

Running Header: Biodiversity

Biodiversity: The Amazon Rainforest

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Introduction

Rainforests across the world contain a vast variety of plant and animal species (WWF, 2005). There are two types of rainforests: tropical and temperate. Tropical rainforests are located near the equator of South America, Africa, and Asia and make up more than half of the world's rainforests (mbgnet,n.d.). Temperate forests on the other hand can be found on the coasts of North America, South America, and Australia. There are far fewer temperate forests than tropical forests throughout the planet. The Amazon Rainforest is known as the Earth's lungs.

Geography and Climate of the Amazon Rainforest

The Amazon Rainforest is located in the northern region of South America, predominantly in the country of Brazil. It is the largest rainforest in the entire world. This biome spans to be 6.7 million km² wide, which is twice the size of India (WWF, 2005).

The average temperature range in the Amazon is 80.7°F (27°C) and can reach temperatures as high as 91.5°F (30°C) (Unique, 2014). It is very hot and humid throughout the whole year. It rains almost every day. Between December to May is the wet season and the river floods the forest.

People of the Amazon

There are people who live in the Amazon: Coboclo families. In order to get around during the wet season they must use boats. Their homes are on stilts, so during that season when the water level fluctuates, they can lower or raise their dwelling.

These are poor families who rent their homes for very cheap. They must get their own food through fishing and hunting. The fish they catch are the Tambaqui and Piraracu, native

to the Amazon River and Rio Negro. They will save the fish to eat or take it to the market to sell where they can make a small living.

These people are one with the forest; respecting the land and the river are very important to them.

Dangers the Amazon Faces

Within the past 40 years nearly a whopping 20% of the rainforest has been cut down, and although 20% does not sound like a lot, considering the size of the Amazon, that's about one football field per minute (National Geographic, 2007). Deforestation, as well as mining are two of the Amazon's biggest concerns. There are laws protecting the forest from loggers, who cause the widespread deforestation.

The Amazon Regional Protected Areas (ARPA) Program takes on deforestation by making areas under strict protection greater. With Brazil's commitment to reduce deforestation rates, "ARPA is working to increase the total area under strict supervision to 10 percent of Brazil's Amazon basin" (*The World Bank*, 2013).

Again, 10% may not sound like much, but it is a step toward protecting the precious land. There are currently 12 million hectares of the Amazon that are under preservation, this law covers 25 million more hectares of the forest. This will also increase the public's concern with environmental awareness, which is something everyone could all use a little more of.

ARPA is a 10-year program that includes three phases (*The World Bank*, 2013):

- The creation of 9 million hectares of new protected areas
- Consolidation of 4 million hectares of strict protection areas
- The establishment of an endowment fund, which is capitalized and meets performance benchmarks

By the time the first two milestones were established there were 62 million hectares of new protected land, and now there are 70 million hectares of protected land. The U.S. National Academy of Science did a study that shows a 37% decrease in deforestation from 2004 to 2009.

Another danger the Amazon faces are miners who are on the hunt for gold. Today, most mining revolves around alluvial gold deposits. Gold can be found in both rivers and floodplains and are mined by both large-scale operators and small-scale miners. The hydraulic mining techniques tear away river banks and clear floodplain forests. The gold unearthed from the ground using something called a 'sluice box', in which it is used to isolate heavier sediment and mercury (Monga Bay, 2012). Much of the mercury is burned off in the process, but it has been known for in to end up in rivers. In that case, it can cause damage to the environment, and contaminate fish, in which humans will then eat. "Small-scale miners are less efficient with their use of mercury, releasing an estimated 2.91 pounds (1.32 kg) of mercury into waterways for every 2.2 pounds (1 kg) of gold produced" (*Monga Bay*, 2012).

Biodiversity

The Amazon Rainforest is extremely diverse in both plant and animal species. There are about 750 species of trees in a 16 square mile slice of the Amazon forest (Earth Chamber, 2005). The high canopy of the Amazon rainforest is a very unknown place, even for most botanists and until recently very few researches have even explored this hard to reach area of the forest. There are many animals amongst the forest. Between land dwellers, birds, and little critters who swim in the Amazon River and Rio Negro, there are enough species to go around.

Flora

These trees have special characteristics that set them apart for example from those of temperate forests. These adaptations include: thin bark and flowers and fruits that grow

directly from the trunk, also known as cauliflory. And the development of large fruits that attract animals to consume them, which in turn, assists with the dispersal of seeds.

Other forms of these adaptations are woody appendages that flank the base of the trunk, buttresses, which channel stem flow. The leaves of these trees are larger to help intercept light and have drip tips that drain off water to aid with transpiration, the release of water through the stomata or pores of the leaf and stem. An example of this mechanism takes place on the Weeping fig.

There are five strategically different growth forms tropical plant species have come to utilize as combatants for survival. To combat the lack of sunlight and nutrient poor soil, plants have adapted to be able to compete. For example, some of these plants have taken to living off of the branches of trees in the various layers of the forest to gain an advantage. Another adaptation would be oily or waxy coating on their leaves to shed excess water.

Many of these plants take the form of vines; there are over 2,500 species like that, that grow in the rainforest. Lianas begin as small shrubs that grow on the forest floor. Over some period of growth they develop rapidly growing woody vines that attach themselves to trees. Using temporary empty spaces in the canopy from when a tree has fallen, to produce fruit and flowers that can reach to the emergent and upper canopy layers.

Their leaves make up a great portion of the canopy (around 40 percent). Herbaceous, green-stemmed plants, such as philodendrons, are examples of climbers, and remain in the understory—the part between the leaves and the ground (Mrs. Gebauer, n. d.). Whereas, some climbers store nutrients in roots and tubers. Another vine is a strangler, it begins its life as an epiphyte in the canopy, but sends their roots downward to be planted in the forest floor. The vines are described as trees whose centers have been hollowed out. As they reach towards the canopy the vines while growing ever thicker, strangling their host tree, which is why they received their name.

Epiphytes, also called air plants, are exceptions to the vine form and grow on branches high in the trees, using them purely for support and extracting moisture from the air, as well as trapping the constant leaf-fall and wind-blown dust. Some examples of epiphytes are from the pineapple and orchid families.

Plants like the Venus fly trap and the pitcher plant can produce their own energy, but have also taken to carnivory. When opportunity strikes, they can digest insects and small mammals as an alternative to photosynthesis.

Other plant species have given up on being autotrophs and have become heterotrophs. Meaning they no longer use the process of photosynthesis to manufacture their food and instead use alternative methods. One of these methods is parasitism, using another organism as a host. Specifically known as direct parasitism, the plant will tap directly into a stem or root of another plant or tree to derive its nourishment. Another example of a heterotroph is saprophytes, which is a plant that receives its nutrients from organic decaying matter. The plant itself cannot break down the organic matter so instead forms a symbiotic relationship with certain fungi (also referred to as myco-heterotroph or mycotrophy). This adaptive nature present in the rainforest is not only restricted to the flora—plant life, however also include the fauna—animal and fungi life.

Fauna

Amazonia is inhabited by many unique fauna. “A typical four square mile patch of rainforest contains as many as 125 mammal species, 400 species of birds, 100 of reptiles, 60 of amphibians, and 150 different species of butterflies” (Fauna,2013). Now add up every four square mile patch of the rainforest, that’s a lot of species!

The jaguar, the biggest feline in the Americas, is at the top of the food chain in the jungle. They are able to climb trees and there spots camouflage them so they are able to sneak up on their prey. Jaguars have exceptional vision and are able to hunt at night, which

gives them the upper hand. Their jaws are so strong that they can penetrate a turtle shell and they usually eat tapirs, monkey, and deer (large mammals) (Fauna, 2013). No doubt, jaguars are incredible animals.

“The Tapir, one of the animals the jaguar feeds off of, is the largest herbivore (350-600 pounds) in the Amazon rainforest and it’s a very ancient mammal” (Fauna, 2013). Their nose represents an elephant trunk. They eat very often, but do not digest their food. Because of this the Tapir became a major player in the dissemination of plants in the Amazon rainforest region. They are able to dodge predators due to their great sense of smell and hearing.

The Anaconda: one of the longer and heavier snakes in the world. It is not poisonous. The snake hunts by entrapping the victim and coiling itself around it, crushing it. The anaconda can swallow an entire cow, and it will take ten days for it to digest. The anaconda is one of the highlights of the Amazon rainforest fauna (Fauna, 2013).

Most of the animals here live in the trees, in the upper canopy layer. Scientists believe that the canopy may contain half of the world's species (Blue Planet Biomes, 2010). A great example of this behavior lies within the sloth. 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 (Blue Planet Biomes, 2010). Over 500 mammals, 175 lizards and over 300 other reptile 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 (Blue Planet Biomes, 2010).

Some species of animal can be found in no other place in the world. The Pink River Dolphins of the Amazon are a pale pink color, and are different from other dolphins in that it has a flexible neck, which allows it to move its head left and right (WWF, 2005). They are pink due to the acidity in the water. It is one of the world’s three dolphin species that have adapted to a freshwater river ecosystem. They were able to adapt to the water, because before

the Andes formed, the river moved from east to west, and once the movement of tectonic plates occurred, the Andes rose and the river moved from west to east, which cause the fresh and salt water to mix, and over time the dolphins adapted.

The insect population thrives in the Amazon. Adaptions include large pinchers that are large in size. A single Amazonian tree harbors as many species of ants as the entire British Isles (Earth Chamber, 2005). Leaf-cutter ants are responsible for harvesting a sixth of the area's leaves, bringing leaf fragments to their underground nests (Blue Planet Biomes, 2010).

There are about 7500 species of butterfly in the Amazon. UCI Biology Depatement, Professor Jim Mallet said, "Different types of rainforest butterflies in the Amazon basin are evolving at very different rates, not at all the pattern expected if forest refuges during the ice ages were causing the origin of new species -- the reason normally given. Instead, we think that idiosyncratic features of the biology of each species, such as competition for food and their individual reactions to the environment dictate the pattern of evolution in each group." (Science Daily, 2005).

Conclusion

Many scientists used to believe that the Amazon Rainforest is so diverse because of the climate change induced fragmentation and geographic isolation (Monga Bay, 2005). Today, scientists believe that biological influences are more of the cause of the species evolution.

Due to the fact that the Amazon Rainforest is so huge, much of the wildlife has yet to be discovered. There are millions of species out there that are completely unknown to the world. This just shows how diverse the Amazon Rainforest really is.

Works Cited

About the Amazon. (2005, October 1). Retrieved March 10, 2015, from
http://wwf.panda.org/what_we_do/where_we_work/amazon/about_the_amazon/

Amazon Rain Forest. (2007, January 1). Retrieved March 11, 2015, from
<http://ngm.nationalgeographic.com/2007/01/amazon-rain-forest/wallace-text>

Amazon rainforest biodiversity due to biology not climate change says study. (2005, December 4). Retrieved March 14, 2015, from <http://news.mongabay.com/2005/1205-diversity.html>

Earth Changes: May 2005. (2005, May 20). Retrieved March 11, 2015, from
http://earthchamber11.blogspot.com/2005_05_01_archive.html

Fauna - Save the Amazon Rainforest. (2013, July 27). Retrieved March 11, 2015, from
<http://www.amazon-rainforest.org/fauna.html>

Gebauer. (n.d.). Rainforest Understory. Retrieved March 11, 2015, from
<http://mrsgebauer.com/rainforestweb/understory/understory.htm>

Rainforest mining. (2012, July 27). Retrieved March 11, 2015, from
<http://rainforests.mongabay.com/0808.htm>

Results. (2013, October 9). Retrieved March 11, 2015, from
<http://www.worldbank.org/en/results/2013/10/09/Brazil-protects-Amazon-increasing-size-protected-areas>

Schaffner, B. (2010, January 1). . Retrieved March 13, 2015, from
<http://www.blueplanetbiomes.org/>

Where are Rainforests Located? (n.d.). Retrieved March 11, 2015, from
<http://www.mbgnet.net/sets/rforest/where.htm>

University College London. (2005, December 5). Why The Amazon Rainforest Is So Rich In Species. *ScienceDaily*. Retrieved March 13, 2015 from
www.sciencedaily.com/releases/2005/12/051205163236.htm