Amigos Newsletter

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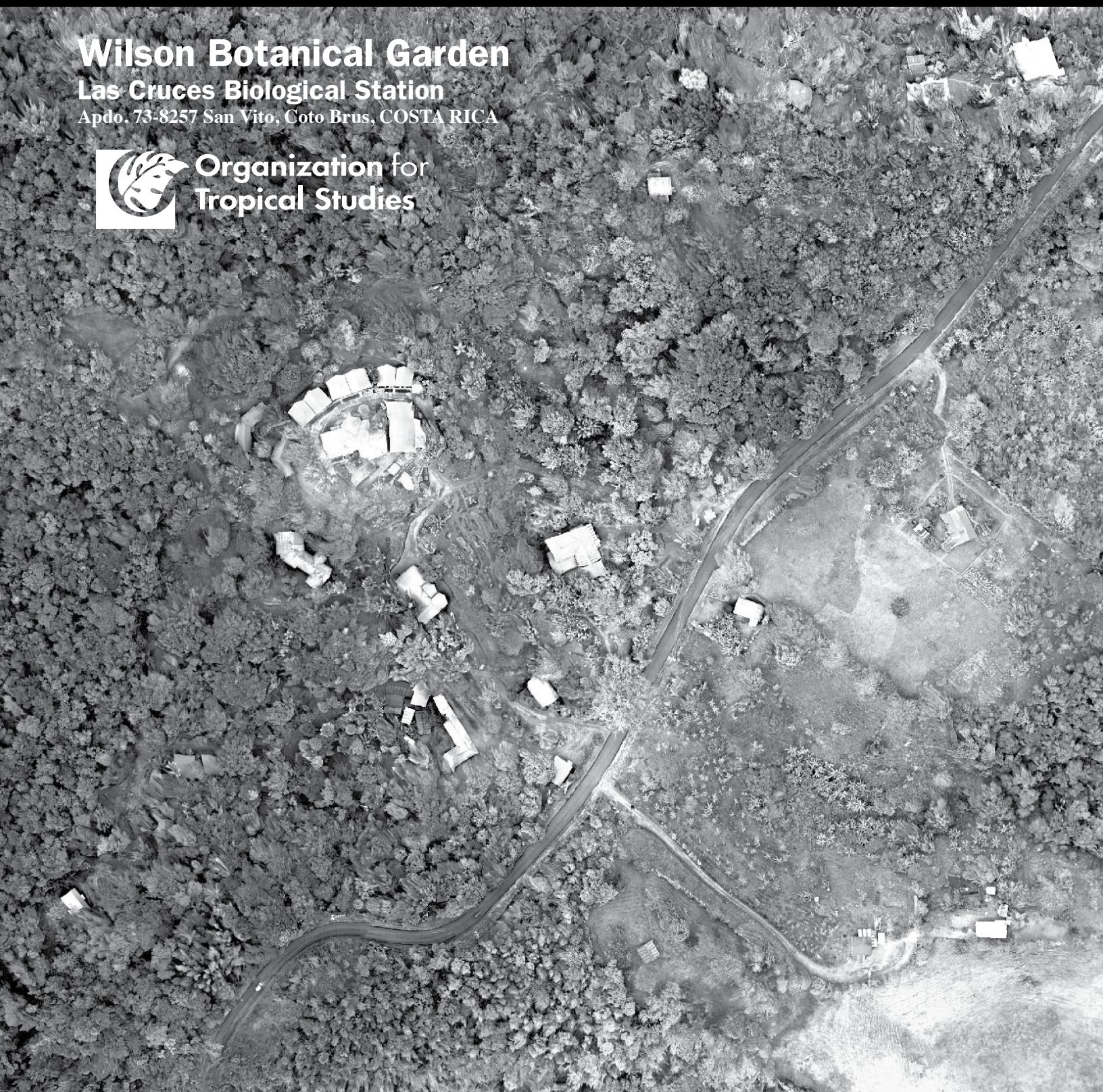

Wilson Botanical Garden

Las Cruces Biological Station

Apdo. 73-8257 San Vito, Coto Brus, COSTA RICA

Organization for Tropical Studies

Who We Are

The Las Cruces Biological Station is one of three tropical field stations owned and operated by the Organization for Tropical Studies (OTS) in Costa Rica. Along with the Wilson Botanical Garden, Las Cruces was acquired in 1973 and is a hidden jewel that offers natural history visitors and researchers alike an extraordinary place to visit and conduct research.

Far from the noise and bustle of the country's capital city San José, Las Cruces is located in the remote southwestern corner of the country between Corcovado National Park on the Osa Peninsula, and the enormous La Amistad Biosphere Reserve (472,000 hectares) that spans south-central Costa Rica and western Panama. In 1983, UNESCO declared Las Cruces and the Wilson Botanical Garden part of the Reserve due to its incredible diversity and proximity to La Amistad.

The Wilson Botanical Garden, founded in 1962 by Catherine and Robert Wilson, is arguably the most important botanical garden in Central America and a "must see" stop on the itineraries of plant lovers, birders, and other natural history groups. It is famous for its worldwide collection of tropical plants which include palms, aroids, bromeliads, gingers, marantas, heliconias, and ferns. More than 3,000 exotic species of plants can be found in the 10-hectare (~ 25-acre) garden, including one of the largest collections of palms in the world.

There is an incredible diversity of animals at Las Cruces, and in the immediate area surrounding the station. The most recently updated bird list includes 410 species; close to half the number of birds found in all of Costa Rica. There are also over 100 species of mammals, of which 59 are bats. Some of the more commonly sighted mammals include agoutis, white-faced capuchin monkeys, kinkajous, olingos, and tayras. Reptiles and amphibians also thrive in this moist, cloud-laden habitat and there is an impressive diversity of insects, and in particular moths and butterflies.

Las Cruces protects over 200 hectares of primary forest (home to over 2,000 native plant species) and several smaller adjacent areas that are in various stages of forest recovery. The forest is surrounded by a mosaic of mixed-use agricultural fields and forest patches, and it is this fragmented setting that makes Las Cruces an ideal place to study the effects of forest fragmentation and isolation on animal and plant communities. The landscape surrounding Las Cruces is also ideally suited for research on biological corridors and restoration ecology; key fields of research that are of ever increasing importance. Part of our mission at Las Cruces is to continue to purchase land for reforestation and, in doing so, expand our protected areas and connect some of the isolated forest fragments around the station. For further information on this campaign please visit our website.

At approximately 1,200 meters elevation (3,900 feet), the prevailing temperatures at Las Cruces are cooler than one might expect. Temperatures range from 21-26 °C (70-80 °F) during the day and 15-21 °C (low 60's) at night. Mean annual rainfall is ~4,000 mm (157 inches)! The dry season runs from January – March, and the rainy season from May – November. Most visitors and researchers come during the dry season.

The station is well known for its visitor-friendly amenities: comfortable private sleeping quarters, delicious meals, knowledgeable and enthusiastic staff, and a well-maintained network of paths and trails. We also provide internet access to overnight visitors.

The nearest town is San Vito, the capital of Coto Brus County. It was settled in the 1950's by Italian immigrants and to this day there is a strong Italian presence. There is an excellent pizzeria, and the Dante Alighieri Italian-Costa Rican Community Center provides language instruction. Indeed, Coto Brus is the only county in Costa Rica where Italian forms part of the elementary curriculum!

We invite you and your family and friends to come visit us for an afternoon, an overnight stay or a week to see and experience firsthand the splendid tropical diversity of the Las Cruces Biological Station and Wilson Botanical Garden.

For more information please visit the OTS website at http://www.ots.ac.cr/ or contact us directly by email: lcruces@ots.ac.cr. Postal mail can be sent to: Estación Biológica Las Cruces/Jardín Botánico Wilson, Apdo. 73-8257, San Vito de Coto Brus, Costa Rica. Telephone (from the U.S.): 011 (506) 2773-4004.

Reservations can also be made by contacting the OTS office in San José by email edu.travel@ots.ac.cr, postal mail: ESINTRO/OTS, Apdo. 676-2050, San Pedro de Montes de Oca, Costa Rica, or by telephone (from the U.S.): 011 (506) 2524-0607.

The North American OTS office is located at Duke University, telephone: (919) 684-5774 or email: nao@duke.edu.

The Organization for Tropical Studies is a nonprofit consortium of universities and research institutions in the U.S., Costa Rica, Peru, Mexico, South Africa, and Australia.

Founded in 1963, OTS is dedicated to providing leadership in education, research and the responsible use of natural resources in the tropics. To this end, OTS offers graduate, undergraduate and professional education, facilitates research, participates in conservation activities, conducts environmental education programs and maintains three fields stations in Costa Rica: La Selva Biological Station in the Atlantic lowland rain forest; Palo Verde Biological Station in the Pacific deciduous dry forest; and Las Cruces Biological Station in the premontane cloud forest near the Panamanian border.

AMIGOS NEWSLETTER
No. 79, MAY 2013

Front Cover: Composite aerial image of the Wilson Botanical Garden taken by the Arducopter Hexacopter (see GIS corner).

Back Cover: A white otter *(Lutra longicaudis)* having a swim in Laguna Zoncho (see article in Flora y Fauna). Photo by Harry Hull.

Director's Keys and Notes

Zak Zahawi/zak.zahawi@ots.ac.cr

As I was returning from another round of travels abroad this past month, I started thinking about what I should write about for the upcoming *Amigos* newsletter. Sometimes I have an idea months in advance, other times I think of something when it is time to sit down and compile all the articles that come in. I was a bit late in getting started on the newsletter this time and was trying to think of what has happened of potential interest to all of you out there! And then suddenly I realized – why not write about what I was just doing in my last round of travels. Well, aside from a personal trip, I was at the National Science Foundation (NSF) in Washington D.C. evaluating research proposals for funding. I could just leave it at that but the most interesting part is how this is done. For some of you researchers out there this might be a boring entry as you are all too familiar with how the NSF evaluation process works, but for many of our other *Amigos* readers this should be pretty novel (and hopefully interesting!).

So how do these wheels move? Well, its slightly different with every funding agency but the way it works at NSF, one the biggest funding agencies for science in the U.S. [not including the medical sciences that are largely driven by the National Institutes of Health (NIH)], is something like this. First off the agency has many different branches that fund all avenues of research ranging from geology to chemistry to of course biology. Even within the Directorate for Biological Sciences there are several Divisions and within each Division a number of separate calls for specific proposals that focus on a particular theme. It is here where most of the activity occurs (at least at the researcher/funder interface). Each one of these calls will have a submission deadline and receives a certain number of submissions through the electronic submission process online. Once all proposals have been received, NSF will then go about inviting a suite of potential reviewers to evaluate the merit of these proposals. All proposals of course have to meet certain criteria before they get to that stage and uploading a proposal for review is not a simple process.

How does this review process work? A number of different experts in the field are invited to serve on a 'panel'. Participants are invited from any number of U.S. institutions and organizations – but you are, of course, not invited if you have submitted a proposal for review! More subtle conflicts of interest (such as a proposal submitted from the same institution by a different researcher) are handled by excluding you from the evaluation process of that specific proposal. The size of panels can vary quite a bit and if it's a large call or a topic of considerable interest, then there will be several panel groups and the different sessions will divide up the work at hand. The panel I was on was fairly small, and received only 55 proposals. The panel consisted of perhaps 12 people and each one of us was required to read and evaluate around 13-14 proposals. A proposal has around 15 pages of text and then potentially a considerable amount of supplemental information. Needless to say reading these proposals can take a considerable amount of time and you have to have read them *before* the panel meeting takes place!

In reading each proposal, you evaluate its worth based on a number of different NSF-wide criteria, but each call also has a distinct set of specific points that NSF wants to see addressed in the proposal. Obviously such issues as the quality of the science are evaluated, but also aspects leading to broader impacts, which can include educational capacity in the traditional sense as well as the proposal's potential impact in terms of

the broader community at large. Each panel reviewer submits a 1-2 page evaluation of the proposal along with a rating, and only then (!) does the panel meet.

The meeting is typically a 3-day affair and is packed from start to finish. A proposal is reviewed by 3 panelists (additional external reviews can also be called upon if necessary), who then evaluate its merits (and flaws) when it comes up for discussion during the meeting. Sometimes this process is smooth as reviewers agree that the proposal is strong (or weak), but other times you find yourself having to defend a proposal against the opinion of another reviewer who did not like it! It is an extremely dynamic process and all the while a 4th panelist is taking notes and is the 'scribe'. This 4th panelist has to write up a summary of the discussion that took place and submit the evaluation to the online system for the 3 panelists who read the proposal to review. Confused? This all happens at the same time so soon your inbox is full of partially completed evaluations and other tasks that are pending!

At the end of the day all panelists do is recommend a proposal for funding or not. This is based upon its overall final ranking, and the summary evaluation that is written during the panel meeting and has to be approved by the three reviewers and the NSF directorate. The entire panel review process (including all write ups) has to be completed before anyone can leave so sometimes it gets a bit frantic! But it is an incredibly enriching experience and the system actually works very well. The good thing is it is well organized so the times you are a scribe aren't immediately followed by another review and so on. During the discussions of the proposals you are not a part of, you can catch up on the tasks at hand, step out for a change of scenery or go and serve yourself another cup of coffee – always omnipresent at these meetings!

What's New at Las Cruces?

Zak Zahawi / zak.zahawi@ots.ac.cr

Las Cruces Advisory Committee (LCAC)

LCAC members hard at work! Photo Zak Zahawi.

The first LCAC meeting in more than 15 years was held on 2-3 February and was an extremely successful event! The LCAC was dissolved in 1999 due to a lack of available funds and has not been reinstated until now. Topics discussed included issues pertaining to the Las Cruces budget, staffing, fundraising, visiting courses, and of course researcher use of the field station. A report is forthcoming from the Chair of the committee and will be used as a reference document by Las Cruces. We plan on holding annual meetings at the station and will likely have an inter-annual conference call as well. Many thanks to the committee members for taking the time to come to the station for this two-day marathon session – and some from far flung reaches of the globe! The committee is made up of the following members:

Matt Betts – Oregon State University
Susan Cordell – US Forest Service (Hawai'i)
John Kress – Smithsonian Institution; Chair LCAC
Chase Mendenhall – Stanford University
Alison Olivieri – San Vito Bird Club
Bob Timm – University of Kansas

Il Giardino Gets Greener!

Needless to say the Wilson Botanical Garden is quite lush. But over the past few months the gardeners who work here have received training in a number of different methods for producing compost, fertilizer, and organic insecticides and fungicides, and the results have been quite astonishing. First off we now have a lombri-compost system, or earthworm composting. This has been on the back burner for a number of years but for some seemingly random reason, it was never acted upon. The structure is essentially a large wooden box (queen-sized bed) and the earthworms are periodically 'fed' a mixture of kitchen compost waste, mixed with manure and other raw materials. Then we have compost production by means of accelerated microbial decomposition (an additive process where compost is mixed with a concentrated product that starts a reactive process so strong that the compost pile generates considerable heat during the process)! The composted material is ready for use in a few weeks. Both composting processes lead to the production of good fertilizer that is spread out into the botanical garden planter beds. Finally, the gardeners are doing bio-fermentation using a mixture of different raw materials available in the local market. The resulting tincture is both a fertilizer and an insecticide! The result? A garden that is very very green and happy!

Production of organic compost by microbial decomposition. Photo Carolina Vindas.

Research Grants Pending!

Four research grants have been submitted for work that would be conducted at Las Cruces in recent months! These are all substantial grants that would have a considerable impact on researcher use at the station. Two were submitted to the US Department of Energy (one a result of the Soil Warming Workshop held last August and described in the previous *Amigos* Newsletter), and two are preliminary proposals to the National Science Foundation. Three of the four grants would be to establish new research, whereas the fourth is for continued funding of an active Las Cruces project. Stay tuned, and if any get funded I will outline what their contributions will be in the next Newsletter!

Research at Las Cruces

Implications of Social Diversity for Costa Rican Development: Reflections on Research

Dana Graef. Ph.D. Candidate Anthropology & Environmental Studies / Yale University
dana.graef@yale.edu

I first traveled to the Boruca indigenous community of Costa Rica as a student in the OTS Field Ethnobiology program in the summer of 2002. We left the gardens of Las Cruces on the morning of a drizzly day in August. Most of the group was heading to the Brunka indigenous town of Rey Curré, which a government-planned hydroelectric project would flood. Our car was traveling to Boruca, another Brunka community that would not be directly flooded by the dam. From the paved Inter-American Highway, our vehicle eventually pulled off onto a dirt road for the long, slow climb to Boruca, a small village in a valley of the Coastal Range. Once there, the former Las Cruces Station Director, Luis Diego Gómez, introduced us to an artisan in the center of town who showed us a variety of multicolored cotton bags, hand woven with a backstrap loom, and a handful of native beans.

View along the road from Boruca to Rey Curré, with the Térraba River in the background. Photo Dana Graef.

There was a soccer game in town that day, so many people were down at the plaza, but the artisan's son led us to the house of an elder man who was at home. A community leader known for carving and revitalizing the practice of creating wooden masks, he spoke to us of his struggles to maintain Brunka culture, and of a government whose priorities were elsewhere. He was wrapped in a green cardigan while sitting on a rope hammock; classical music played in the background and roosters called. When we asked about the potential impacts of the dam, his response was stoic and resigned: if the government wants to build it, there's nothing we can do. While the music swelled in the background, he told us: 'I'm living the life of the forgotten.'

As our vehicle returned to Las Cruces that night, and in the months following my return to the United States, I remained troubled. Was the indigenous community truly powerless if the government chose to build the dam? What did it mean to live a forgotten life? Why was there not

broader public opposition to the project? With encouragement from Luis Diego, I returned to Costa Rica in 2003 to investigate reactions to the hydroelectric project in Boruca, Rey Curré, and the Central Valley. Luis Diego was not shy in his opposition to the dam, a development initiative that has been hovering over the region and in the minds of government officials since the 1970s. Referring to the project as a 'magnificent idiocy' in an *Amigos* newsletter in 2001 (No. 56), he wrote: 'Personally, I will sit on the middle of the road when the bulldozers rev up their engines' —a slightly milder intervention than ones he proposed in private conversation.

While residents of San José and employees at the electric company spoke of national benefits and national needs, environmentalists like Luis Diego spoke of social and ecological costs, and indigenous peoples spoke of the irrevocable loss of their ancestral lands. Archaeological sites may be quantified, but the meaning and value of landscapes rooted in history cannot. There is no true cost/benefit analysis of the multifaceted implications of such a choice. Consequently, the specter of the hydroelectric project has posed uncomfortable questions for Costa Rican society at large. When I began my research in San José, I often encountered discomfort with and prejudice against indigenous peoples, both implicit and explicit. In particular, deforestation in the Brunka region was often cited as a factor intended to undercut the legitimacy of indigenous land claims. However, such judgments failed to take into account historic policies of the central government that had explicitly promoted non-indigenous agricultural colonization of the region, leading to rapid deforestation. More recently, there have been efforts in the indigenous communities to cultivate seedlings and plant new trees.

Over the past decade, I have continued to return to southern Costa Rica as an undergraduate and doctoral student. Returning again and again to the same place, I have seen despondency turn to optimism, optimism to despondency. One year an elder woman, now deceased, spoke despairingly about loss of the indigenous language; another year, she was enthusiastically working on Brunka translations of local tales. Visitors come and go; cell phone reception and the Internet have arrived; the economy has transitioned away from agriculture and towards the sale of masks and woven bags. My experiences as an ethnobiology student sowed the seeds for a series of research projects on the Boruca Hydroelectric Project, the history of the Inter-American Highway, and eventually, a broader inquiry into the relationship between environmentalism and processes of agrarian change. The proposed dam—still not constructed—has been reduced in size, renamed Diquís, and relocated around a bend in the river to a place that would flood parts of the Térraba indigenous territory, Boruca's neighbor to the north. The points of struggle shift.

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The very existence of Costa Rican indigenous communities upends that: Costa Rica is a racially heterogeneous nation.

Over time, indigenous communities' struggles against the dam have given them national and international visibility. Throughout the country, 'here there are almost no indigenous peoples' and 'we're almost all *mestizos*' are less common refrains. Yet Costa Rican society—especially in the nucleus of San José and the Central Valley—has been built on a premise of egalitarianism. The very existence of Costa Rican indigenous communities upends that: Costa Rica is a racially heterogeneous nation; there are disparities in wealth and access to land across the country; there is urban poverty as well as rural; there are those who are hungry. To accept such disparities—especially the presence of marginalized indigenous communities whose claims to land predate the nation—is to accept that development justified for the 'common good' may lack precisely that: a common denominator, the promise of equal benefits or justifiable costs.

Bat Ectoparasitism and Disease Dynamics in an Agricultural Landscape

Hannah Frank / hkfrank@stanford.edu

The world is changing rapidly – temperatures and weather patterns are shifting; forests are being cut down; oceans are acidifying. These alterations have myriad effects at all levels, from individual survival to whole ecosystem function. Importantly, these changes also affect organism interactions, including disease dynamics. In recent years, scientists, veterinarians and public health officials have noted a surprising number of emerging diseases that have caused great problems for animals and humans alike. Some, such as chytridiomycosis and white nose syndrome, are of huge conservation concern, decimating populations of amphibians and North American bats respectively. Others, such as SARS coronavirus and swine flu, are important problems for humans as well. These latter viruses are "zoonotic" diseases, meaning that they are transmissible from animals to humans. The emergence or intensification of many of these diseases has been linked to environmental changes, including destruction of the habitats of the natural "reservoirs" of these diseases. To forge greater understanding of these disease dynamics I study how human environmental impacts interact with the behavior and ecology of animals to affect their exposure to disease and parasitism.

One of the most important groups in which to explore the effect of habitat alteration on disease dynamics is bats. Bats are ecologically diverse and very important for ecosystem functioning. Within bats there are species that eat fruit, nectar, small vertebrates, blood and insects. In fact, all of this diversity is encompassed by species we catch at Las Cruces! With such diverse diets, bats play a vital role in seed dispersal, pollination and insect control. They can also be found roosting in everything from rolled up leaves to old buildings to caves.

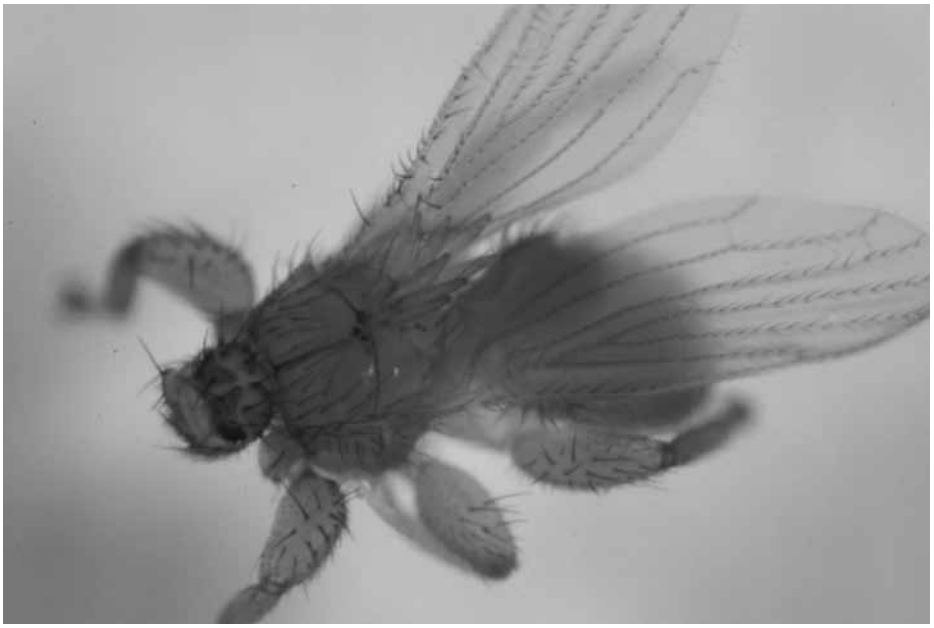
Micronycteris microtus **caught in a forest fragment.**

These differences in behavior and ecology lead to differences in exposure to diseases and parasites.

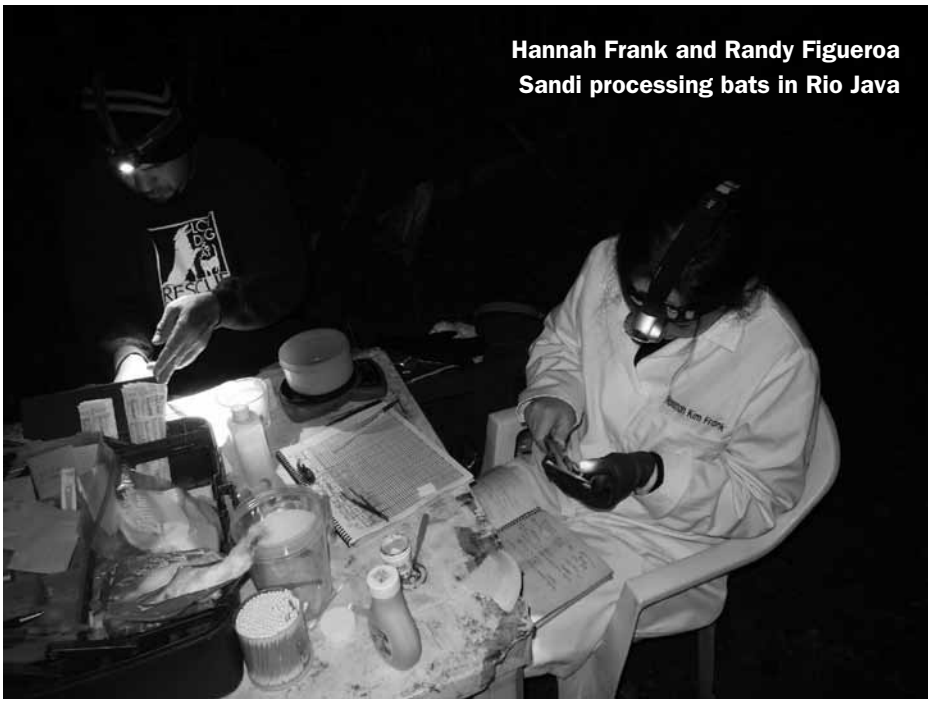
Along with colleagues in Coto Brus and Stanford University, I have been capturing bats in 18 sites distributed within the Las Cruces Forest Reserve and surrounding coffee fields and forest fragments. Altogether we have caught over 4700 bats in this landscape.

Because parasites are a frequent vector of disease I began my research by investigating one important group of bat parasites called the bat flies. Bat flies belong to two families of blood sucking flies that live almost their entire lives on bats. Females hop off the bats to lay their larvae on roost walls and after they develop, the new flies hop onto other bats,

making roosting behavior a key factor in determining a bat's parasite risk. Habitat alteration could potentially change these interactions by decreasing the number of roosts that are available to animals, possibly forcing them to crowd or to keep coming back to the same roosts over and over again. This can therefore change how these animals are exposed to parasites, which can be detrimental to the host by vectoring diseases as well as directly through blood sucking. In the past two years I have collected the ectoparasitic flies off of every bat we have captured. (If you think video games are fun, you should try chasing tiny flies with forceps.)



A bat fly, *Trichobioides perspicillatus*, caught on a *Phyllostomus discolor* bat individual



Hannah Frank and Randy Figueroa Sandi processing bats in Rio Java

My initial results confirm previous findings that bats which use roosts of long duration (things that stick around for a long time like caves) are more likely to have parasites than those which use short duration roosts like leaves. I have also found that the communities of bats caught in forest fragments differ from those found in the forest reserve: bats caught in the forest reserve are actually more likely to be parasitized than those that live in trees outside the reserve. Differences in the bat community trickle down to their bat fly communities— as the landscape changes which bat species are found in which areas, the bat parasites present also change. This is potentially very important, as these parasites can transmit disease. In fact, an undergraduate in our lab is examining just that question, looking for *Bartonella* bacteria in the bat flies that I have collected. Members of this genus of bacteria cause cat scratch fever as well as symptoms such as endocarditis or meningitis in humans.

Parasites are just one part of the disease puzzle. In order to learn something about other diseases in this system I have collected saliva, blood (just a couple drops) and fecal samples which I will use to screen for viruses. This will allow me to tell not only which diseases might be circulating in bats that might be a problem for humans but also give researchers important baseline information about the health of bats in this system, ensuring these important ecosystem service providers will be flying around for years to come.

Special thanks to Winston, Randy and Jeisson Figueroa Sandí, Yimer Ilama Loria, Federico Oviedo, and Chase Mendenhall for all of their help capturing and processing bats!

GIS Corner

Yerlyn Blanco / yerlyn.blanco@ots.ac.cr

This past January the GIS (Geographic Information Systems) and IT (Informatics) department at Las Cruces resumed activities after the departure of Mauricio Sarmiento in September. Mauricio was at the helm for some 2 years. I am the new GIS and IT lab manager and am very happy to form part of the team at Las Cruces.

I will start by informing you that the GIS lab recently acquired a series of photographs of the Wilson Botanical Garden by means of an "Arducopter Hexacopter". These machines are usually used for recreational activities, but this one was modified for scientific purposes. The addition of a GPS locating device and a photographic camera allows the machine to be programmed on a flight path to take photographs of interest. These photographs are then processed using specialized software for analysis and interpretation. The hexacopter was brought to Las Cruces by researchers collaborating with the Islas project to take images of their plots, but while here we took advantage of the technology and programmed a flight path over the Wilson Botanical Garden (see front cover photograph). This is a composite image of thousands of photographs taken by the hexacopter.

Other projects continue at the station, such as the creation of a precise botanical garden map. This map will outline all trails and planting beds in the garden that house the many species featured in our collection. This map is being created so that tourists can make use of it, but more especially for educational purposes, as its precision will permit students to locate, and in turn identify individual plants in the garden. It can also be used for research projects, and for garden management and inventory work.

The Arducopter Hexacopter just prior to take off! Photo Yerlyn Blanco.

We are also developing a project with the personnel who work in the Las Cruces herbarium, and are continuously adding plant specimens from all over the county. Each specimen has an XY GPS coordinate which you can use to determine where the plant was collected. You can use this information to either make trips to these field sites again, or to determine sites that have not been sampled as yet. This work will be done in tandem with aerial photographs in order to identify key forested areas of interest where collections should take place.

Assistance with the Amistosa Biological Corridor project also continues. Several meetings and activities are planned in upcoming months with all of the major participants involved. OTS Las Cruces is the sole NGO represented and provides GIS assistance to the project. Additional projects will undoubtedly surface in 2013 and we hope that they will meet our interest and expectations!

Flora and Fauna

White Otter at Finca Cantaros

Gail Hewson Hull / ghhull@gmail.com

Laguna Zoncho at Finca Cantaros, 3 km from Las Cruces Biological Station, was visited on Sunday, March 3, by a very unusual creature—a white Neotropical Otter (see photo on back cover). *Lutra longicaudis*, or "Lobito del Río" in Spanish, was causing quite a stir at 6:45 AM among the Common Moorhens, Purple Gallinules, Blue-winged Teals, and Masked Ducks. Even a Blue Heron was watching the swimming show from a safe distance. The Moorhens, year-round residents, were especially annoyed by the early morning visitor, and their alarm calls were raucous.

I was on my usual early rounds with my dog and spotted something white on the far side of the lake. A look through my binoculars at the sleek animal on the shore confirmed not only that it was the first otter we have seen at our lake in nineteen years, but that it was completely white, with pink nose and ears!

Not having my camera, I raced home to rouse my husband, Harry, who moved faster than ever before at that hour of the morning. His telephoto lens and rapid-fire shutter speed allowed him to capture the otter swimming and diving for about a half hour. At that point we had to leave because we were expecting some guests that day, and later visits to the lake to see the white rarity were in vain. We have no photo of the otter out of the water.

We would like to know where it went, and hope it is looking for a mate to return to our little one-hectare lake, which has native fish. Perhaps it went to the Las Cruces reserve and is now enjoying the pools of the Rio Java. In any case, may it stay safe. It was a very handsome animal, as graceful as any mythical aquatic ghostly siren.

Sighting of a White-crested Coquete in the Wilson Botanical Garden

Yerlyn Blanco & Ariadna Sánchez
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During the last couple of weeks in February, we sighted a White-crested Coquete (*Lophornis adorabilis*) hummingbird in the immediate vicinity of the visitor's cabins (see photo on page 14 of this newsletter). These birds, which are primarily found in southern Costa Rica, are common in the forest and are usually in the tree crown canopy. They typically feed on the nectar of tree flowers such as *Inga* spp. and *Vochysia* spp., but also take advantage of more weedy species that flower in clearings such as *Stachytarpheta* spp. This is the first time the species was sighted in the garden and it was photographed next to planted individuals of *Stachytarpheta* spp. in front of the cabins! One more for the garden list!

A Common Potoo and its Fledgling

Zak Zahawi / zak.zahawi@ots.ac.cr

This amazing photograph of a Common Potoo (*Nyctibius griseus*) with its young chick was taken on February 10th in a coffee field near the Las Cruces Biological Station. But there is more to the story. The adult individual bears young almost every year in the same place. So Yohani Zeledon (a resident of Coto Brus and the photographer on this occasion) and Carolina Vindas, who works at the station, have 'followed' this story since the mother laid her egg! As a result the timing of this photograph was perfect as it wonderfully captures the mum in full training mode on how to be a Potoo, along with a good apprentice!

A Common Potoo, and its young chick standing tall on a live fence in San Bosco de Sabalito. Photo Yohani Zeledon.

De la Comunidad

Good Environmental Practices in Indigenous Territories of the Brunka Region

Ariadna Sánchez / ariadna.sanchez@ots.ac.cr

Workshop participants from the indigenous territories of Boruca, Rey Curré, and Terraba visiting the Proyecto Bio-alternativo de La Amistad in Altamira, Buenos Aires.

In March, 2012, within the framework of the *Programa Conjunto Sector Privado y Desarrollo de la Región Brunca*, and in coordination with the United Nations for Development Program (UNDP), the Outreach and Environmental Education Program (OEEP) for Las Cruces held a Workshop on Good Environmental Practices in six Indigenous Territories belonging to four different ethnic groups in southern Costa Rica. Among the participants were 19 people from La Casona reserve (Ngöbe-Buglés) including traditional healers, midwifes, artisans and cultural advisers; 7 people from the Salitre Territory (Bribris) from the Brìbripa Kanèblo organization that is working in ethnoturism; 12 participants from Cabagra (Bribris), the majority high school students and teachers; 9 people from the Boruca community (Brunkas) including artisans and farmers, 14 people from the Térraba community (Teribes or Naso Brorán); and 16 participants from Rey Curré (Brunkas).

This workshop was developed as two working sessions within each community. Starting with a group discussion session about environmental problems in their own village, the group was also able to propose some possible solutions from their own perspective. Later, the discussion was reinforced with an informative lecture about global and national environmental statistics, and the adoption of better environmental practices at the domestic and agricultural level, that was illustrated with videos and images.

The second session consisted of a one-day tour to visit 3 successful projects in the southern region of the country that have been working in local sustainable development. The selected projects were the Asociación de Productores La Amistad (ASOPROLA; http://www.asoprola.org/), Asociación de Mujeres Organizadas de Biolley (ASOMOBI; http://www.cegesti.org/casosexito/asomobi.pdf), and the Proyecto Orgánico Bio-alternativo La Amistad (https://www.facebook.com/media/set/?set=a.1446862687395.2063721.1108001656&type=1). All are located in the buffer zone of the La Amistad International Park, in Biolley, Buenos Aires. These projects have been characterized by having a focus on conservation, working with organic or sustainable production of services and products, and by promoting local development including rural tourism. The participants were able to ask questions about the different processes (farming organic coffee and vegetables, producing organic shampoo and creams, honey, crafts, among other products) as well as the main obstacles and needs that these projects have faced.

Some of the results of the workshop were:

a) Active participation of small businesses that work in ethnotourism and artisan production as well as community institutions or organizations to raise awareness about actual environmental problems at the local and global level.
b) Inform and transfer basic knowledge about viable alternatives at the local level that could promote the application and use of better environmental practices and technologies in the indigenous communities.
c) Provide examples of low cost environmental technologies and easy effort practices that can be applied at the domestic level, and present a few ethnotourism projects in indigenous territories.

The participants showed great satisfaction with the inter-exchange experience, and a strong interest in replicating similar activities and practices in their own communities in order to promote more responsible ethnotourism.

Contributions of OTS Courses to the Luis Diego Gomez Herbarium

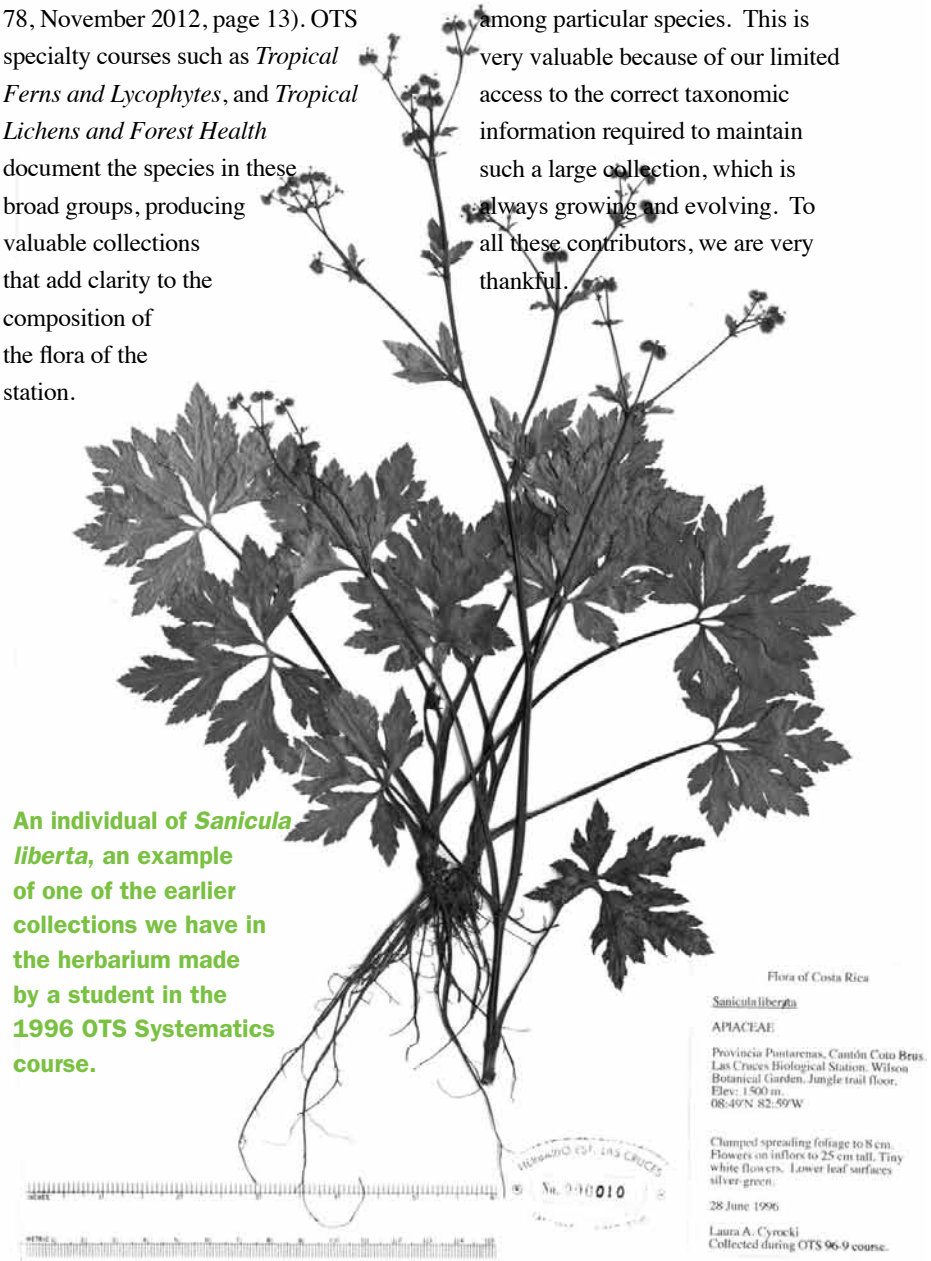
Rodolfo Quirós / rodolfo.quiros@ots.ac.cr

All the courses and training programs developed by the Organization for Tropical Studies (OTS) are designed to have an important hands-on component that immerse participants in the whole field experience, which include lectures and field activities. Many of the OTS courses that visit Las Cruces have contributed to our development in different ways. Small projects in the forest, botanical garden, and other areas fill the life of graduate students during their stay here, and may represent ideas to pursue further projects by the undergraduates who follow. Some of the undergraduate programs also do other activities, such as volunteering time to eradicate invasive plants in the forest, or designing a guided trail for medicinal plants. All these are valuable contributions to the development of the Station as a center that promotes knowledge.

Another valuable contribution has benefited the Luis Diego Gomez Herbarium. We jump-started the herbarium with a good number of samples that the *Tropical Plant Systematics* courses (both the English and Spanish language versions) have deposited at Las Cruces since 1996 and were kept in miraculously good condition in the laboratory until a suitable space became available. Historically, the faculty of these courses (Drs. Robbin Moran and Brad Boyle) have encouraged students to collect plants at all the locations they visit. Las Cruces is the place where they start these courses due to the variety of plant families that are to hand in a single and easy-going field excursion. Once the course is over, one or more boxes of samples are then sent to the herbarium as a contribution from the students.

Among the field projects that other courses promote, some have a botanical component that requires the collecting of plant specimens to document what is studied in the field. This is the case of the samples that students collected during the *Global Health* course in 2012 when they studied the tree species that indigenous communities use for fuel (see Amigos No. 78, November 2012, page 13). OTS specialty courses such as *Tropical Ferns and Lycophytes*, and *Tropical Lichens and Forest Health* document the species in these broad groups, producing valuable collections that add clarity to the composition of the flora of the station.

One other contribution that courses provide to the herbarium is the visit of specialists that work with specific plant groups that accompany the students. Those taxonomists visit the herbarium, and in a short period of time review the identification of the specimens, making corrections and teaching us how to distinguish among particular species. This is very valuable because of our limited access to the correct taxonomic information required to maintain such a large collection, which is always growing and evolving. To all these contributors, we are very thankful.



An individual of *Sanicula liberta*, an example of one of the earlier collections we have in the herbarium made by a student in the 1996 OTS Systematics course.

Our Donors

Of Coffee Pots and Advisory Committees

Alison Olivieri / sanvitobirdclub@gmail.com

Many of you may know this fundraising adage: 'If you ask for money you will probably get advice so if you really want money ask for advice'. Well, we'd like both please so, as you have just read in the Director's What's New section, Dr. Zahawi has re-animated the Las Cruces Advisory Committee for guidance and recommendations and we now turn to you, our "mejores amigos" for your kind and generous donations.

This is not to say that we would spurn your suggestions or comments -- far from it. In fact, we would welcome same so please do not hesitate to contact me (email address above) or Zak (zahawi@ots.ac.cr) or any LCAC committee member with questions or observations.

What we wrangle with constantly here are the mounting costs of maintenance and improvements. An example that may make you fall out of your chair is our coffee pot problem. If you have visited the Station of late, you know that the coffee pot is in constant use, i.e., all-day-every-day. Apparently, these large but actually not robust urns burn out with alarming frequency so what is really needed is a professional, industrial-strength coffee dispenser that costs – are you ready? -- $5,000!

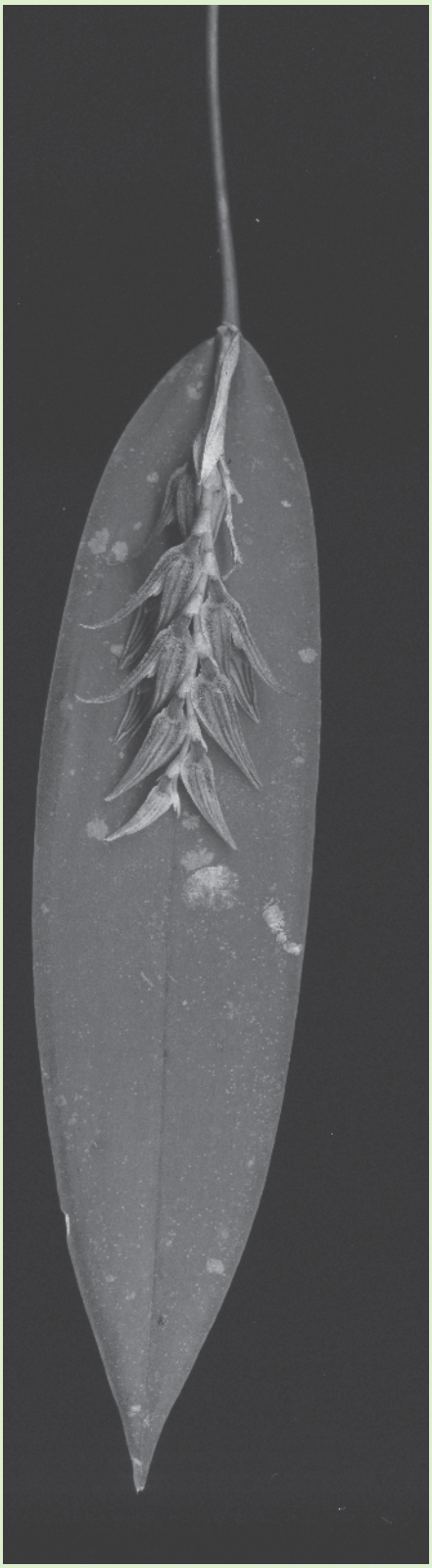
Do we have more pressing concerns? Happy you asked that and the answer is: YES! Our Annual Fund always needs your generous support. We cannot keep the Wilson Botanical Garden thriving, the guest rooms clean and welcoming, the food delicious and the staff on board without your timely monetary gifts.

Further, we have the Land Acquisition Campaign designed to create a biological corridor that would connect the Las Cruces forest with the nearby Ngöbe (or Guaymí) Indigenous Reserve -- and it is becoming ever more critical. You may have noticed some exciting mammals sidling into view: in the last issue (*Amigos 78*, November 2012) you saw a camera trap photo of an ocelot. Elsewhere in this issue you will read about the largest bat in the western hemisphere appearing in a mist net in a nearby neighborhood AND an albino otter spotted in the lake at Finca Cantaros!

What we would really like is to have you, our 'amigos', return to Las Cruces to see what is going on down here, what we're doing, what needs to be done and what we would like to do. Maybe you could make regular, annual journeys like the neotropical migrant Black-and-White Warbler (US Fish & Wildlife Service band #2190-62784) netted recently in a local bird study -- originally banded in January 2005 and having survived at least seventeen 3,000-mile migrations.

An image of the White-crested Coquete showing its distinctive white and green crests as it visits a *Stachytarpheta* spp. flower. Photo Daniel Hernández.

Of course, our problem would be: if you all decided to come at once, we would definitely have to replace that coffee pot!



A flowering *Acianthera lepidota* orchid in our collection. Scan by Jesus Marchena.

As always a big THANK YOU to you all!

Las Cruces donors through February 2013

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Contributions to OTS are tax-deductible.

- Las Cruces is home to over 2000 native plant species, 3000 species of plants from all over the world, and over 400 species of birds.

- With the most important botanical collection in Central America, Las Cruces has attracted and enchanted visitors and researchers alike for over 40 years.

- Become an *Amigo* by making your tax-deductible contribution today. Thanks to the support of people like you we can maintain this incredible biodiversity!

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Benefits

All of our *Amigos* receive benefits for their donations including a yearly subscription to the *Amigos* newsletter. For more information please write to cathleen.lemoine@duke.edu or lcruces@ots.ac.cr

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