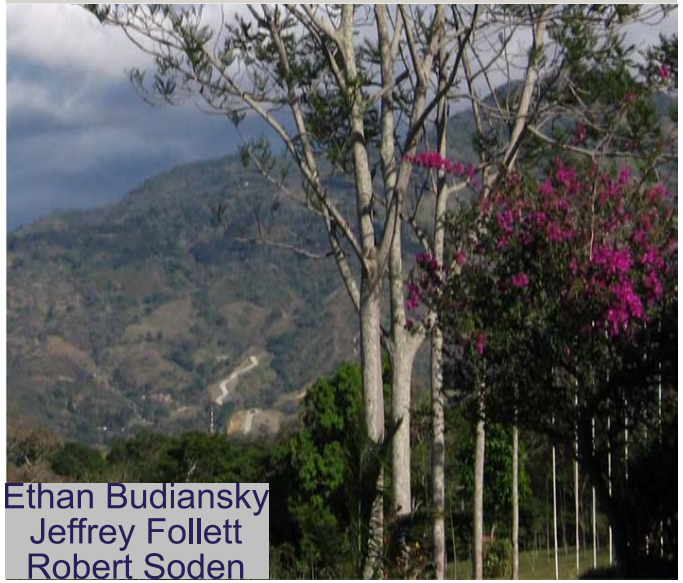
Introduction to the Nature of UPAZ



Ethan Budiansky
Jeffrey Follett
Robert Soden

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Blue-gray tanager-http://www.rainforest.org/resources/gallery/birds1/bgtanaglg.jpg

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Muscovy duck-http://images.google.co.cr/imgres?imgurl=http://www.zinnysworld.com/Water%2520Birds/duck%2C%2520muscovy%2520-%2520P020320-047m.jpg&imgrefurl=http://www.zinnysworld.com/ducks.htm&h=425&w=535&sz=56&tbnid=dFHrp_Or3B0J:&tbnh=102&tbnw=129&prev=/images%3Fq%3Dmuscovy%2Bduck%26hl%3Den%26lr%3D&oi=imagesr&start=2

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Turkey vulture-http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Turkey_Vulture.html

Hook-billed kite-http://www.avesphoto.com/website/n030318/species/n030318-9.htm

Squirrel cuckoo-http://www.greenbackedheron.com/photo/59215662

Groove-billed ani-http://www.avesphoto.com/WEBSITE/NA/species/ANIGRB-1.htm

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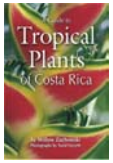
TABLE OF CONTENTS

PREFACE

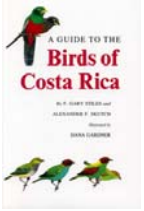
You are going to spend the next year studying at UPAZ and El Rodeo. You will see and hear many birds and butterflies, walk past multiple trees, avoid plenty of spiders, and even catch a glimpse of an occasional mammal and reptile here and there. This is a very diverse and unique ecosystem that we live in, with a long history of human influence. However, resources have not been readily available for UPAZ students to learn about their surroundings.

This guidebook is meant to provide people with the resources available not to just experience nature, but to learn about it as well. We hope that you will carry this book with you as you travel around El Rodeo. Use it as a foundation for your learning about the flora and fauna of this region. Hopefully this will spark your interest to continue exploring and learning about this area.

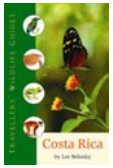
For continued exploration, we recommend the following guidebooks:



A Guide to Tropical Plants of Costa Rica
Willow Zuchowski
Zona Tropical, 2005



A Guide to the Birds of Costa Rica
F. Gary Stiles, Alexander F. Skutch
Cornell University Press, 1990



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Les Beletsky et al.
Interlink Books, 2004

Costa Rican Natural History
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University of Chicago Press, 1983

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Images

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All photos-Robert Soden

Insects and Spiders
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Golden silk spider-Ethan Budiansky

Jewel spider-http://hartmanprehistoricgarden.com/sp-gasteracantha2.jpg,

Amphibians and Reptiles
Cane Toad-http://www.ryanphotographic.com/Bufo%20marinus.jpg

Slender Anole-http://www.fortunecity.com/greenfield/drongo/177/limifronslw05001.JPG

Coral snake-http://www.projectmosquitia.com/files/DSC01788.JPG

Birds
Black-bellied duck-http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Black-bellied_Whistling-Duck.html

international communities as well as become economically profitable. Marine protected areas have also been created with the purpose of preventing overfishing and the destruction of marine habitats.

This ideology of using the biological richness of Central America as a foundation for future prosperity has also begun to spread to the other countries of the region. In 1990 at the Summit of Central American Presidents development principles were articulated that included increased protection of the natural environment, adoption of sustainable development programs, responsible use of natural resources, control of pollution, and the reestablishment of an ecological equilibrium. Essentially it was recognized that environmental degradation, or lack of an equilibrium, was one of the main causes of the poverty and war that have plagued much of the isthmus.

Other than protected areas Costa Rica's government has been attempting to create innovative environmental programs meant to promote conservation. One such example is payment for environmental services whereby landowners receive government payments for managing their lands in a manner that benefits society as a whole. Basically they interact with their land in a way that allows it to naturally promote a healthy environment for wildlife and humans. If these programs succeed they will hopefully spread to the other countries of the region and the world at large and improve the relationship humans have with their environment.

Natural History of the Canton de Mora

The Univerisidad para la Paz is located in a very unique place in Costa Rica. The campus is within the zona protectora de El Rodeo (ZPR), which is part of the Canton (Municipality) de Mora. Specifically, UPAZ covers about 2% of the Mora landscape. The Mora is made up of 5 districts: Colón, Tabarcia, Guayabo, Piedras Negras and Picagres. The Mora is a combination of dry lower forest and a premontain moist forest belt, with El Rodeo located at an elevation of 500 to 1500 meters. It is one of the most altered and fragmented life zones in Costa Rica, a mosaic of smaller forest zones divided by agriculture and pastureland. It is possibly the largest forest left of this type. Despite its disrupted ecosystem, the Canton de Mora is home to an abundance of Costa Rican flora and fauna. There are around 275 tree species within 50 botanical families, 500 vascular plant species, over 50 species of herbivores and carnivores in the region- whose numbers have increased significantly over the past 15 years due to establishment of the protected zones- and 150 species of birds and abundant numbers of reptiles. However, this region has experienced significant conversion and degradation of the ecosystem as a result of increased human activity over the past few centuries.

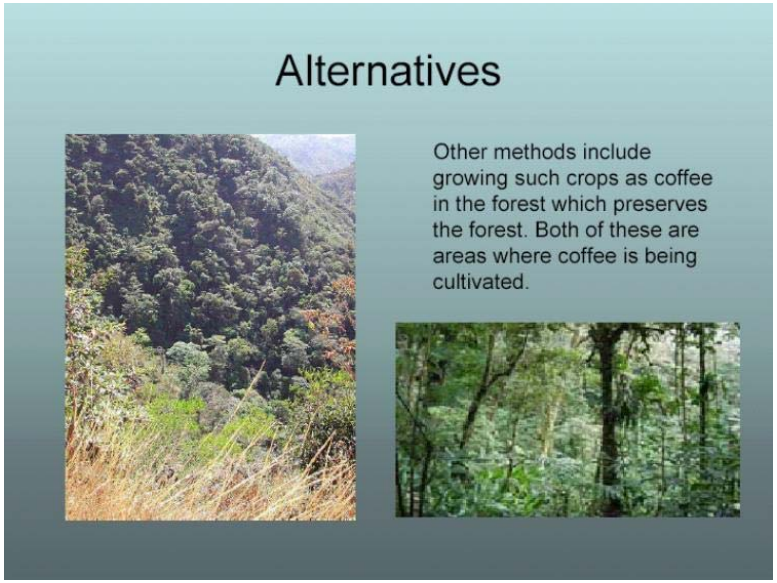
During the pre-colonial era, the Mora Canton was part of the chiefdom of Chief Pacacua, with the town named after him (Pacaca). It was inhabited by aborigines from the Western Huetar kingdom known as the Quitrissi. These indigenous people practiced small-scale agriculture for subsistence and rotated their crops and fields in harmony with the environment. It was up to the chief, or cacique, to designate which land was to be farmed. The livelihood and social structure of the Quitirissi people was highly dependent on their agricultural practices. They had a strong bond and deep relationship with nature, something that was lost following colonization and mass immigration.

In 1560, this region was "discovered" by the Spanish conqueror Juan de Cavallón, and the Mora landscape was forever changed. The Spanish established large haciendas sometimes with around 500 heads of cattle. They modified the system of communal land of the Huetar people to the establishment of private property, eliminating centralized control over land-use. Their practices shifted from subsistence farming to money-making activities: such as cattle ranching. The Spanish practiced permanent monoculture cultivation over large areas with legumes, sugarcane, citrus and various other fruit trees. Later, they introduced coffee, pigs, chickens, horses and cows, while the indigenous people previously only had domesticated turkeys and dogs.

In beginning of the 17th century the Spanish moved the central town Pacaca to the area of Ciudad Colon. The original location of Ciudad Colon (named after Christopher Columbus) was located where Tabarcia currently sits. Since the 19th century families have immigrated from the Alajuelita, Desamparados, Tibás, Zapote and la Uruca into the Mora area into this region in search of rich soil to grow crops not only for survival but also for trade. Land was acquired through purchase from the aborigines and by registering previously unclaimed land.

In 1999, the population of the Mora Canton was approximately 19,000 inhabitants: 66% rural and 34% urban. A large portion of the land within the Mora County is owned by the Rojas family, which has history of land ownership in this region. In the El Rodeo region, the major economic activities have been cattle ranching, honey production, tourism, and agriculture. While at first glance, there appears to be large amounts of coffee plantations in El Rodeo, they are actually quite small in size and number. The poorer soil and lower elevation results in less productive plants and lower quality beans.

In response to severe environmental deterioration taking place all over Costa Rica, the zona protectora de El Rodeo was established in 1976, protecting 2350 hectares of the Mora and forbidding all environmentally destructive activities. In 1981 the decree establishing the protected zone was annulled in order to build the UPAZ campus. However, 3 months later, in response to public pressure, the protected zone was re-established, minus the campus's almost 300 hectares. The protected zone provides a sanctuary for Costa Rica's plants and animals, and a plethora of activities for locals and students including hiking, bird watching, mountain biking and horseback riding.



ture and agroexports had resulted in the loss of most of the virgin forests and created a volatile economic climate. In the last few decades conservation of biodiversity has become a top priority in the quest for future prosperity.

A series of parks have been established to conserve valuable wilderness areas and preserve biodiversity. Both public and private funding have been used to establish these parks in the hope that they will serve as educational and recreational tools for the domestic and

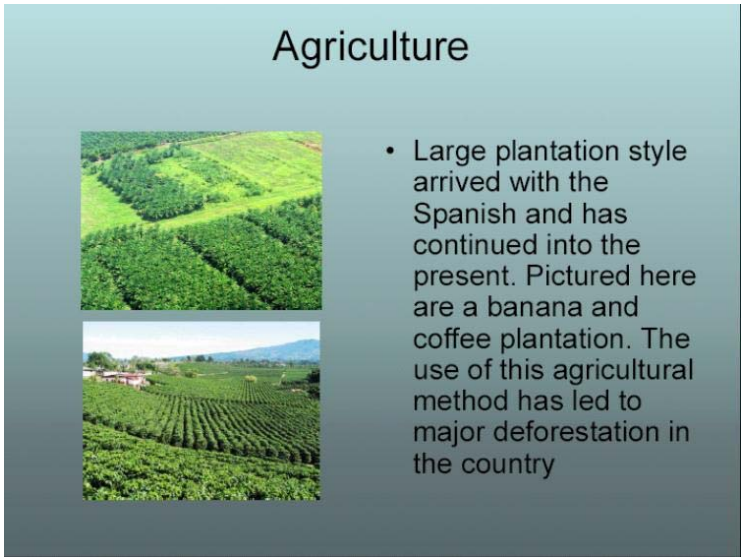
ent feel when compared to the rest of the country.

From independence all the way up until 1949 when the army was abolished and democracy became firmly entrenched Costa Rica was politically chaotic. During the 19th century the country went through 6 different constitutions and experienced intermittent periods of civilian and military control. Despite this the government made significant investments in transportation, public health, and education that would continue into the 20th century and form the basis for public participation in government policy.

The growing dependence of Costa Rica on the agroexport sector resulted in Costa Rica going through several recessions due to price fluctuations of the world market in the first half of the 20th century. The aforementioned ability of workers to organize effectively forced the government to recognize demands for higher wages and eventually the creation of a social security system in 1941.These workers were opposed by the large agroexport producers who themselves had considerable power. This struggle culminated in the civil war of 1948 which ultimately stripped them of much of their power, abolished the army, and established the democratic system that exists to this day.

Environmental Challenges

In the latter half of the century while most of the other countries of Central America were being ripped apart by internal conflict Costa Rica was relatively prosperous. Unfortunately the 1980s saw another significant decline in coffee and banana prices which caused the country to borrow heavily. Essentially an emphasis on monocul-



FLOWERING TREES

Buttercup tree
Poroporo
Cochlospermum vitifolium

Buttercup trees are easily identified in the dry season by large, bowl-shaped yellow flowers with numerous golden stamen. Buttercup trees grow to 21m and have smooth, grey bark. The sap, which is yellow-orange, is a commonly-used cotton dye. The wood is soft and used in matchsticks, boxes, and paper.

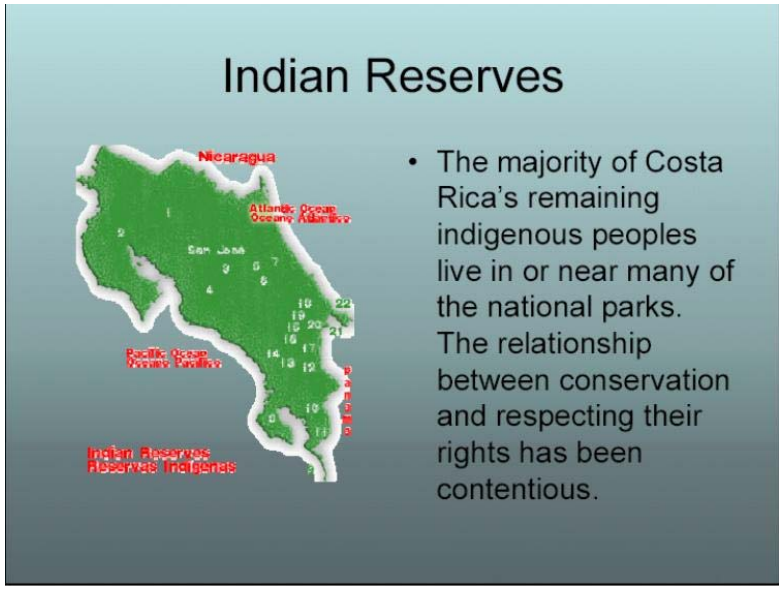
Flamboyant
Malinche
Delonix regia

Flamboyants are recognizable from a distance by their wide crown, fern-like leaves, and clusters of bright-red flowers between March and July. Native to Madagascar, they are now spread widely through Central America and the Caribbean and are known to attract a variety of hummingbirds, butterflies, and birdlife. The pods, which appear beginning in August, are used as musical instruments similar to maracas. Flamboyants are very popular ornamentals, are used as shade trees and nitrogen-fixers in coffee plantations and they are commonly used as live fences.

to an increasing rate of overall environmental degradation; however, over the last few decades the government of Costa Rica has become a leader in conservation efforts and has hinged much of its future to its biological richness.

After independence Costa Rica continued to enjoy its relatively isolated status. Other countries such as Panama and Nicaragua were of greater interest to foreign powers because they were ideal sites for the building of a canal. During most of the 19th century coffee was the most important export and coffee barons became increasingly powerful, but never adopted the coercive techniques used to exploit poor laborers that became commonplace in much of the isthmus. Once again the availability of common land ensured that peasants could simply move onto new land rather than work for the barons if wages and working conditions were inadequate. As a result laborers generally received decent living wages and were able to organize into guilds and unions to improve working conditions and push their political interests.

By the 1870s large banana plantations had been built on the Caribbean coasts and Costa Rica imported workers from the Caribbean, Italy, Spain, and China to work the land and build a major rail-



road from San Jose to Limon. The majority of these were initially owned by the American United Fruit Company (UFC). The introduction of banana plantations has been a significant factor in the deforestation of the Caribbean coast. In addition the importation of workers, especially those from the Caribbean, gives this area a culturally differ-

and the expropriation of their lands. For various reasons Costa Rica remained more isolated than most of the region and was able to develop in a more autonomous manner.

At the time of conquest Costa Rica boasted a native population estimated at around 400,000. Within a short amount of time this figure fell dramatically mostly due to disease. Today it is estimated that there remain only 30,000. Due to the lack of mineral wealth in this part of Central America the relationship between Spaniards and natives was markedly different from other places such as Guatemala and Nicaragua. Compared to these places there were far fewer natives and also fewer settlers. As the native population declined land became more available and labor became scarce. Landless people were able to move and occupy common lands as opposed to being forced to work for large landholders in the oppressive conditions that prevailed elsewhere.

The simultaneous decline of the native population and the appearance of the Europeans greatly altered the human relationship with the natural environment. Rice, coffee, citrus, sugar cane, horses, cattle, and pigs were among the newly introduced agricultural commodities. The new crops required more agriculturally intensive and concentrated cultivation, and the new livestock (cattle in particular) required pasture lands. Essentially European models of agriculture replaced native practices such as slash-and-burn crop rotation with more plantation style modes of production. Areas such as Guanacaste saw the establishment of large cattle ranches which contributed to widespread deforestation.

During the 16th century Costa Rica's economy and that of the region as a whole came to rely on the export of certain agricultural commodities. Cacao, coffee, and cattle were the most important of these in the case of Costa Rica. Essentially this marked a permanent shift towards monoculture that exists to this day. Environmentally this meant that the native technique of cultivating an area and then leaving it fallow to recover was no longer widely used. As the population grew and landless peasants moved into periphery areas to farm common lands natural areas were permanently altered. Native techniques of allowing land to restore itself to its natural state generally came to an end in most places.

Independence-Present

In 1821 Central America became independent from Spain along with much
of the rest of the Americas. Initially it became part of the Central American Republic in 1823, but by 1839 it officially became an independent country. Since this time Costa Rica's economy has become more integrated into the world economy mainly in the form of agroexports. This has facilitated the deforestation of the country and has led

Jacaranda
Jacaranda
Jacaranda mimosifolia

The unusually shaped lavender flowers of the Jacaranda tree make it easily recognizable when it flowers late in the dry season. As of February 2006, most of the Jacarandas around UPEACE are still too young too flower. The Jacaranda is native to Argentina but today is found all over the world. Popular as an ornamental, it is also used in some reforestation projects around Costa Rica.

Machete Flower
Poro
Erythrina lanceolata

The Machete Flower, sometimes called the Coral Tree, is part of the same genus as the Mountain Immortelle. It doesn't grow nearly as tall, reaching only about 8m at maturity. In addition, it doesn't possess the nitrogen-fixing properties of its cousin, so is less popular in coffee plantations and used more commonly for live fencing and as an ornamental.

Mountain Immortelle
Poro Gigante
Erythrina poeppigianao

The bright orange flowers of the Mountain Immortelle light up Rodeo's coffee fields between December and April. Fast-growing and easily cultivated, they are planted for shade and nitrogen-fixing. They are also often found in cacao farms and as part of living fences. Their seeds and bark are toxic, containing chemicals that cause paralysis similar to the legendary Curare Arrow toxins of the South American tropics.

Pink Trumpet Tree
Roble de Sabana
Tabebuia rosea

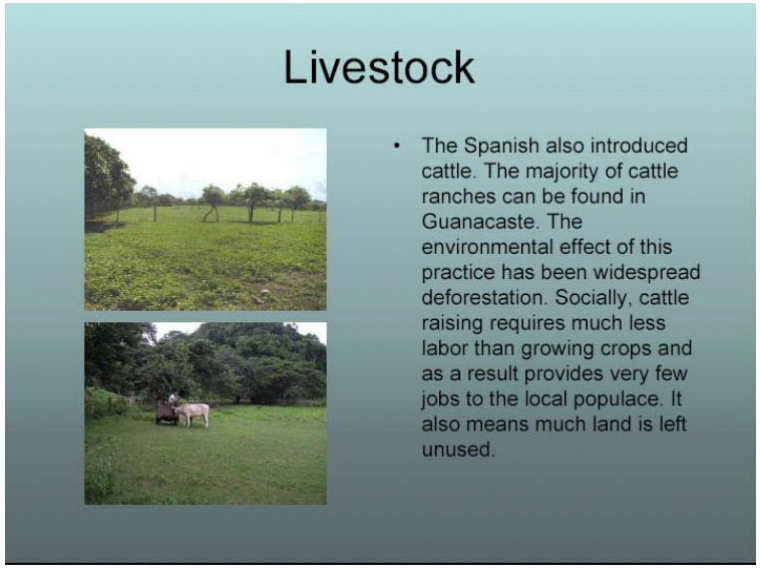
The Pink Trumpet Tree is one of five species of Tabebuia found in Costa Rica. As a genus, Tabebuia is known for brilliant floral displays and valuable timber. Another species of Tabebuia, Tabebuia ochracea, or Cortez Amarillo has bright yellow, horn-shaped, flowers and is also common in the area. The Roble de Sabana (Roble meaning oak) is named for its wood, which resembles oak and is used in a wide variety of furniture, boats, and tools. The Roble de Sabana flowers intermittently throughout the dry season.

the arrival of Europeans were not native to the isthmus and were most likely brought in from Mexico. Maize, beans, cassava, yams, agave, and squash were the most important and widely cultivated of these imports. While innovations such as irrigation, terracing, fertilizing and other agricultural methods were widely used in much of the region the natives of Costa Rica likely grew crops in small plots consisting of a variety of different species. To promote soil fertility natives would slash-and-burn an area, cultivate it, and then leave it fallow so that it could once again return to its natural state.

It is important to note that the people of Costa Rica were constantly interacting with the powerful and well organized Toltec, Mayan, and Aztec civilizations to the north and that many of the imported crops and modes of subsistence meant that the human relationship with the environment was constantly changing. Foreign influence has been a constant variable in the natural history of Costa Rica and Central America and is further illustrated by the arrival of Spanish explorers.

Colonial

Central America fell under the rule of the Spanish empire in the early 1500s and parts of it immediately gained significant economic and strategic importance. The rich volcanic soils of the region have historically given it some of the best agricultural soils in the world. As a result the region would become an important center for agroexport production. Additionally its geographic location established it as an important trade route. During colonial times the native population of much of the isthmus was devastated by disease, slavery,



falls much more heavily over the entire region. The Caribbean coastal areas and lowlands however can be said to receive more significant and more consistent precipitation all year long than their Pacific counterparts and are more "tropical." The highlands generally consist of a wide variation of microclimates and are therefore more difficult to generalize although they too do follow seasonal patterns.

The oceans themselves are also drastically different in terms of salinity, biodiversity, bottom topography, and ocean processes. The Pacific coast of Costa Rica is relatively straight and is bounded by the Middle America Trench which ensures that it is exposed to deep ocean currents and as a result deep ocean conditions such as upwelling of relatively colder nutrient rich water that supply food for a variety of larger predator fish that are good for subsistence and commercial uses. This exposure to the open ocean also makes the Pacific coastal waters more vulnerable to temperature variations brought on by such things as El Nino events and ensures drastic tidal shifts.

The Caribbean coast of Costa Rica is sheltered from open ocean processes due to a variety of factors. The presence of islands and the curvature of the coastline ensure that deep ocean conditions do not have great effect. The Gulf Stream brings warm water all year long that does not vary significantly in temperature. Little upwelling occurs and tides are almost nonexistent. Throughout much of Central America this has resulted in a perfect environment for the growth of coral reefs. This is not typical in Costa Rica due to large amounts of sediment run-off into the ocean after rain that essentially drowns coral reefs. Thus sea grass beds and mangroves tend to be important bases of biological productivity.

Pre-Colombian

Although the climate was much drier when human-beings first reached the isthmus around 9000 B.C. these relative geographic conditions were still in place. From this time until the appearance of Europeans in the Americas the way that native peoples sustained themselves changed significantly. In Costa Rica research suggests the typical model of native populations primarily practicing nomadic hunter-gathering modes of subsistence followed by more semi-permanent communities focused on agricultural cultivation.

The earliest recovered artifacts consist mainly of a variety of spear points and other tools that suggest heavy reliance on game animals. Regional comparisons of these artifacts show very little variance in type and complexity of the tool kits; therefore, it is likely that groups of people were constantly moving from place to place following the animals that they depended on. Eventually native populations became much more focused on the collection of indigenous plants such as arrowroot and began to remain longer in smaller areas.

The plants that Central Americans depended on most before

Yellow Elder
Vainillo
Tacoma stans

The Vainillo is one of the most common flowering dry-forest trees. They are hardy and easily propagated through cuttings. Used for shade in coffee plantations, live fences, and firewood, the Vainillo has yellow, vanilla-scented flowers that bloom between November and March. UPEACE students plant these trees along the road from Ciudad Colon to UPAZ for beautification and erosion control. They can grow up to 10m, but often are shorter, and are easily recognizable by their long thin fruit.

Yellow Oleander
Chirca
Cascabela thevetia

The Yellow Oleander, also called the 'Lucky Nut' for its smooth, green seeds that are carried and or pressed into the hands of newborn babies to bring luck. Its small, hornlike yellow flowers bloom throughout the year, bringing color to the road from Ciduad Colon to UPEACE. Despite its use in folk remedies for toothaches, fevers, and hemorrhoids, the lucky nut is extremely toxic. A single nut, if ingested, is enough to cause heart-failure and death in adults.

OTHER TREES

Coffee
Café
Coffea arabica

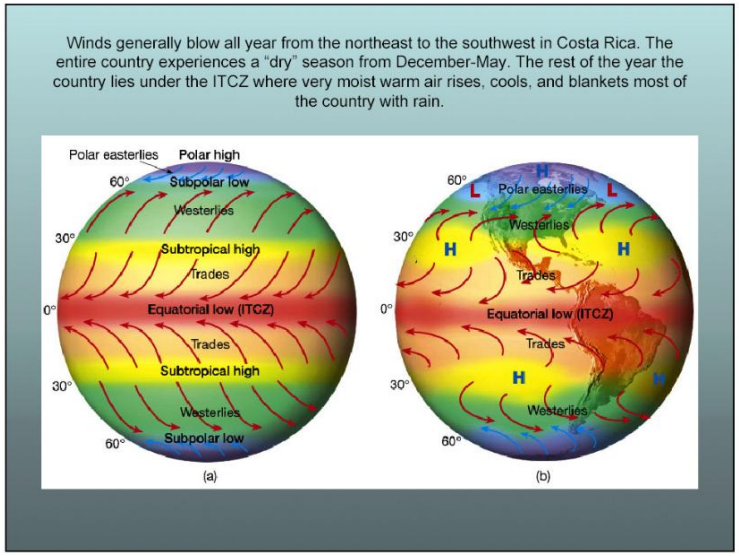
Originating in Ethiopia, the coffee plant has been domesticated and used to create caffeinated beverages for almost 1.000 years. Sometimes called *grano de oro*, it is one of Costa Rica's most important exports; it is second only to oil in terms of total value of commodity traded on the world market. The coffee farms on the road from Ciudad Colon to UPAZ are marginal in terms of their productivity and quality of product. Arabica coffee, the higher-quality of the major coffee species (the other being Robusta, used in many supermarket brands), prefers higher elevations and more nutrient rich, volcanic soils. Coffee flowers bloom between February and May; their fruit ripens in November.

Fig Tree
Higueron
Ficus Spp.

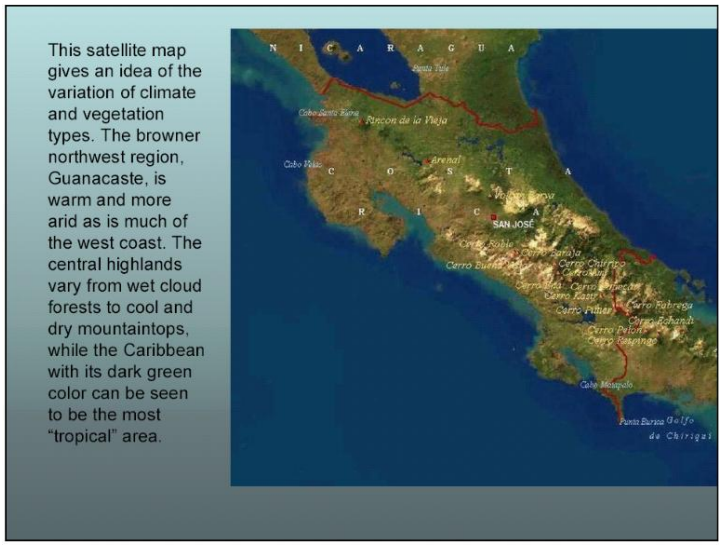
There are about 50 species of Fig in Costa Rica, and over 800 worldwide. Most Figs start as epihytes, living in the crotch of other trees. As they age, they send roots to the soil, anchoring the fig and begin the process of strangling the host tree. Over many years, figs develop complex, interwoven, root systems that wrap around the host, eventually killing it. Sometimes, the rotting of the dead host can leave Figs with the appearance of having hollow trunks. In Costa Rica, the latex of ficus trees is used in a number of traditional medicines in addition to popular consumption of the fruit.

and natural variation.

Climactically Costa Rica, like the rest of Central America,



lies in the path of the trade winds that blow from the northeast to the southwest all year. From December until May each year the winds blow across the isthmus without sufficient cooling to cause widespread precipitation. This time of year is considered the summer in the region despite the geographical location of Central America in the Northern Hemisphere. From May to December on the other hand rain

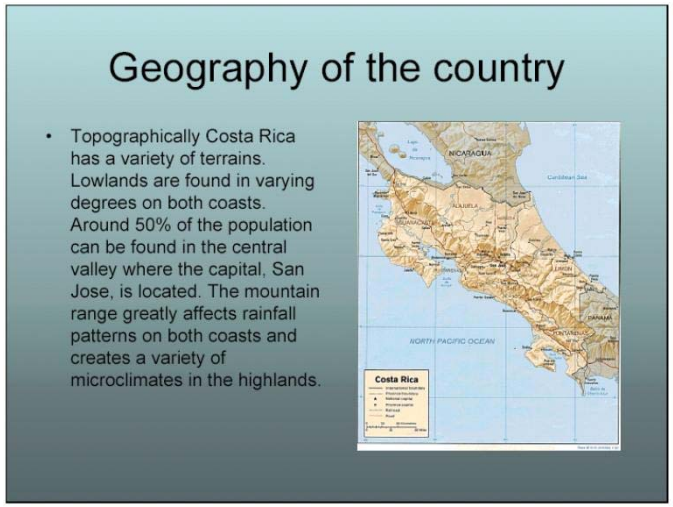


Natural-Human History of Costa Rica

Central America has long been known for its biological and cultural diversity. The arrival of humans on the isthmus around 9000 B.C. marked the beginning of a long and often tumultuous relationship with the natural environment. The geographical realities of this region have alternately isolated and integrated its peoples into the global economic and social system. Essentially the natural history of human interaction with the environment in Central America and Costa Rica can be divided into 3 time periods: Pre-Colombian, Colonial, and Post-Colonial. During each of these periods the various populations of the isthmus (land bridge) have employed modes of subsistence and production that have greatly affected the natural environment. Despite sharing a similar historical background with the other countries of the region Costa Rica has followed a different developmental path that emphasizes peace, stability, and a quest for environmental sustainability.

Geography

Central America has existed in its current geographical form for only around 3 million years. All of the countries currently found here are bordered by both the Pacific and Atlantic oceans with the exception of Belize and El Salvador. Topographically lowlands can generally be found on the coasts with highlands and mountains being located in the middle running north and south throughout the isthmus. As a result the central highlands and the Pacific and Caribbean coasts have very different climates and natural environments. Costa Rica is no exception to this model and exhibits a wide variety of climactic



Guava
Guayaba
Psidium guajava

The Guava tree is native to the Americas and has been used by humans for over 1,000 years for its hard, dense wood, edible fruit, and medicinal properties. Their fruit and bark are widely used in remedies for diarrhea and dysentery. Leaves of the Guava tree are also believed to have antibiotic properties. A generally small tree (10-15m) with a wide crown, Guavas have a coppery, flaky bark that chips off to reveal a green trunk. Guavas are very common shade trees, and flower and fruit throughout the year.

Guanacaste
Guanacaste
Enterolobium cyclocarpum

Designated the national tree of Costa Rica in 1959, the Guanacaste is native to Costa Rica and is named for it's oddly shaped fruit (Guanacaste literally means "ear-tree"). Common on the Pacific coast, its flowers are white and come into bloom between January and May. The thick, grayish trunk and wide, majestic crown makes the Guanacaste a defining feature of many Costa Rican landscapes. The pods and bark are used in the making of soap while both the fruit and sap have medicinal uses.

Gumbo Limbo
Indio Desnudo
Bursera simaruba

Used widely throughout Costa Rica as a living fence and for shade tree, the Gumbo Limbo is easily identified by its green, photosynthetic trunk, not quite covered by flaky, rust-colored bark. The tree can be propagated extremely easily; a branch of the Gumbo Limbo, if placed in the ground, will often develop a root system and grow to become a full-size tree. A wide variety of species use the tree for shelter or forage, including capuchin monkeys, brentid beetles, and a number of bird and ant species. In addition, the bark is used in many traditional remedies for ailments as diverse as obesity, sunburn, back pain, and syphilis.

Malay Apple
Manzana de agua
Syzygium malaccense

The Malay Apple produces a waxy, red, and pear-shaped fruit that is consumed widely in Central America. It is a tall tree, growing up to 20m with tan and gray bark and dark green, opposite leaves. The roots can be used in treatments for dysentery and as a diuretic. The pink flowers are known to attract butterflies and are the tree is planted around UPEACE for this purpose.

MAMMALS

Variegated squirrel
Ardilla, Chiza
Sciurus variegatoides

Variegated squirrels weigh about ½ kg (1 lb) and measure about 50 cm (19-22 in) head to tail. These squirrels are one of the most commonly mammals in Costa Rica. They are found from sea level to 2,400 m (8,000 ft), usually in dry deciduous or mixed forests. Their predators include large snakes, predatory birds and capuchin monkeys. They feed on soft fruit, tender leaves, flowers, pod fruit, insects and bird eggs.

White-faced capuchin
Mono carablanca
Cebus capucinus

White-faced capuchins are important seed dispersers in Costa Rica. In one study, it was estimated that capuchins transported 300,000 seeds of one species of plant in one day. Their varied diet, including many ripe fruits and seeds, greatly benefits a variety of species. They are predominantly active during the day, spending as much as 80 % of their day moving through the canopy in search of food. White-faced capuchins are the only Costa Rican monkey not considered to be threatened. They have been seen moving in the treetops in the morning on the road up to UPAZ. Look for a mid-sized monkey (2.5-3.5 kg, 5-7 lbs) with a yellowish or white face, shoulders and chest in the forests of the reserve and Peace Park.

Mango
Mango
Mangifera indica

Originally from the Indian subcontinent, Mangoes have been cultivated by humans for around 4000 years. Today, over 1000 varieties of this fruit exist, and it has worked its way into the folklore and culinary tradition of cultures all over the world. Mango trees fruit between March and July in Costa Rica, and can be identified by their grayish trunk and long, narrow, and dark-green leaves. The fruit is delicious, and is high in Vitamin A, potassium, fiber, and antioxidants. It also has a wide variety medicinal uses. The tree, which is a distant cousin of poison ivy, has resin which can irritate the skin.

Norfolk Island Pine
Araucaria
Araucaria heterophylla

Grown in many parts of the world as a Christmas Tree it is also sometimes used as a bonsai tree. Native to South America, the Norfolk Island Pine is planted on the UPEACE campus as a windbreak and ornamental. It is recognizable by its straight trunk, relatively short branches that grow almost symmetrically, and large, spiny cones.

Pitch Apple
Copey
Clusea Rosea

The Pitch Apple is also commonly called the Autograph Tree, because letters inscribed on the backs of its leaves remain permanently visible. During colonial times, Spanish soldiers would take advantage of this property to fashion decks of playing cards out of them. Like the Fig Tree, Pitch Apples start as epiphytes though they rarely grow large enough to seriously threaten their host trees. Its latex is a bright yellowish-green and it's white flowers bloom between June and September.

Rainbow Bark
Deglupta
Eucalyptus deglupta

The Rainbow Bark is one of over 700 species of the extremely large and diverse genus, Eucalyptus. It is extremely fast growing, averaging over 7m in height after 2 years in recent field trials at La Selva Biological station. Rainbow Bark is easily recognized by its straight trunk and the brilliant, multicolored bark for which it is named. Many varieties of Eucalyptus trees are popular in plantations for their ease of cultivation, speed of growth, and variety of uses. However, they have developed a reputation for releasing toxins into the soil and depleting local water supplies.

Summer tanager
Cardenal, cardenal veranero, tangara veranera
Piranga rubra

Male

The summer tanager is generally only seen in Costa Rica between mid-September and mid-April because it migrates to the southern United States and Mexico during the summer and only winters in a range from central Mexico to Amazonian Brazil. The female is a dull olive, which helps it blend in when tending to its nest. The male is bright red to attract females. The summer tanager is 16.5 cm (6.5 in).

Female

Great-tailed grackle
Sanate, zanate, clarinero, zanate grande
Quiscalus mexicanus

Male

This family includes blackbirds, caciques, cowbirds, grackles, meadowlarks, orioles, and oropendulas. Although they vary in color and habits, they all share the same unique feeding behavior of "gaping." A bird sticks its closed beak in a small crevice or under some leaf litter, and then pushes its beak open, thus revealing the previously hidden space to the bird's eyes. The great-tailed grackle is the largest, completely black (with hints of greenish blue) bird that you will see in the area. However, there is a difference in size between males and females. Males are 43 cm (17 in) and females are 33 cm (13 in) and a bit more brownish-gray.

Female

Blue-gray tanager
Viuda, tangara azuleja
Thraupis episcopus

Tanagers are an important link in tropical ecosystems. They consume large quantities of fruits and therefore consume many seeds. After traveling some distance, tanagers defecate, thus transporting seeds to new locations and providing a fertilized place for the seed to grow. Some ecologists believe that tanagers are the most common seed dispersers in the tropics. The blue-gray tanager is common around all of Costa Rica year-round except in the drier north Pacific where it is rare. The male and female look similar, both being about 15 cm (6 in).

Stinking Toe
Guapinol
Hymenaea courbaril

Named for its large (12cm long), foul-smelling fruit which is purportedly pleasant tasting, the Stinking Toe is spread widely throughout Central America and the Caribbean. The tree's resin is used in incense called Copan which is popular in Mexican Dias de los Muertos celebrations. The Stinking Toe provides food and habitat to a variety of fauna, including rodents, bats, and bees.

Tower Tree
Gallinazo
Schizolobium parahyba

Common on the UPEACE campus, the Gallinazo is a popular tree used in reforestation efforts. It is a native tree and is fast growing, but has an extremely short life span. Many of the trees around the flagpole area on the main lawn are already dead and will have to be removed soon. Gallinazo trees can grow up to 30m and have straight, light-grey trunks, fernlike leaves, and bright yellow flowers.

Shrubs, Flowers and other Ornamentals

Bamboo
Bambu
Bambusa vulgaris

Native to China, Bamboo is now common in many parts of the tropics. Related to grass, bamboo is planted for a wide variety of purposes, including as a windbreak, an ornamental, for shade, and a source of poles for building. Bamboo plants flower irregularly, and almost never in Costa Rica. Due to its speed of growth and hardiness, bamboo is acquiring the reputation of an invasive.

Bougainvillea
Veranera
Bougainvillea Sp.

The Bougianvillea vine was given its name by French military officer Admiral Louis de Bougainvillea when he discovered them in Brazil in 1768. The French admiral was in the midst of a voyage that would make him the first Frenchmen to circumnavigate the globe. His romanticized description of the peoples he encountered in his later voyage to Tahiti would influence Jean Jacque Rousseau's philosophy and contribute to his conception of the "noble savage." In the years since Bougainvillea's journey, the genus of plants that bear his name have become an extremely popular ornamental and are widely dispersed around the UPEACE campus and Ciudad Colon.

Brown jay
Piapia, urraca parda
Cyanocorax morio

The brown jay is a member of the Corvidae family, which includes crows, ravens, and magpies. Ornithologists consider this group of birds to be some of the most intelligent in the world due to their versatility and adaptability. Jays are important to the functioning of ecosystems due to their role as scavengers. They break down nutrients contained in dead animals freeing them for other uses in the environment. Brown jays are unusual in that they are plain looking for Neotropical jays. Even the most affectionate and passionate researchers call them "homely." Brown jays are 40 cm (16 in), often seen in groups, and are noisy with calls sounding similar to the word "jay."

Bronzed cowbird
Pius, vaquero ojirrojo
Molothrus aeneus

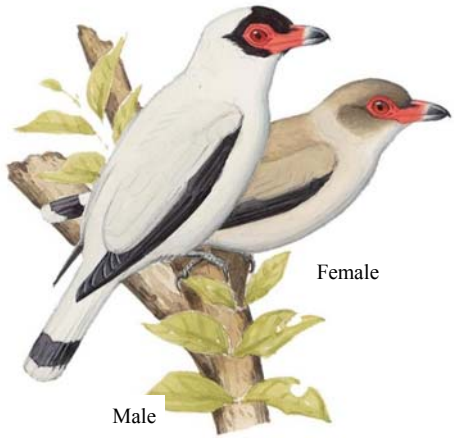
Male

Bronzed cowbirds are nest parasites favoring laying eggs in nests of the yellow-throated brush-finch and Prevost's ground sparrow. It benefits from this relationship because it does not need to invest energy in making, maintaining, and defending a nest. Its hatchlings are much larger than the host's hatchlings allowing the baby cowbird to out compete or kill the host's hatchlings. This can be very detrimental to the host species. Forest fragmentation has benefited these birds and helped to expand their parasitic impacts. Bronzed cowbirds are 20 cm (8 in).

Female

Masked tityra
Pájaro chancho, titira carirroja
Tityra semifasciata

Tityras are important seed dispersers for plants higher in the forest's canopy such as figs and arils. Tityras use holes excavated by woodpeckers for their nest cavities. They are stout birds, averaging 21 cm (8.25 in).



Motezuma oropendola
Oropéndola, oropéndula de Montezuma
Psarocolius montezuma

It seems that Montezuma oropendolas do all they can to stand out from the crowd. Their appearance is like one of those books that are broken into three sections, which mix and match the top, middle, and bottom of various animals. This bird has a yellow tail, a black body, and a head with a most unusual beak. It has the most unusual songs you will here on campus, and once you have heard it, you won't forget it. Their nests are long sacks, which are grouped in isolated trees with sometimes 50 nests in one tree. They especially like tall palms. A great example near campus is a palm tree located near the main lake in the park, which has about 20 nests hanging from it. The male Montezuma Oropendola is 50 cm (20 in) and the female is 38 cm (15 in).

Brazilian Red Cloak
Pavoncillo Rojo
Megaskepasma erythrochlamys

Brazilian Red Cloak is a large, bushy hedge plant with bright red bracts. It blooms with white flowers during the rainy season.

Cabuya
Cabuya
Furcraea cabuya

This easily recognized relative of Yucca is planted on the road between UPEACE and Ciudad Colon. Part of the agave family, the Cabuya makes an excellent live fence; its trunk is surrounded by numerous sword-shaped leaves, each growing up to 2m and lined with thorns. Cabuyas fruit during the rainy season, sending enormous stalks up to 10m in the air that produce green flowers when mature.

Cecropia
Guarumo
Cecropia Spp.

The five species of cecropia trees found in Costa Rica are similar and easily recognized by their distinctively-shaped crowns and leaf clusters. The Cecropia is famous as the preferred food of the three-toed sloth. It is also home to a variety of bats, butterflies, and birds. Fold remedies involving Cecropia are said to exist for high-blood pressure, athsma, diabetes, and bronchitis.

Croton
Palo de Oro
Codiaeum variegatum

The croton is a very popular landscape shrub and many varieties exist throughout Costa Rica. Its brilliantly-colored leaves are found in shades of red, yellow, and green and can change depending on age and availability of sunlight.

Clay colored robin
Igüirro, mirlo pardo
Turdus grayi

You can differentiate this brown bird from others by its yellowish bill and reddish-brown iris. Its song is believed to "call the rains." This could be due to its nesting shortly before the rainy season begins. It also happens to be the national bird of Costa Rica. Clay colored robins do not defend large territories. However, they do vigorously attack brown jays, who at times pillage smaller birds' nests. It is approximately 23.5 cm (9.5 in).

Great kiskadee
Cristofué, pecho amarillo, bienteveo grande
Pitangus sulphuratus

The great kiskadee belongs to one of the most diverse families of birds, the flycatchers. Of all the bird groups, the flycatchers probably have the most unidentified species. This is due to their generally drab appearance, their great diversity, and their presence in almost all terrestrial habitats. The great kiskadee eats insects as most flycatchers do, but also takes small frogs, lizards, small fish and tadpoles. They are commonly seen and hear around the campus buildings. The great kiskadee is 23 cm (9 in) and is differentiated from other flycatchers by its rusty brown wings and black and white striped head.

Hoffmann's woodpecker
Carpintero, carpintero de Hoffmann
Melanerpes hoffmannii

The Hoffman's woodpecker has a diet consisting of more fruit than the average woodpecker. This allows it to live in the same geographical area as other woodpeckers without having to compete for the same food sources. As with all woodpeckers, the Hoffman's woodpecker uses its tail as a brace while working its way up trees looking for food and can be identified by its undulating flight (irregular wing beat and a rising and falling pattern). Hoffman's woodpeckers are 19 cm (7.5 in).

Rufous-naped wren
Chico piojo, saltapiñuelas, soterrey nuquirrufo
Campylorhynchus rufinucha

The most conspicuous detail about wrens is their tail. It is usually held straight up in "military attention," and is often flitted up and down while foraging. Wrens are not showy in their color (usually brown), but they make up for this with their songs. Researchers place the wrens' vocalizations at the top of bird song complexity. Wrens often place their nests in cacti or acacia plants, which harbor ant colonies. The ants provide protection from small mammal and lizard predators. The rufous-naped wren can often be seen visiting classrooms on the UPAZ campus or in the bushes along the side of classrooms. They will travel in family groups up to breeding season when the male and the female, who mate for life, drive off the old brood in preparation for the new offspring. They are 18 cm (7 in).

Easter Orchid
Guaria Morada
Cattleya skinneri

The Easter Orchid is not found at or around the University for Peace campus, as it prefers humid cloud forests. It has been included because it is the national flower of Costa Rica. Like most orchids, it is an epiphyte that lives entirely on the branches and trunks of other trees. It's small lavender flowers bloom in April, around the time of the holiday from which it takes its English name.

Heliconia
Heliconia
Heliconia Spp

Heliconias are a strikingly beautiful family of epiphytic tropical flowers. Showiest in the neotropics, the Heliconia family is large and diverse, with over 35 species native to Costa Rica alone. Aside from their ornamental value, they serve important ecological functions, providing food and habitat for numerous species of insect, butterfly, and bird – especially hummingbirds. This image shows two species, Sexy-Pink (*Heliconia chartacea*) on the left and Lobster Claw (*Heliconia rostrala*) on the right, and was taken in the central gardens of UPEACE.

Hibiscus
Clavelon
Hibiscus Spp.

Hibiscus is one of the most popular hedge plants in Costa Rica, chosen for its beauty and ease of cultivation. The Hibiscus is a member of the *Malvaceae* family, which contains over 200 species, including Turk's Cap, Okra, and Marsh Mallow, a white flower whose roots, when boiled, produce a sticky white confection that inspired a snack now roasted around campfires everywhere.
The Hibiscus flower is used in juice, herbal tea, and as a dye in shoe polish and mascara.

Impatiens
China
Impatiens Wallerana

Impatiens is a diverse and widespread genus, containing over 800 species. These short plants grow flowers of a variety of colors and are known for attracting butterflies. There is a patch planted for this purpose near the UPEACE foot ball field.

Blue-crowned Motmot
Bobo, pájaro bobo, momoto común
Momotus momota

The family of motmots only has 9 species and they can only be found in the Neotropics. They are a truly beautiful and unique bird and it is a treat to see them on campus. The most striking feature is their tail, which is long and for some of its length lacks the traditional barbs of feathers. This is called a racket tail (as in tennis racket). The ancient Mayans believed that the motmot became a burrow nester due to its embarrassment about its "funny" looking tail. With large prey, the motmot bangs its victim against a branch to finish the kill before eating. The blue-crowned motmot is about 39 cm (15.5 in) and can be found in the lower branches of trees waiting to strike an insect or frog below its perch, especially in the lower 3 meters of shady groves, often near the streams of the Peace Park.

Lineated Woodpecker
Carpintero lineado
Dryocopus lineatus

The Mayans believed that woodpeckers were lucky birds that protected a lucky green stone under their wing. The trick was to find a woodpecker's hole and cover it. After the bird created a new hole, it was to be covered again. After nine times, it was believed that the bird would drop the lucky stone for the persistent person. Surprisingly, even with all this hole covering, none of Costa Rica's six species of woodpeckers are currently threatened. However, some are declining in numbers due to deforestation. The lineated woodpecker is large (34 cm or 13.5 in) with a distinctive red crest.

Groove-billed ani
Tijo, zopilotillo, garrapatero piquiestriado
Crotophaga sulcirostris

According to Mayan folklore the groove-billed ani's feathers were initially bright pink, therefore ani mothers were very proud of their nestlings. One day the ani's friend, Hawk, was going to find some food. The ani mother raved about the beauty of her nestlings and asked that the hawk avoid her beautiful darlings. The hawk agreed, but when she came across a nest of runty looking birds she did not recognize them as the beautiful nestlings that the ani mother described and ate them. In mourning, the ani mother put on black feathers and has not shed them since. ani's devotion to their young can be seen in how they nest communally. At any given time, there are two to five pairs laying eggs in the same nest. Each couple takes responsibility for care of all of the eggs. Imagine having five mothers and five fathers. They often forage in packs, hopping among the grasses in a line to drive up their prey of insects. Groove-billed anis are about 30 cm (12 in) in size.

Blue-and-white swallow
Golongrina Azuliblanca
Notiochelidon cyanoleuca

Due to their adeptness at catching and eating insects on the wing, swallows have been popular with humans for much of history. The Mayans respected swallows because of their importance in reducing populations of crop damaging insects. Perhaps due to this long history, swallows are one of few bird groups that benefit from human alterations of land. They are often found nesting on bridges and buildings that have replaced native vegetation. The blue and white swallow is 11 cm (4.5 in) and can often be seen at dawn and dusk snatching insects above coffee plantations and rangeland along the road to UPAZ.

Porterweed
Rabo de Gato
Stachytarpheta frantzii

An extremely common roadside ornamental in Costa Rica, the Porterweed is easily distinguished by its small, lavender flowers on long green stems. Porterweed attracts numerous species of butterflies and moths, and is planted extensively around the UPEACE campus for just this purpose. Related species, S. jamaicensis (Blue snakeweed) and S. mutabilis (pink snakeweed) are also found in Costa Rica. The plant is native to Costa Rica and flowers year-round.

Red Dracaena
Cana India
Cordyline fruticosa

The Red dracaena is native to India but is a common ornamental in Costa Rica. Noticeable by its bright red and green foliage, this shrub can grow up to 4m but is normally kept much shorter. The Red dracaena is also known as the good-luck plant or the cordyline.

Red Ginger
Antorcha
Alpinia purpurata

Native to the Pacific Islands, Red Ginger is a popular landscaping shrub and exported to be used in cut-flower arrangements. It's large, red or pink conically-shaped bracts are visible throughout the year. Red Ginger is not commonly ingested, though it is related to the Ginger plant whose root is, as well as cardmom and tumeric.

Hook-billed kite
Gavilán piquiganchudo
Chondrohierax uncinatus

This bird is recognized by its deeply hooked beak and long, banded tail. It preys upon terrestrial and arboreal snails for which its hooked beak is well adapted. The snail meat is extracted without even breaking the shell. These birds have favorite perching trees, where you often find piles of shells. The bird is approximately 41 cm (16 in).

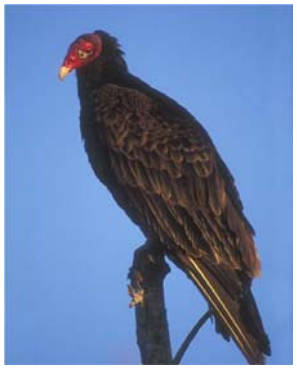
Squirrel cuckoo
Bobo chizo, cuco ardilla
Piaya cayana

Cuckoos have a particular fondness for eating caterpillars. They can even safely consume hairy caterpillars, which often contain toxins that are harmful to predators or at the very least taste bad. Cuckoos have been seen biting off one end of a caterpillar, squeezing out the toxic insides, then swallowing the harmless remainder. The squirrel cuckoo differs from most cuckoos in that it builds its own nest and rears its own young. Most cuckoos are brood parasites, laying their eggs in other birds' nests, leaving raising the young to other species of birds. Squirrel cuckoos are about 48 cm (19 in).

Black vulture
Gallinazo, zoncho, zopilote negro
Coragyps atratus

Black vultures and turkey vultures roost communally, often together. Roosting communally helps transfer information about the location of food to every individual in the group. It also reduces the risk of not finding food because information about a food discovery spreads quickly at the roost, thus leading to greater food security for all. When food is plentiful there are no skirmishes at food sites. However, when food is limited, there is a definite pecking order with black vultures eating first and chasing off turkey vultures. This is interesting because the black vulture is smaller (66 cm, 26 in) than the turkey vulture.

Turkey vulture
Noneca, viuda, zonchiche, zoncho, zopilote, zopilote cabecirrojo
Cathartes aura



According to Mayan legend, vultures used to be beautiful, fully feathered, white birds. They only dined on the finest and freshest meats. However, after eating food set out as an offering for the gods, the nobles set a trap. Another great feast was laid out for the vultures, while the nobles and witch-doctors waited in the forest. After the vultures arrived for the feast, the witch doctors jumped out of the woods to sprinkle magic powder on the vultures. In their haste to get away, the vultures flew too close to the sun and singed the feathers off their heads. In the clouds, the magic dust made the vultures turn black. After returning to the ground, the gods decided that vultures would have to eat carrion for the rest of their existence due to their misdeeds. The scientific community believes that vultures have bald heads because they begin feeding by sticking their heads up the back end of carcasses to get to the intestines. Feathers would make it difficult to pull their head back out of the carcass. Feathers would also be difficult to clean, thus leading to infections. Turkey vultures have an amazing sense of smell and are able to find hidden food such as buried carcasses or food buried deep in forests. Turkey vultures are 76 cm (30 in) in size and many here are migrants to North America where they breed in the summer.

INSECTS AND SPIDERS

Yellow fever mosquito
Mosquito del dengue
Aedes aegypti

This mosquito carries the viruses for dengue and yellow fevers. It usually breeds in artificial environments such as rain gutters, flowerpots and old tires. It only feeds within one hundred yards (100 meters) from its breeding location. It feeds in the early morning and late afternoon and will feed at night in artificial light. It prefers human blood to any other type. The Ciudad Colon area is an area that has historically had problems with dengue fever. The best thing to do is limit the number of places that they can breed in and around your home.

Golden silk spider
Arana hilo de oro
Nephila clavipes

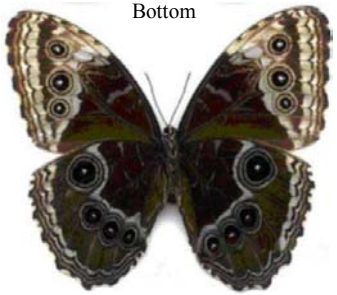
Though somewhat scary looking, this spider is not poisonous. You will usually find many webs in one area which is a technique for guarding against predators. The "capture web" for feeding is surrounded by "barrier webs" for stopping predators. Their webs are very strong and have been known to accidentally capture hummingbirds. Their silk is stronger than steel, economical and biodegradable. Currently, tests are being conducted for the use of the golden silk spider's silk as a substitute for Kevlar, which is used in bulletproof vests. Females can be up to 8 cm (3 in) long with males being significantly smaller.

Jewel spider, Spiny Spider
Panadera
Gasteracantha cancriformis

These are small spiders of about 7mm (1/4 in) for females and 4 mm (1/6 in) for males. They are members of the orb-weaving spiders (family Araneidae). A defining characteristic is the 6 spines on their back. They build a vertical web about 1 to 2 m (3 to 6 ft) above the ground, which they sit at the center of from day to night. Although its web is invisible like most spiders', the anchor threads contain many white dots on the silk probably to deter large animals, like humans, from walking into them.

Morpho peleides marinita

Bottom

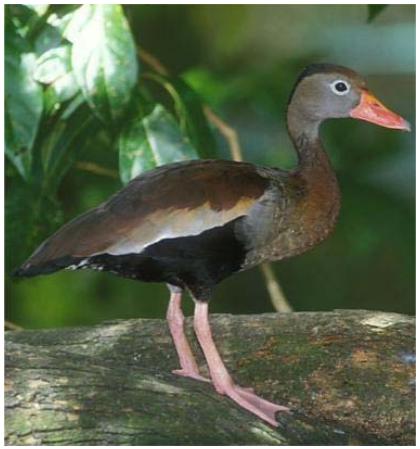


They occur from sea level to 1,800 m on both the Pacific and Caribbean slopes of Costa Rica. It is the most common species in Central America, with its floppy, zigzag flying over fields, coffee plantations, along rivers and through forests. The males are generally active from morning to midday and the females are usually only active in the midday. They are 64-78mm (2.5-3.1in.).

Top

BIRDS

Black-bellied whistling duck
Piche careto, pijije cariblanco
Dendrocygna viduata



Black-bellied whistling ducks spend very little of their time in the water. Most of their feeding occurs on shore at night. During the day they can be found lounging along the banks of lakes or in the trees surrounding lakes. Both species of ducks mentioned in this guide can be found at the lake in the park near campus. Black-bellied ducks are medium sized ducks at about 53 cm (21 in) with a very proper upright stature, pink bill and pink feet.

Muscovy duck
Pato perulero, pato real
Cairina moschata

When muscovy ducks were common, local hunters would tie a female to a tree and kill the males as they came to breed with the female. Due to this practice and habitat destruction, the muscovy duck is now common in only small portions of its historical habitat range. Due to their good taste, the muscovy duck has been domesticated, so it is not unusual to see the domesticated version in people's yards. It is 85 cm (34in) with the female lacking the red warts on its face.

Central American coral snake
Coral
Micrurus nigrocinctus

Coral snakes can be found in the coffee plantations surrounding the UPAZ campus, usually under logs or rocks. Coral snakes are brightly colored and rarely grow larger than one meter (3 ft). They are extremely poisonous and can kill humans. When a coral snake feels threatened, it swings its body back and forth with its mouth open and bites anything it may touch. Some non-poisonous snakes, such as the king snake, mimic the color pattern of coral snakes. Predators stay away even though the non-poisonous snake does not pose a true threat.

Ascia sp.

They are widely distributed in Costa Rica from sea level to 1,600 m in all habitats. They are most common visiting garden flowers or laying eggs on the *brassicaceous* weeds that grow in San José. *Ascia sp.* are 30-34mm (1.2-1.3in.)

Siproeta stelenes biplagiata

Top

Bottom

Usually occurs at sea level to 1,400 m on both the Pacific and Caribbean slopes and is most common in open secondary growth. They are often seen visiting flowers, carrion, dung, domestic gardens, and rotting fruit. This is perhaps one of the most familiar butterflies in CR. They are 45-48mm (1.8-1.9in.)

Anteos maerula

Female

Male

Occurs at sea level to 900m in association with Pacific slope deciduous forest. This species is more common during periods of rain and are often seen around red flowers. They are very fast and powerful flyers. *Anteos maerula* are 43-55mm (1.7-2.2in.).

Papilio androgeus epidaurus

Female

Occurs at sea level to 1,000m only on the Pacific Slope. They are found as solitary individuals in open pastures, secondary-growth forests, and along beaches. Both sexes visit a variety of flowers that range from herbs to dominant forest trees. They are 63-67mm (2.5-2.6in.).

Male

AMPHIBIANS AND REPTILES

Cane Toad, Marine Toad
Sapo grande, Sapo Comun
Bufo marinus

Toads are just a special type of frog. They have rougher, drier, bumpy skin and are usually found on land. They have two large glands behind their eyes (parotids) that exude poisons when predators try to eat them. Some toads have muscular control of these glands and can shoot the poisons up to a foot. Dogs and cats have been killed after trying to eat toads loping around their homes. However, it is not true that humans can develop warts from handling toads. The marine toad is the most common species of toad in Costa Rica and is the most likely to be seen around campus. They have been seen in the drainage pipes leading from the rooftops on campus. Even with their thicker skin they are still dependent on water for their existence. If they are away from water for too long, or stuck in the sun, they will die very quickly from dehydration. These toads are large and can be up to 20 cm (8 in).

Slender anole
Galleguillo
Anolis limifrons

Slender anoles can be found on tree trunks perched facing downwards in the search for food. Males defend territories of about 30 square meters (90 square feet). When another male intrudes, the defender will display his throat sack and do "push-ups" while bobbing his head up and down. If the intruder does not scurry away, the defender will bite the intruder, hopefully getting the message through.