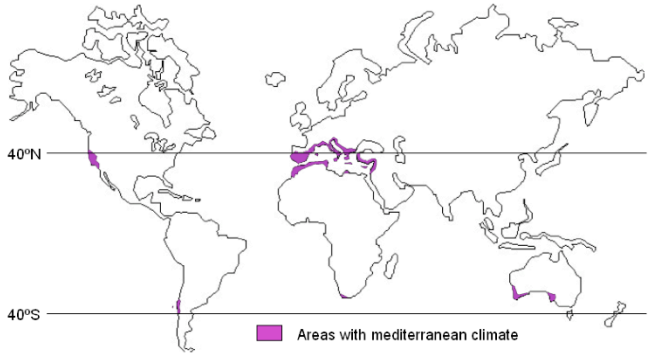
Zoo's Horticulture Collection

San Francisco Zoo
Mediterranean Climate

- Mild, wet winters and warm, dry summers
- Five Mediterranean Climates:

  Lands around the Mediterranean Sea, Chile, South Africa, Australia, and California especially at the zoo



California is in one of the world's five Mediterranean climate zones, characterized by mild, wet winters and warm, dry summers. Other Mediterranean climates, as shown in purple here, include lands around the Mediterranean Sea, Chile, South Africa and Australia.

San Francisco's frequent fog along the coast moderates the mild climate. Summer fog helps plants to survive the dry season. At the zoo, there is a microclimate because of the coastal fog that you might not get a few miles further east.

Adaptations of native California species include drought and fire tolerance, able to withstand high degree of disturbance from winds and tides, and exposure to salt and sand. Spring and fall are important growth seasons here.

Monterey Cyprus

Cupressus macrocarpa

The most dominant and largest tree at the zoo is the **Monterey Cypress**, which is featured prominently in the Zoo logo. It is also known as the "lone cypress" and is a native to the Central Coast of California, found predominantly on the Monterey Peninsula. This tree loves the foggy coastal climate. Mature trees can reach 70 feet or more, but ocean winds frequently bend the trees into flat-topped profiles. Here at the Zoo these cypress grow tall and straight because they are protected from the relentless ocean winds that shape their flat top. The largest trees were planted about 80 to 90 years ago and are now nearing the end of their life cycle. These trees serve as vital wind breaks to coastal areas all over the world. As a conifer, they stay green all year keep the Zoo looking alive.

Swamp Gum Tree

Eucalyptus ovata

Swamp gum eucalyptus (*Eucalyptus ovata*) was one of the original lake-shore plantings at the Zoo, planted sometime around 1925. There are only about 20 of these trees known to exist in California, and this is one of the largest! Swamp gums can thrive in wet areas like the edge of this pond and may reach 80 feet tall. However, this tree adapted to our windy coastal habitat and has spread out wide instead of tall. This one is located by the lower lake between the koala and the walkabout.

Eucalyptus Blue Gum

Eucalyptus globulus

Blue-gum Eucalyptus (*Eucalyptus globulus*) is the second most common big tree found in the Zoo, after the Monterey cypress. Sometimes also known as the Tasmanian blue gum, it is a very large evergreen from Australia. This tree is the most extensively planted eucalypt and its bark sheds often. It grows very fast and is well suited to a Mediterranean climate. The leaves can be steamed-distilled to extract eucalyptus oil.

Many Blue-Gum trees were planted around the zoo, 60-70 years ago. Besides helping in the Zoo as Pacific Ocean wind breaks, these trees are also are used for Koala browse. It is because of the abundance of eucalyptus trees here in California that we are able to exhibit koalas.

Pride of Madeiera

Echium candicans

Pride of Madeiera (*Echium candicans*) is an evergreen shrub with gray-green leaves that sends up beautiful spikes of rosy to blue flowers. Growing to almost eight feet, this perennial plant is found in many areas of the Zoo, including the Taube Family Entry Village. Since it is drought tolerant and reseeds itself, it does very well at the Zoo and all over coastal California. Bees, butterflies and hummingbirds frequent this plant. Pride of Madeira is native to the Madeira and Canary Islands but has naturalized here in California.

Also in the *Echium* genus is the Tower of Jewel which is a biannual. It is endemic to the island of Tenerife, one of the Canary Islands off of Spain.

Proteaceae Family
Protea

Protea sp.

Most of the plants around the Roberts African Savannah and the Bernard Osher Giraffe Lodge are native to the southwestern tip of Africa. The Cape Floral region of South Africa has one of the world's highest densities of plant species. It has the third-highest level of biodiversity in the world. It has 10 percent of the world's flowering species and 69 percent of them are endemic. This region has the same climate as California with dry summers and mild wet winters. It is especially similar to the San Francisco area with its summer fog, which helps the plants survive the dry season.

The family Proteaceae is an ancient one, probably one of the oldest groups of flowering plants. Its ancestors grew in Gondwanaland, 300 million years ago. In addition to the Cape Floral region, other Proteaceae can be found in the Southern Hemisphere, mainly in Australia. In the Savannah there are three genus's representing the Proteaceae Family: *Protea*, *Leucospermum* and *Leucadendron*.

Protea or **Sugarbush** are native to South Africa. As early as the 1670's European settlers collected the plentiful nectar from *Protea repens* flowerheads. It was boiled into thick ruby-red syrup, which was used as a sugar substitute. This syrup was also believed to be an effective treatment for coughs and other chest ailments.

The majority of familiar Protea of South Africa and Australia are adapted to harsh environments that are both arid and nutrient deficient. *Protea* are specially adapted against natural fires. Their seed heads are fire-proof, protecting the seeds. These seeds are released when the plant dies or is killed after a fire. Fire season is typically in late summer or autumn and is followed by the rainy season, which provides moisture for the new seedlings. The hairs on the seeds aid in wind dispersal across the area.

The King Protea (*Protea cynaroides*) is the national flower of South Africa.

Many succulents of kalanchoes, echeverias, and aloes are also grown near the zoo's African savannah exhibit with the tall tree aloes being showcased as you enter the tunnel to the Donga.

Proteaceae Family
Leucospermum

Leucospermum sp.

Leucospermum, or **pincushions** are also in the Proteaceae family and are named for the rings of brightly colored yellow, orange or red styles that protrude like curved pins from their flower heads. They have tough and leathery leaves with flowers in a group or cluster. *Leucospermum* are extremely fire resistant. In a fire, the above ground parts are burned, but the woody rootstock survives sending out multiple stems.

Proteaceae Family
Leucodendron

Leucodendron sp.

Leucodendron or **conebush** leaves are usually green, often covered with a waxy bloom and are endemic to South Africa. Their flowers are also produced in dense clusters. The fruit is a heavy woody cone, containing numerous seeds; each seed is a small nut with a silky-haired helicopter-like parachute, enabling it to disperse by wind. Like the rest of the Proteaceae family they are fire resistant too.

Greenie's Conservation Corner

Opened on Earth Day 2010, Greenie's Conservation Corner is a demonstration zone for sustainable practices and eco-friendly activities. *Conservation Corner* is an opportunity to have a dynamic teaching and learning facility to show what we as individuals can do to become more eco-friendly or "green" in our own backyards.

The **five major elements** demonstrated at Greenie's Conservation Corner include:

1. Alternative Energy Systems: Energy can be generated from abundant natural resources such as wind and sunlight. A **wind turbine** converts kinetic energy into useable electricity to power lights in the earthquake shack. The **solar panels** use light energy from the sun to generate electricity to run the bathroom, drip, fountain, pumps, etc. utilizing solar and small wind power.

2. Food Source: Where our food comes from and how it is grown has varying impacts on our environment. Local animals are attracted to the area because of food or shelter. The **organic raised beds** provide food for zoo animals and support local pollinators without using non-organic fertilizers and harmful pesticides. **Plant pollinators** such as bees, birds, butterflies and bats are critical to production of food. There are bird feeders to help attract some of the local birds. **Composting and worm farming** are two natural ways to improve soil and reduce waste. All green-waste from the garden and the kitchen will be composted and reused as nutrient rich soil.

3. Shelter: Animals need shelter to survive as we do. Creating shelters can support local wildlife. The 1906 earthquake shack is one of the last buildings left that was used to help shelter people after the disaster. It is an interpretive shack conveying history and the importance of communities, gardens, and challenges we all face on our Planet Earth. **Bat houses** attract bats which control mosquitoes and other insect populations. **Bee hives** provide a safe shelter for the bees where they tend their young and store food.

4. Water Conservation: Water is essential to life but only 2% of the earth's water is fit to drink. It is important to conserve this valuable resource. Barrels are used to collect **rainwater** from the roof of the building where the water is stored and then distributed to the garden beds as needed. The **drip irrigation system** is an efficient method of watering a plant's root zone by a slow application of water. **Native and water-wise plants** that are easy to grow in a coastal climates are growing in the garden beds. Native plants are adapted to the region's water cycle and need less water. Low/no flow toilets were installed in the nearby bathroom to reduce water usage.

5. Repurposed Materials and Recycle: By taking useful products and exchanging them, without reprocessing, reuse helps save time, money, energy, and resources. This exhibit was constructed by reusing materials found around the zoo. By looking around the garden you can see clever ways these zoo materials were repurposed and not thrown away. Examples include using the cement garbage receptacles as garden beds for the planting of herbs and flowers; reusing wood for the raised beds and interpretive signs; and old rope used to mark the area around the exhibit; and the fountain is made of an old water trough and animal drinkers.

CA Native Gardens

California has more than 6,000 species of native plants, including the state flower, the **California poppy**, *Eschscholzia californica*. Here at the zoo, we have six small gardens that support only California native plants. Native plants are adapted to the natural water cycle, which in California means a wet winter and a dry summer. Once established, California native gardens need little maintenance or water.

One garden is right across from Hearst Grizzly Gulch, and it is filled with plants that would be found in a wild grizzly bear habitat. Two others are located near Lion Fountain, and those demonstrate North American shrubs and sand dune habitats of California. The other three are very small and found in the Fisher Family Children's Zoo, Greenie's Conservation Corner, and in the courtyard of the Connie & Bob Lurie Education Center.

'Gail's Fragrance Garden' is a sensory and fragrance garden designed to attract migratory species. This garden features plants especially chosen for their fragrance, texture or color.

Plants have fragrances to either defend against being browsed or chewed or to attract animals (bees, insects and birds) for pollination and seed dispersal. The fragrance may be found in the flowers, leaves, roots or bark. On warmer days the leaves' smell evaporates more readily to cool their surfaces, so the garden will always be more fragrant on warm days. In some cases, plants may have bad smelling leaves but sweetly perfumed flowers. Visitors may touch, rub and smell these plants to experience the wonderful smells.

Prehistoric Garden

One of the newest additions to the Zoo's gardens is the Prehistoric Garden across from the South American Tropical Building by the edge of the lake. This area focuses on ancient plant varieties that have survived for approximately 200 million years. Non-flowering plants that resemble palms called cycads are also known as "living fossils" because they flourished during the time of the dinosaurs; many ferns also thrived in the low light and high moisture of these ancient tropical forests. Mosses, gunnera, and horsetails are represented in this garden as well as some of the earliest flowering plants, such as *Magnolia* and a bird-of-paradise flower, (*Strelitzia reginae)*, and some species of dinosaurs.

Browse
Acacia

Acacia longifolia

The San Francisco Zoo continually supplies, as part of the Zoo's Animal Wellness Initiative, daily harvested browse materials for animals such as koalas, giraffes, rhinos, red panda and many more. This includes branches and leaves of eucalyptus, coprosma, acacia, bamboo and other trees and shrubs. This enriches the animal's diet and stimulates their senses and replicates how they would eat in the wild.

The most significant browsers are the koalas. Koalas have adapted to the **eucalyptus** leave's oils that are toxic to most other animals. These picky marsupials need three varieties of fresh eucalyptus daily. Koalas get most their water requirement from the Eucalyptus, which contains 40-60% water. They eat only the top 3-4 inches of the browse and will eat only certain types of Eucalyptus; this new growth contains the more water and nutrients than the older growth. A eucalyptus browse garden is located just beyond the koalas and although this small garden is only harvested two or three times a year, it demonstrates the diverse eucalyptus species that our koalas include in their diet.

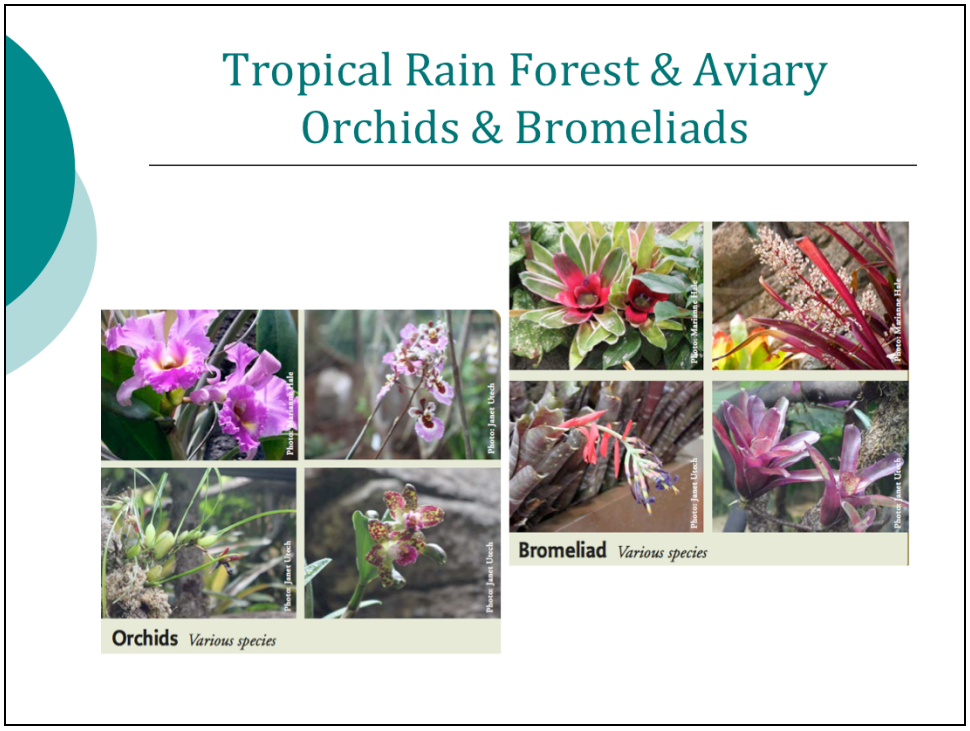
Coprosma is a genus of shrubs or small trees of the Family Rubiaceae found in New Zealand, Australia, and Hawaii. This browse is supplied to hoofstock of the zoo.

Acacia longifolia, originally from Australia, is eaten by the zoo's hoofstock, primates and birds. About 800 species of Acacia shrubs and trees inhabit the Earth's warmer climates, especially temperate parts of Australia, where the trees are called wattles.

Bamboo is part of the grass family and are some of the fastest-growing plants in the world. Our red panda has a daily supply of bamboo.

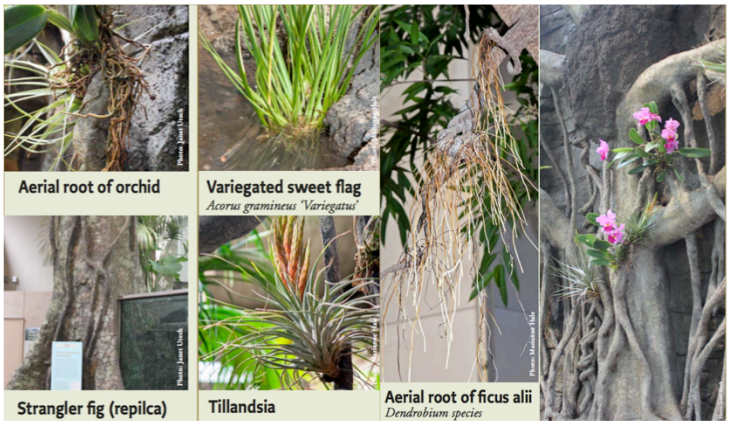
Palms frequent rainforest interiors and grasslands of the Neotropics. Palms are widely used by indigenous peoples of the Amazon for diverse purposes: thatch for houses, rope, weavings, fishing line, wood to support dwellings, hunting bows and more. Palms are often abundant in the forest understory and are frequently armed with sharp spines along the trunks and leaves.

Ferns species live in a wide variety of habitats; they do well in moist shady forest where environmental factors limit success of other plants. Many ferns may carpet the forest floor and thrive there.



In the rainforest, less than 2% of the sunlight reaches the forest floor. To get enough sunlight in the rainforest, vines such as liana have roots in the soil but then wrap around other plants to grow up to the sun. Other plants such as **orchids** and **bromeliads** have adapted the strategy to grow entirely on other plants. In order to get water, orchids have roots with a spongy material that helps collect water and particles in the air. Bromeliads typically have long, stiff leaves and showy flowers, and include the pineapple plant. Bromeliads' leaves are wrapped tightly into a cylinder and are used to form a water storage area. The bromeliads catch their own water and store it for their future use. This stored water is also used for homes for tree frogs.

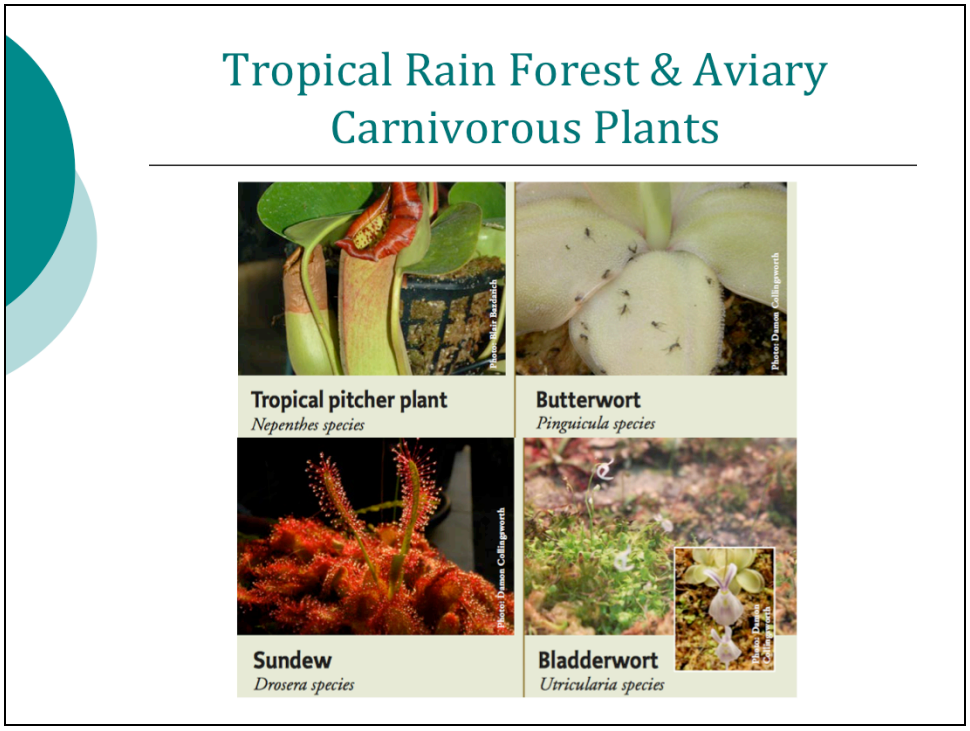
Tropical Rain Forest & Aviary
Aerial Roots - Epiphytes



Epiphytic plants are sometimes called "air plants" because they do not root in soil; they live on other plants. Roots that form above ground are called “aerial roots” and have many important functions to help plants survive. Epiphytes attach firmly to a branch and survive by trapping soil particles that they use as a source for their nutrients. If you look closely, you’ll be able to see several examples of aerial roots inside this building.

On woody trees and vines, such as the one pictured to the right, they can function as supports, helping to anchor the plant. Other aerial roots can help absorb moisture and nutrients. This allows plants, such as orchids, to live off of the forest floor on other plants and away from the fierce competition for space and sunlight. Some plants that live in wet marshes and bogs have underground roots but they need aerial roots to help with air exchange.

Ferns, orchids, and bromeliads can all be seen up in the canopy.



Most plants gather nutrients directly from the soil, but some plants can survive in low-nutrient habitats. Carnivorous plants live in areas with abundant sun and water, but with low levels of vital nitrogen in the soil. They have an incredible adaptation: the ability to trap and digest insects and small animals. Their leaves attract insects with bright colors and sweet nectar, once the insects arrive, the plants trap them in several ways:

Pitfall traps, such as pitcher plants, trap things in deep slippery pools filled with digestive enzymes.

Snap traps, such as the Venus flytrap, have leaves that snap shut when trigger hairs are touched more than once.

Adhesive traps, such as sundews, have leaves with glands on the ends of stalks that have a sticky substance to grab small insects.

Suction traps, such as bladderworts, have empty bladders covered by trap doors. When an insect touches the door, they are sucked into the bladder and digested.