

Amazing Plants

There are about 375,000 species of plants worldwide, with more being discovered or described on a regular basis. Many of these are typical herbaceous or woody things we're all familiar with. But some plants are very different, whether for their bizarre appearance, rarity, size, or some other unique feature. You might think of some, such as baobabs, redwood trees, voodoo lilies and many others. This article is a brief introduction to a few of the most interesting plants I've had the opportunity to see in habitat (in no particular order) that most people have never even heard of, much less seen.

***Puya raimondii*, or Queen of the Andes**, is the world's largest species of bromeliad. The terrestrial plants themselves can be 9-10 feet tall, with a rosette of spiny, grass-like leaves. And then the gigantic, erect inflorescence that holds more than 3,000 flowers grows up to 30 feet tall! This makes it one of the largest flowers clusters of any plant on earth. The individual creamy-white flowers are about 2 inches wide with bright orange anthers. The plant flowers once after 50-100 years, and then dies (monocarpic). Unlike most bromeliads, it doesn't reproduce by offsets, but only from seed. It occurs only in the Andes at about 13,000 feet in a few isolated locations in Peru and Bolivia. Huascarán National Park in Peru is one of the most accessible of those sites. A few small specimens exist in perhaps a half a dozen botanical gardens in the world (including UC Berkeley's Botanical Garden, where one bloomed in 2014), but the best chance to see these dramatic plants is in the wild.



Puya raimondii in Huscarán National Park, Peru.



Entrance to Huascarán National Park, Peru (L), *Puya raimondii* in the Park, and a younger plant (R).



Puya raimondii L-R: leaves, the author in front of a flowering plant, flowering plants (white) and dead plant that flowered the previous year (brown), closeup of inflorescence, hummingbird at flowers, and closeup of white flowers.

***Puya berteroniana*, or blue or turquoise puya**, is another large terrestrial, monocarpic bromeliad from South America, native to the mountains of Chile. The rosette of spiny, silvery-green leaves only grow 3-4 feet tall and wide, with the plant eventually forming a large colony of offsets. But its claim to fame are the astonishing turquoise flowers with bright orange anthers. Massive flower stalks 6-7 feet tall are covered with 2-inch blossoms that are hard to believe they're not made of plastic. It is grown outside its native habitat in the Andes in a few botanical gardens in mild climates, such as the University of California - Santa Cruz Arboretum and is offered for sale, but would be difficult to grow as a container plant.



***Puya berteroniana* in habitat (L), inflorescence (LC, flowers (RC), and closeup of waxy, turquoise flower (R).**



Blooming *Echium wildpretii* in Parque Nacional de Teide, Tenerife, Canary Islands.

Echium wildpretii is an herbaceous biennial endemic to the island of Tenerife in the Canary Islands. With a common name of Tower of Jewels, this plant lives up to its name when it flowers in the second year, producing a thick, erect inflorescence up to 10 feet tall densely covered with bright salmon to red flowers from the gray-green to silver rosette of leaves. Longwood Gardens (Pennsylvania) and the Missouri Botanic Gardens in St. Louis, MO have had it blooming in their conservatories, and it can be grown in parts of California (I have never seen it in any public or private gardens, although many other species of *Echium* are commonly used as landscape plants in California).



Young plants (L), blooming plants (LC and C), inflorescence (RC) and flowers (R) of *Echium wildpretii*.

Welwitschia mirabilis is an ancient gymnosperm (a cone-bearing plant – cycads, pines, spruces, and firs are distant relatives) which is the only surviving member of the Welwitschiaceae family, originating in the Jurassic period. First discovered in 1859 by Friedrich Welwitsch, this “living fossil” is unique in the plant world because it produces only two leaves during its entire lifespan, which can be up to 2,000 years, but is generally 400-1,500 years. It lives in isolated communities in an extremely harsh environment in a narrow strip of the coastal Namib Desert from central Namibia to southern Angola where rainfall is often limited to just an inch a year. It gets the majority of its water from regular ocean fogs, however (its distribution coincides with the fog belt where dense fog forms regularly as the cold Benguela Current of the Atlantic Ocean meets the hot air coming off the desert).



***Welwitschia mirabilis* in habitat in the sandy Welwitschia Flats of Namib-Naukluft Park near Swakopmund, Namibia (L) and on rocky slopes in western Namibia (LC and RC), and a very large, old plant (R).**

The wide, succulent leaves grow continuously from the woody base up to 12 feet long, splitting after a while into strap-like sections, making it seem like the plant has more leaves. It is thought that this mass of foliage directs moisture condensing on the leaves toward the base of the plant to water the roots growing in the sandy soil. But it can also take up water from fog directly through numerous stomata on both leaf surfaces. Like other gymnosperms it is dioecious (male and female on separate plants), but instead of cones the male plants produce something called microstroboli which are reminiscent of angiosperms (flowering plants). The largest specimen recorded is in the Messum Mountains. Another huge plant on the Welwitschia Flats near the Swakop River is over 4 feet tall and 28 feet wide. Since the plant is easily grown, even in containers, small specimens are often on display in conservatories or greenhouses in many botanic gardens including Kew, Kirstenbosch, and even at the Domes (Milwaukee Park Horticultural Conservatory), and other places.



***Welwitschia mirabilis* plants have just a single pair of leaves (L) and produce female (C) and male cones (R).**

***Dypsis decaryi*, commonly called Triangle Palm** for the shape of the trunk, is quite unusual because it does not have the radial or bilateral symmetry of nearly all other plants, and instead has three sides to the main stem, forming a triangular shape in cross section. Limited to a single mountainside in Madagascar, its survival in the wild is threatened because of its limited distribution and over collection of seeds for export. But because this palm is fast-growing and easily grown from seed, it is widespread in cultivation and is commonly planted as an ornamental in mild climates. It does well in containers and can even be grown as an indoor plant. Outdoors it is frequently used as a specimen plant where its unique shape will show well, or even as a street tree in some places.



Triangle palm, *Dypsis decaryi*, in Madagascar (L), near Spanish Village in Balboa Park, San Diego (LC), in a residential landscape in southern California (RC), and closeup of the three-sided trunk (R).

Couroupita guianensis is a tall tree (up to over 100 feet tall) native to the rainforests of northern South America and Central America, with very distinctive flowers and hard, round brown fruits that inspire the common name of **Cannonball Tree**. In the family Lecythidaceae (which also contains Brazil nut, *Bertholletia excelsa*), this tree is grown as an ornamental in other tropical areas and has naturalized in some places. The 3-5 inch wide, strongly scented flowers are borne in large bunches directly on the tall, unbranched trunk (cauliflorous), making trees in bloom very showy. Each flower has six apricot-pink to red petals that gradate to yellow towards the tips, with an unusual, lopsided arrangement of the stamens, with a ring of fertile stamens at the center and other sterile stamens arranged to form a hood. The flowers, which lack nectar, are pollinated by carpenter bees and other insects attracted by the pollen. The fruit is edible (but can have an unpleasant smell), and is often fed to livestock.



Cannonball tree, *Couroupita guianensis* (L), flower clusters (LC), flower (C), intact fruit (RC) and opened fruit (R).

Nepenthes is a large genus of about 150 species primarily from tropical forests of Southeast Asia, commonly called **pitcher plants**. Pitcher plants live in nutrient-poor soils, so have evolved to acquire nitrogen from other sources. All of these plants have a highly modified leaf that forms a deep container with a lid on top. The lid prevents the pitcher from filling with rain water, and a colorful rim lures insects



A bog filled with *Nepenthes* in Madagascar (L), with mainly yellow pitchers (LC and RC) and a few red ones (R).

or other prey to the plants. The bottom of the pitcher is filled with syrupy fluid that attracts the animals, and the interior walls of the pitcher is coated with a waxy substance so the animal can't crawl back up the slippery surface. After the insect drowns special digestive enzymes break down the meal. Most are carnivorous, digesting lizards, insects, spiders, worms and anything else that end up trapped in the sticky sap inside the pitcher. But at least one species has gone in a different direction, producing a sweet exudate and a perfect perch to attract tree shrews, who then defecate into the pitcher and the manure is digested for the nitrogen it contains. These plants are common in indoor collections of botanic gardens worldwide and are often offered by specialty nurseries.

Alluaudia is a genus of six species in the family Didiereaceae endemic to Madagascar. Most occur in the southwestern part of the island. Like many other members of that plant family, each individual leaf is accompanied by a conical spine produced from brachyblasts similar to the areoles found in cacti. The leaves are arranged in rows along the stems, the spines likely developed to protect against feeding by now-extinct lemurs. *A. montagnacii* is found in the spiny forest as part of a specific plant community with *Euphorbia intisy* and *E. stenoclada*. *A. procera* is a deciduous species that resembles (but is completely unrelated to) ocotillo, *Fouquieria splendens*, of the Sonoran Desert in North America. The paired ½ inch long rounded succulent leaves and grey spines alternate along longitudinal lines up the stems. It adapts to container culture, so is often grown by succulent collectors. These plants can be seen in many botanic gardens in mild climates, such as in the Madagascar plant collection of the Living Desert Zoo and Gardens in Palm Desert, CA (near Palm Springs) and in the Desert Dome of the Milwaukee Park Horticultural Conservatory.



Alluaudia in the spiny forest in southern Madagascar (L), *Alluaudia* sp. in habitat (LC and C), closeup of the leaves (RC) and the spines (R).

Aloe pillansii, the giant quiver tree, is one of the scarcest and most spectacular species of Aloe native to southern Africa. It grows up to (15m) high, branching dichotomously (dividing regularly into two equal branches) so it superficially resembles the much more common *Aloe dichotoma*, the quiver tree. However, *A. pillansii* has paler, wider, recurved leaves; is taller, with a more scraggly, Dr. Seuss-like



Aloe pillansii habitat (L), in the Richtersveld, South Africa (LC), with the author (RC), and the more common *Aloe dichotoma* (R) near Nieuwoudtville, South Africa.

growth form; and has a more limited distribution on mountain slopes in the arid winter rainfall area of the Richtersveld on the border between Namibia and South Africa. Found only in remote, rugged areas, these bizarre trees have fissured golden bark on swollen trunks and branches that begin only midway up the trunk, each topped with a dense rosette of leaves. Because it is very slow growing and is difficult to cultivate, it is rarely seen in collections.

***Kigellia africana*, sausage tree**, is a tree in the family Bignoniaceae which occurs throughout tropical sub-Saharan Africa. There are several subspecies (once recognized as 10 different species). Its common name comes from the huge fruits that look like fat sausages hanging from the branches on long, rope-like peduncles up to 20 feet long. The grey-brown, woody berries can grow up to two feet long and weigh 15 pounds. Although poisonous to humans, the fibrous pulp is eaten by baboons, elephants, monkeys and other animals. Before the namesake fruits grow, large, velvety deep red to orange or purplish green bell-shaped flowers are produced in pendant panicles, although each individual flower is oriented horizontally. They are pollinated at night by bats and visited by many insects during the day.



***Kigellia africana* inflorescence (L), flower (LC), fruits (C and RC), and a local holding up a large fruit (R).**

Every part of the tree has been used medicinally by different indigenous peoples throughout its range in Africa; it was traditionally used to make dugout canoes in Botswana and Zimbabwe; it is often considered a sacred tree so is frequently protected when other trees are cut down. It is grown as an ornamental shade tree worldwide in tropical climates (although there is a risk from falling fruits depending on where they are planted!). This tree can be seen in a conservatory at Kew Gardens, and outside at botanic gardens or other locations in mild climates. There is one old specimen in the northwest corner of the Mediterranean Garden on the north side of the San Diego State University campus by the Life Sciences and Physical Sciences buildings, and another at the San Diego Zoo Safari Park.



Sausage trees, *Kigellia africana*, on the Okavango Delta, Botswana (L), in Masai Mara National Park, Kenya (C), and a young tree planted in the parking lot of the Phebeni Gate to Kruger National Park, South Africa (R).

And here are two more amazing plants that I have only seen in botanic gardens, but hope to see in habitat someday...

Victoria amazonica is the world's largest water lily, native to the Amazon basin. With leaves with upturned edges that can grow to 10 feet in diameter and roots up to 25 feet long, it can support a fair amount of weight (if evenly distributed). The flowers are equally huge, starting out white and fragrant with only female parts mature when they open at night, attracting pollinator beetles which get trapped inside. The flowers then turn a pink color and are scent less when the male parts mature to dust the beetles with pollen before releasing them as the flower opens the next night. Piercing spines cover the stems and underside of the leaf to help prevent being fed on. John Lindley introduced it to Europe in 1837 where its scientific name was given in honor of Queen Victoria. Kew Gardens in London has a great collection of these plants, but they can also be seen in many other botanic gardens throughout the world (http://www.victoria-adventure.org/victoria/gardens_2003.html).



Victoria amazonica at Kew Gardens (L and LC) with huge floating leaves (RC) and big flowers (R).

Aloe polyphylla is another unusual aloe with a limited distribution, but unlike the previous *A. pillansii*, this one is commonly grown as an ornamental. Native to basalt rock crevices on very steep slopes high in the Drakensberg Mountains of Lesotho (an African kingdom surrounded by South Africa), this plant grows with its numerous broad, grey-green leaves with sharp, dark tips arranged in a perfect, tight, five-pointed spiral – which can be clockwise or counter-clockwise. The stemless plants grow in dense groups, but do not produce offshoots. It is endangered in its native habitat because of over-harvesting, and because its only pollinator, the malachite sunbird, is also in decline. It is propagated from seed, and more recently by micro-propagation as demand is high as a prized specimen for collectors. It is also a common feature of succulent gardens and botanic gardens worldwide in mild climates, such as Totara Waters in Auckland, New



Male malachite sunbird on *Erythrina caffra*.



Aloe polyphylla at Totara Waters, Auckland, New Zealand (L), spiral arrangement of the leaves when viewed from above (C), and red flowers (R).

Zealand or in coastal California gardens (where it doesn't get too hot in the summer), including the University of California - Berkeley Botanical Garden.

– Susan Mahr, University of Wisconsin – Madison

Additional Information:

- *Aloe pillansii* – on the PlantZAfrica website at <http://www.plantzafrica.com/plantab/aloepillans.htm>
- *Aloe polyphylla* – on the PlantZAfrica website at <http://www.plantzafrica.com/plantab/aloepoly.htm>
- *Couroupita guianensis* – on the Missouri Botanic Garden's Kemper Center for Home Gardening website at <http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=281687>
- *Dypsis decaryi*, Triangle Palm – University of Florida Extension Publication #FOR 240 at <http://edis.ifas.ufl.edu/fr302>
- *Echium wildpretii* – on the Missouri Botanic Garden's Kemper Center for Home Gardening website at <http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=292969>
- *Kigelia africana* – on the PlantZAfrica website at <http://www.plantzafrica.com/plantklm/kigeliaafric.htm>
- *Nepenthes* - the Monkey Cups – on the Botanical Society of America website at http://botany.org/Carnivorous_Plants/Nepenthes.php
- *Victoria amazonica* – on the Missouri Botanic Garden's Kemper Center for Home Gardening website at <http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=c263>
- *Welwitschia mirabilis* – on the PlantZAfrica website at <http://www.plantzafrica.com/plantwxyz/welwitschia.htm>