarantula in the process of molting. It takes several days for the exoskeleton to harden again. The most dangerous enemy the spider has is man and the destruction of its habitat.

2003

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Wrentit - *Chamaea fasciata*



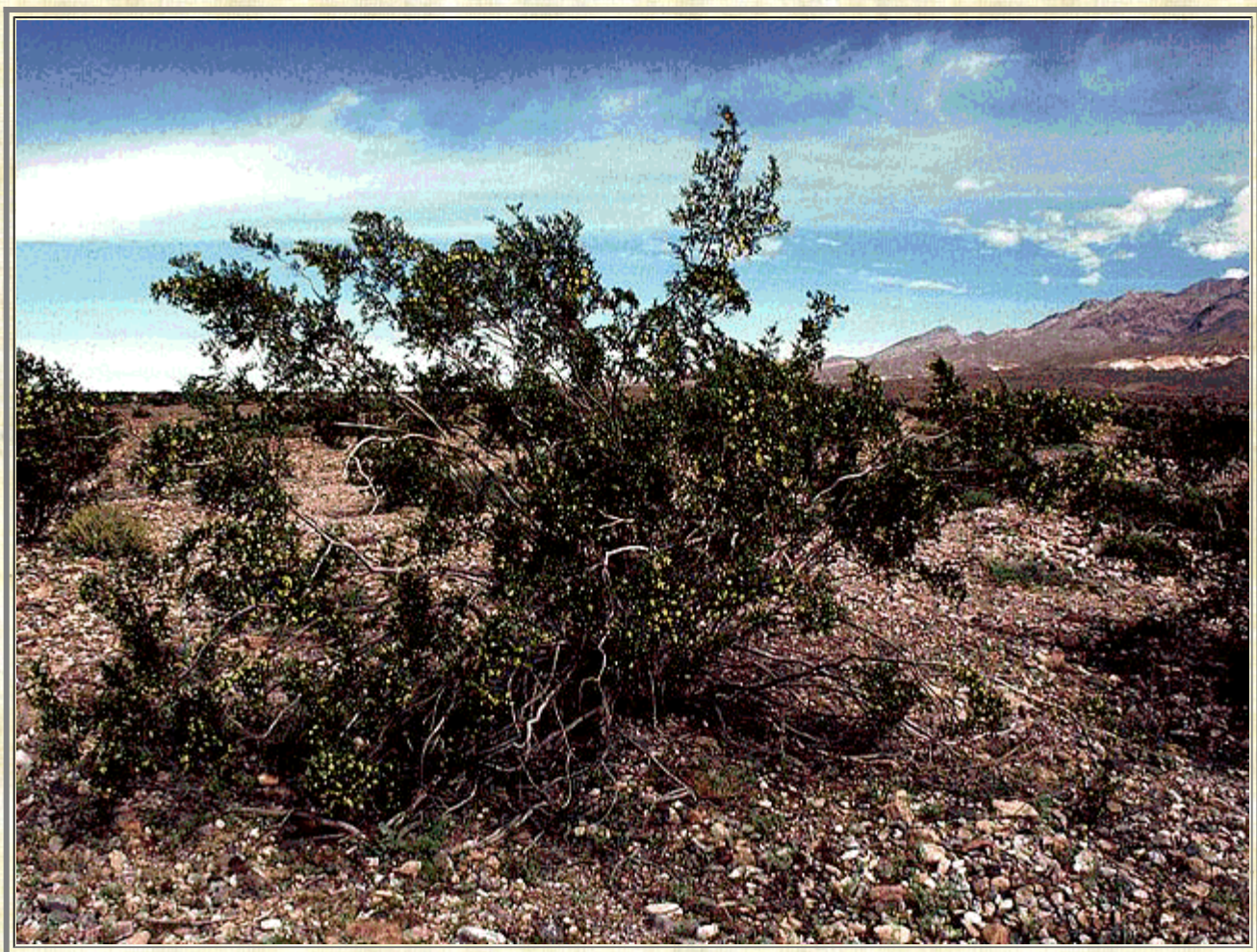
Creosote Bush

(Larrea tridentata)



Creosote Bush

(Larrea tridentata)



Mojave Rattlesnake (*Crotalus scutulatus*)

