

Central America

Travels and Adventures through the Amazing World of Medicinal Plants

Costa Rica

Geoff D'Arcy Lic. Ac. DOM.



While the small country makes up about 0.003% of Earth's land, it is home to roughly 5% of the world's (known) species. It has over 500,000 different species of animals and plants.

Costa Rica lies between Nicaragua to its north and Panama in the south. It has both a Pacific and Atlantic Coast. A series of volcanic chains (cordilleras) runs from the Nicaraguan border in the northwest to the Panamanian border in the southeast, splitting the country in two. In the center of these ranges is a high-altitude plain (Central Valley), with coastal lowlands on either side. Over half the 5.1 million population lives on this plain, which has fertile volcanic soils. The Caribbean coast is 132 miles long while the Pacific coast is 635 miles long. Costa Rica not only has tropical rainforests and beautiful beaches but also some active volcanoes, windswept mountaintops and incredible weather. Although it is a small country, it has a very large variety of tropical habitats, which are protected by the best-developed conservation program in Latin America. Clearly it's main resource were it smiling people. Right from the airport with its vendors, it was clear, that these were non-pushy and friendly people.

Costa Rica is famous for its enlightened approach to conservation. They are serious about their commitment to conservation! **Costa Rica has maintained a higher proportion of its land mass for national parks. Much more than any other country in the world- with 10.27 % protected as national parks by Costa Rican law. An additional 17 % set aside for reserves, wildlife refuges and protected zones..** Many species that are threatened or even extinct in neighboring countries still thrive here. The parks envelop complex

ecosystems, ranging from cloud forest to marshland, savanna, rain forest and coral reef, and contain extraordinary biodiversity. In most parks it is possible to see several different habitats even within the course of a day, they are home to some of the most pristine rainforests on earth. There is an incredible abundance of flora and fauna. Its home to an incredible 850 species of birds, 9,000 species of plants, 208 species of mammals, and 160 species of amphibians. This means that the traveler can experience the tropics in a really natural way. The variety and density of wildlife in the preserved areas attracts people whose dream it is (like my youngest daughter Alyssa) to see wild animals such as monkeys, sloths, caimans, sea turtles and exotic birds in their natural habitat. Apart from hiking in rainforests and mountains, the more adventurous will find the opportunity to snorkel on dazzling tropical reefs, or raft some of the most thrilling whitewater in the tropics. Costa Rica has twelve major life zones, which are home to an astonishing and diverse amount of plant and animal life. No other country in the world has so much actively protected area per capita and more botanists per capita. This small nation is truly committed to conservation.

Costa Rica, named by Christopher Columbus, means 'rich coast'. Most Europeans came to Costa Rica after the age of the Conquistadors. The local indigenous population was weak, and the country mountainous area prevented the establishment of large landholdings. This resulted in a people focused on commerce not conquest. Costa Ricans were spared 15th-century Madrid's rigid and formal hierarchies.

Costa Rica has the most stable political climate in Latin America. This is quite an achievement, considering how volatile the other Latin American governments have been. For half a century Costa Rica has been a democracy. It has had democratic elections since the 19th century and is one of the most peaceful nations in the world. After the 1948 civil war, it did the unthinkable by abolishing its armed forces. Since then, Costa Rica has avoided the despotic dictatorships, military coups, and terrorism that have torn apart other countries in the region. Successive reforming Costa Rican governments invested the resources made available by scrapping the military budget into education and health care. Now that's a revolutionary idea!! There has been no political repression since 1948 and human rights are highly respected.

We arrived at a small airport, and in fact we were the only flight of the day. The weather was hot and dry. We were greeted by, laid-back friendly faces. The rainy season was just weeks away from starting, yet the sky did not betray this, not even a hint of a cloud. We were shuttled off, as part of a group, heading off to a traditional package vacation. We were delivered through dry desert to a tropical pacific costal area near Puntarenas. It was a classic large hotel with a beach facing the Pacific Ocean and a large complex of three kiddy swimming pools; we knew *this* would be a major hit with our kids.

We relaxed enjoying this hotel complex until everyone was ready to head off to the rain forest, and I could not wait. At first our daughters were not too keen on leaving. On the journey to the eco-lodge, however, we stopped on route to view some caimans and that's when their enthusiasm started to peak. We had stopped along the Grande de



Tárcoles River, a river well know for bearing one of the most important crocodile populations in Costa Rica. The crocs live on the water margins, on riverbanks or often in swampy areas. Some of these animals reach more than 4 meters long. Yikes!!! These are animals left over from pre-historic times.

Unlike the dinosaurs who disappeared 65 million years ago, crocodiles never died out. They have remained virtually unchanged for 200 million years. The lifespan of the crocodile is comparable to that of human beings - some crocodiles live for up to 100 years. They propel themselves in the water by their webbed feet and especially by their flattened tails. They can float near the surface almost submerged, as their eyes, ears and nostrils are situated on the tops of their heads, allowing them view-unsuspecting prey unobserved. They are pretty scary animals!!!

After this encounter, everyone was enthused more about our visit. We arrived at the Villa Lapas Eco-Lodge, which is located next to the Carara National Park. The lodge was located on a mountain, between the rainforest and a roaring river and was spartan, yet it met all our needs (after having been down the Amazon, it was like a four star hotel by comparison). This park is important in Costa Rica because it is an "ecotone" or melding

area between the dry forests to the north and the wet forests in the south. The park is about 11,000 acres and comprises secondary and primary forests with lakes and rivers. The tour is a 3-hour walk. The rainforest is quite a treat; you could feel the effects of the oxygen-laden air, not as much as in the vast expanse of the Amazon, yet it was noticeable and invigorating. Other forests around the country are frequently draped in a mist of clouds. Algae, mosses and lichens get a foothold on the wet surfaces, providing a perfect place for orchids, bromeliads, ferns and innumerable other plants. The Carara was different, as it blended dry and tropical forests. It was resonated with the songs of birds at dawn, then the forests become quiet in the heat of the day apart from the screeching of the Macaws. The word "Carara" is an indigenous term, meaning "river of crocodiles". The area in which the reserve is located was occupied by an indigenous culture that is thought to have been allied with groups located in the Central Valley from 300 B.C. to 1500 A.D. Extensive tomb sites have been excavated here, and the burial places of people of high status are remarkably complex. Many endangered and threatened species live and breed here, like the American crocodile and the Purple Heart tree. Carara is also considered a sanctuary of the rare and beautiful Scarlet Macaw. Walking in the rainforest is like taking a step back in time. Our naturalist guide was tall a student, with close-cropped black hair and his enthusiasm for the park was so contagious, he would open his large clear, dark brown eyes wide, at each exclamation or emphasis during his explanation of the local animal or plant life. As we were walking with our guide we saw 30 or so Macaws swoop in calling and screeching to each other. These Macaws also are known to 'self-medicate', these large brightly colored parrots are very fond of an unripened *poisonous* fruit of the sandbox tree. They tear open this fruit feast on its fruit and seeds even feeding it to the young. How do they survive? well they have learned over the ages, to eat a detoxifying clay they find high on river banks before they feast. This clay neutralizes the toxins. For the most fulfilling experience, it is important to go with an experienced naturalist guide. A naturalist will color-out and explain the complex inter-relationships of species in the forest, help you identify the birds, spot well-camouflaged creatures, really bringing the forest to life. Soon it would be the rainy season, when the Tarcoles River floods its banks, creating a large lagoon that quickly fills with water hyacinth. Crocodiles and caimans are easily spotted along with

“new world” because they could not match the native healers! The Spanish brought all the best-known Indian healers to the College of the Holy Cross in Mexico City, to pass on their knowledge of medicinal plants. *The Aztecs were expert herbalists. In 1552, during the early years of Spanish rule in Mexico, two Native American students at the College of Santa Cruz in Tlaltilulco, Martinus de la Cruz and Juannes Badianus, compiled a list of herbs that the Aztecs had used for centuries as medicines. Martinus wrote and probably illustrated the original Aztec text, and Badianus translated the work into Latin. Housed in the Vatican Library, the Badianus Manuscript is the oldest known American herbal.* In 1552, the first materia medica of Central America was published. It became known as *Badianus’* manuscript. It gives 185 medical plants and 200 illustrations. It was ‘the cream of the crop’ from the rich Aztec herbal heritage, which suffused Central America at that time. Then in 1571, the Spanish King sent his personal physician to study with the Aztec healers, and in the following 7 years he recorded 3,076 plants, 1,200 included the plants medicinal qualities. In the Aztec empire, herbal medicine had reached a high degree of sophistication before being dismantled and discredited by the Spanish. Under the Aztec system experienced doctors and nurses practiced in hospitals funded by Aztec government. The nobility would even dispatch medicine hunting envoys, off to distant parts, in search of new plants.

Passionflower, a.k.a. Maypop (*Passiflora incarnata*)



Passionflowers have some of the most beautiful blossoms in the world. According to legend, its name comes from a Jesuit priest, who found the vine in 1620. That night, he had a vision, the priest associated components of the blossom with ‘Christ’s Passion’, leading to the common name, “Passionflower.” The five petals and five sepals were representative of the ten faithful apostles present at the crucifixion; the five anthers represented Christ’s wounds; the three pistils, the nails. The corona was the thorny crown, while the leaves were reminiscent of the Roman spear, and the tendrils

were their whips. First documented by Spanish physician, Nicolas Monardes in the 1560's, the leaves of the passionflower had long been used as a natural sedative by indigenous peoples. When Monardes brought the vine back to Europe, it was used as a remedy for nervousness, insomnia. I have used it for many years with great results for a sedative and analgesic; One of the early successes with this plant in my practice, came when I was helping a young woman patient of mine, to come off powerful anti-anxiety drugs that were now creating more problems than solutions. The medicines had a powerful withdrawal side effect. Her Sympathetic nervous system was like a 'taut spring', kept at full tension, by her lack of sleep, anxiety and a continuous flaring of her bodies 'fight or flight response'. This was taking its toll, on this once vibrant, withdrawn young woman. Almost immediately from starting the passionflower, it was like seeing the taut spring' slowly uncoil, slowly unwind. It was not a sudden miracle-like response, more like a gentle relaxing of the tension in her hands and facial muscles, an amiability crept into her being,.... her parasympathetic nervous system was being nourished. Her 'fight or flight response' was being 'switched off'. She relaxed slowly and came off her medication much to the relief of her Medical Doctor her family and myself. It was like watching a flower open to the morning sun. Passionflower is very effective without any disorientation or narcotic after-effects. I use it with other herbs in pain formulas; for instance, for headache it has a calming analgesic effect when combined with other herbs that guide the "stuck" energy away from the head. In my insomnia formulas, it is a primary herb used to balance disturbed sleep patterns and sleeplessness. It is widely acknowledged as good medicine for anxiety, tension, irritability, and spasms, all of which can rob us of a good night's sleep. It also calms other nervous states accompanied with asthma, palpitations, high blood pressure, muscle cramps and general hyper-activity. It has been the subject of a great deal of research for nearly a Century, and many medicinally active components have been identified in all parts of the plant. Yet as with many of nature's chemistries, none of the active compounds have been identified as producing "specific" effects. Generally, all of the compounds work together to generate, in combination, the mechanism by which its curative properties are known.

Quassia, a.k.a. Hombre Grande (*Quassia Amara*)



One of the most common herbs of Costa Rica is a bush called hombre grande (quassia amara.) An extract from the plant is used to soothe stomachaches. The extract is bottled and is often sold in taverns, where it is used as a folk remedy for drinking too much alcohol. It is also used as a digestive aid and appetite aid. Else where in Central America, in Surinam where its cousin grows, the Quassia tree (*Picrasma excelsa*). A native of the tropics, it

was brought to Europe in 1756. It was named after the native healer who had introduced it to the Europeans, a generous gesture not often repeated throughout the New World. This is used to strengthen digestion, increase bile flow, stimulate weak appetites, and especially to treat anorexia. This herb is very bitter, as with nearly all digestive aids, and its cooling abilities lend it toward the treatment of malarial fevers. It also used to treat threadworm. Its chemistries have been explored and found to contain quassinoid bitter principles and alkaloids. Some quassinoids have cell-killing properties and anti-leukemia actions.

Corn, a.k.a., Seda de Maiz (*Zea mays*)

Any discussion of the medicinal plants of Central America should also cover corn, (maize), the staple food of the native peoples of the Americas. [Archaeological evidence](#)



[from the Tehuacan caves in Puebla, Mexico, suggests that people were using corn \(*Z. mays*\) from about 5000 BC.](#)

Corn silk, the silky wrap around the corn, has long been used by the Costa Ricans for bladder infections, to improve urine flow. The Aztecs used a corn meal decoction for dysentery. It helps to stimulate the production of bile, and research out of China indicates that it may lower blood pressure and reduce blood-clotting time. Writing this

chapter from St. Joseph's County in Michigan, which is one of the heartland's main

producers of corn, there are hundreds and hundreds of miles of genetically modified (G.M.O.) corn crops. The amazing fact is that 35% of the U.S. crop in 1999 was GMO. Thankfully with European, Central American, and Japanese opposition to GMO crops, the prices here in America's heartland are falling, and with them (hopefully) GMO corn's crop domination. Corn is an amazing example of a "wind pollinating plant." It avoids dependence on anything other than wind for pollination. Therefore, as part of nature's safety valve, it sheds 130 kilograms (nearly 300pounds) of pollen from its tassels over a one-week period to try to insure its survival. There is an astounding 25 million pollen grains per stalk...more than 20 to 50,000 times more pollen than it needs to fertilize one acre completely! The idea of releasing GMO corn into the environment to pollinate in such quantities , it will eventually polute non-GMO corn.

Potential Health Issues with Genetically Modified Organisms

Are GMO products bad for you? There is evidence building [that may](#) support this belief. Yet the greater question is why are we experimenting with in our eco-system, with an experiment we cannot control or maybe even stop? Let's look at the potential side effects. Scientists do not yet understand living systems completely enough to perform DNA surgery without creating mutations which could be harmful to the environment and our health. They are experimenting with very delicate, yet powerful forces of nature, without full knowledge of the repercussions. We place our planet at risk for widespread crop failure. We should remember the potato blight of the Irish history; that produced massive famine as a result of only planting only one variety of potato, this is not a practice the farmers of the highlands of South Americas, where it originated. Genetic engineers intend to profit by patenting genetically engineered seeds. This means that when a farmer plants genetically engineered seeds, all the seeds have identical genetic structures. As a result, if a fungus, a virus, or a pest develops which can attack this particular crop, there could be widespread crop failure. This could threaten our entire food supply—insects, birds, and wind can carry genetically altered seeds into neighboring fields and beyond. Pollen from transgenic plants can cross-pollinate with genetically natural crops and wild relatives. All crops, organic and non-organic, are vulnerable to contamination from cross-pollination Health Hazards. Our Ecology may be

damaged. The influence of a genetically engineered organisms on the food-chain may damage the local ecology. The new organism may compete successfully with wild relatives, causing unforeseen changes in the eco-systems.

Genetic engineering uses material from organisms that have never been part of the human food supply **ever**, to change the fundamental nature of food. **There has been no** long-term testing, **and** no one **really** knows **over time** if these foods are safe. Potential toxins maybe created. Genetic engineering **may** cause unexpected mutations in an organism, which **could** create new and higher levels of toxins in foods. These **potentially** may lead to increased allergic reactions, by producing unforeseen and unknown allergens in foods. **The** potential exists, for further decreasing the nutritional value of our food. The **acknowledged** threat to our antibiotic resistance **due to antibiotics inclusion in the food chain**, may be made even greater by genetic engineers **who** use antibiotic-resistance genes, to mark genetically engineered cells. This means that genetically engineered crops, **may** contain genes, which confer resistance to antibiotics. These genes may be picked up by bacteria, which may infect us. **Further exacerbating our resistance to antibiotics.**

If labeling of GMO products is not allowed, then potential problems cannot be traced, by our public health agencies, **or even avoided by those with potential allergies.**

The good news for Japan is their government seems more concerned or less controlled by big agribusiness interests. The decision of the Japanese government to request labeling of transgenic foods will **slow down** new cultures of transgenic foods in the US. To avoid the damages **of companies** images, caused by labels on **GMO** foods, big Japanese companies are removing **GMO** components from their supplies to the US, thus creating alarm among those farmers who are expanding this kind of cultivations, and lowering crop prices, which in turn **ultimately** influences the amount of GMO crops planted **each** year.

The Japan Tofu Association is planning to move on to non-GM soy. **also the** Nippon Flour Mills Co Ltd, the second producer of flour in Japan, is considering moving to non-GM flours for its production of oat flakes. The Japanese Tohato Inc., which produces snack foods, and is now completely dependent on the production of US cereals, is planning to move to French ones to avoid labels on modified foods.

All the herbs that I use and I am involved with are completely free of any GMO herbs or excipients. Within the herbal supplement industry in the US many manufacturers use cornstarch as an excipient to carry the extracted ingredients, and corn is now estimated to be 60% GMO, I believe the jury is still out, as far as GMO products are concerned, because of this there are no GMO products in any of the medicinal products I use.

Bio-prospecting: “There is gold in them there rainforests.....!”

“...that in the end, what will determine the future of biodiversity in the world are the more intellectual and spiritual values that we give it. We need to realize that if biodiversity does not exist, we are not going to survive, that microorganisms have as much right to exist as we do”

Rodrigo Gámez, Director, Instituto Nacional de la Biodiversidad, Costa Rica

Prospecting used to be associated with gold prospecting, sifting endlessly through mounds of dirt for a few grains of gold. These days, the new gold is found sifting through nature’s pharmacy to screen the plants for compounds that may come to be the next pharmaceutical giant. In 1958, shamans in Madagascar led Eli Lilly Pharmaceuticals to the rosy periwinkle plant (*Catharanthus roseus*) for the treatment of Hodgkin’s disease (a type of lymph cancer) and childhood leukemia. The company “struck gold” using the knowledge of the shamans and the natural resources of Madagascar. Their return has been a whopping \$100 million per year for the two drugs. Justly so, they were criticized for denying both the country of Madagascar and the shamans who led them to the plants any share in the profits. The “gold nuggets” in this “gold plant rush” are the two plant compounds, the alkaloids vinblastine and vincristine, found to be responsible for the remarkable 80 and 90 percent remission rate for Hodgkin’s Disease (a type of lymph cancer) and Childhood Leukemia respectively.

In 1991, Merck signed a ground breaking, million-dollar agreement with Costa Rica’s National Biodiversity Institute (INBio). This agreement, INBio will give screening rights to Merck for any plant or animal it collects for the pharmaceutical company. The

agreement is important because any profit Merck earns from a Costa Rican plant-derived drug, will be shared with the tiny Central American country. “This is true sustainable development,” INBio’s director, Rodrigo Gamez is quoted as saying, “because we are extracting valuable and renewable products from our forests without causing damage.” “Green gold” is the name he gives his country’s rainforest assets. Because Merck is transferring knowledge to Costa Rican scientists, he adds, “We will develop our capacity to test plants for medicinal properties here, so in the future we can sell our knowledge to overseas markets, rather than just hauling bananas on our backs for them.” He went on to explain, “When we started in INBio, there were forestry laws that said that the only thing of value in the forest was the wood and that the rest was waste. This changed radically and now our biodiversity law is very specific and clear in reference to the perception of value. The fact is that we established a negotiation framework in which the industrial partner financed research in Costa Rica, and ten percent of the budget went directly to conservation purposes, for protected areas. This 10% provided hundreds of thousands of dollars for conservation. Also, the transfer of technology and the development of scientific and technological capacity both have much more value. This is our intellectual capital - if you will. We certainly have received a very large direct benefit in technology transfer and capacity development.”

These days the promise and the hope of a win-win situation for the funding and conservation of rainforests is waning, challenged by gene splicing. The Instituto Nacional de Biodiversidad (INBio), a non-profit organization that works with the Costa Rican Ministry of Environment to manage natural drug discovery in Costa Rica’s rainforests, believes they have noticed a significant decrease in interest from pharmaceutical companies since the early 1990s. These days only two pharmaceutical companies are working with them, whereas in the early 1990’s there were five. It seems that with newer types of technology available in drug development – most notably, genetic engineering - companies are less interested in “bio-prospecting.” Thus, the great hope for rainforest conservancy (the search for plant-based gold using indigenous knowledge), which demands a lot of time and money, is being overlooked and the drug companies are instead turning to the cheaper process of gene-splicing. It is

disheartening to think we are losing the opportunity to save biological species as well as rainforest cultures. Bio-prospecting really offers opportunities for conservation of both. Some companies still come to the rainforest, but are doing so by eliminating the cost of FDA approval and turning back to the original sources of the pharmaceuticals - herbal medicine itself. For instance, because Shaman Pharmaceuticals was millions of dollars short of complying with FDA recommendations, the plant-based remedies, under the new name of Shaman Botanicals, are now being marketed as “dietary supplements”; these are not subject to the same rigorous testing and approval processes as drugs. Other companies have followed suit in developing herbal products from plant materials. Herbs from the rainforest that now being sold as dietary supplements include: lapacho, also known as Pau D’arco (*Tabebuia avellanedae*, and *T. impetiginosa*,) used for the treatment of cancer, especially leukemia, infections and for pain relief; passionflower (*Passiflora incarnata*,) used to reduce anxiety and tension; cat’s claw, also known as Una de Gato (*Uncaria tomentosa*,) claimed to be a possible remedy for cancer and AIDS; and boldo (*Pneumus boldus*,) used for liver and gallstone problems.

Hence, we as a society are returning back to “self-care” wellness remedies. In the new millenium, “new” healing is, in actual fact, the “ancient” chemistry of nature—we are coming nearly a full circle!

3000 B.C.- *“Here, eat this root “*

1000 A.D.- That root is heathen. Here, say this prayer.

1850 A.D.-That prayer is superstition. Here, drink this potion.

1920 A.D. - That potion is snake oil. Here, swallow this pill.

1945 A.D. - That pill is ineffective. Here, take this antiseptic penicillin.

1955 A.D. - Oops....germ mutated. Here, take this tetracycline.

1960-2000 - 39 more “oops. more germs mutated”.... Here, take this more powerful antibiotic, if you can afford it. 20% of North Americans cannot, 80% of the world cannot.

2001 A.D. – Cipro, a last resort antibiotic, has failed, is ineffective and toxic; besides, all the microbes are resistant, and some even feed on it (even on vancomycin).

2002 A.D. - *“Here, eat this root “*