DUKE LEMUR CENTER

SAVA Conservation

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SPECIAL POINTS OF INTEREST:

- **Lanto Andrianandrasana works with Erik to lead SAVA Conservation forward**
- **U.S. Embassy exhibit in Sambava**
- **Fish farming with native freshwater species coming to the Marojejy region**
- **Parasites found in wild silky sifakas**

INSIDE THIS ISSUE:

What is Conservation?

Welcome to our second DLC SAVA Conservation newsletter. We hope to make this a quarterly update, but make no guarantees! Even at this early stage of the project there is so much happening that we don't dare get too far behind on news about activities, lest we never catch up with relaying that news.

You will notice that in this issue there isn't much news about lemurs or other Malagasy fauna. I hope that you don't find that too disappointing, but one thing that we have learned over the years is how much "conservation" is about people rather than the flora and fauna that we are ironically striving to protect. When Andrea and I lived in Madagascar, American friends and colleagues had visions of us spending most daytime hours in a Malagasy forest, with lemurs cavorting overhead. Although there was certainly a bit of that (which was a really fun part), the majority of our time was spent working with Malagasy people at all levels, from local villagers, to teachers, to government officials, to university students, to conservation professionals, etc. It's not very glamorous, and at times can be downright plodding and frustrating, but that is what achieving a sustainable conservation impact requires. It is what occupies 90% of Erik's and Lanto's time and efforts.

Helmet Vanga feeding young.
(Photo by Éric Mathieu, www.marojejy.com)

In this issue you will see an article about SAVA Conservation's collaboration with our American Embassy to establish and maintain a month-long mobile exhibit in Sambava. That does not seem to have much to do with conservation, and has taken much time investment by Erik and Lanto. However, the exhibit has been an excellent opportunity for Erik, Lanto and the SAVA Conservation project to become better recognized in the community, which is vitally important to our conservation efforts.

By working with people within the community and in some cases helping them to improve their lives in various ways, one builds relationships which are so critical to establishing a sustainable conservation project. Although we are certainly committed to long-term involvement in the SAVA region, our primary goal must be to convince the human population, at all levels, that conservation is important and in their interest, so that they will not only join us in our efforts, but will also continue to carry the torch after the foreigners are someday gone.

The Other Half of the DLC SAVA Conservation Team

Lanto explaining to students the different activities of our SAVA Conservation project.

In the last SAVA Conservation newsletter I introduced project director Dr. Erik Patel. I would now like to introduce the other half of our on-the-ground team, Lanto Andrianandrasana. Lanto has been with the project for more than a year now, starting off with oversight of the first phase of teacher trainings. Lanto now works hand in glove with Erik, involved in all of the various project activities. It keeps him more than busy!

Lanto has extensive experience with research and conservation. After receiving his master's degree from the University of Antananarivo in 2006, Lanto first worked as a field research assistant on a variety of lemur species in Ranomafana National Park. He then went on to do similar work with silky sifakas in various protected areas in the SAVA region. Lanto has been a long time assistant and colleague of Erik's, through years of research on the silkies.

On the personal side, Lanto was born in Antsirabe, in Madagascar's high plateau, and grew up in Antananarivo. He is married to Mireille Razafimandranto, who also has a biology background and has also done work for Erik in the past. Lanto and Mireille have a 4-year-old son named Lanto Fanomezantsoa and a new baby daughter named Fifaliana. We are very proud to have Lanto on the DLC SAVA Conservation team.

"Lanto has extensive experience with research and conservation… receiving his master's degree from the University of Antananarivo."

Lanto with his family: wife Mireille and son Lanto Fanomezantsoa.

Rocket Stove Training at Center for Renewable Energy (CER)

By Robert and Jean Auerbach, Peace Corps Volunteers

Lanto (on the right) and Razaka making a rocket stove.

Finished rocket stoves.

Traditional wood-burning open stoves used in developing countries are known to be inefficient and pose health risks for rural villagers. In fact, the World Health Organization (WHO) estimates that more than two million premature deaths annually are caused by exposure to smoke from traditional cook stoves and open fires, with women and children being the most afflicted. In the Marojejy National Park region, continual logging of fuel-wood is a major source of deforestation and one of the reasons there are so few trees outside the park boundaries.

At the Center for Renewable Energy (CER) in Sambava, we conduct one-day trainings where we teach people how to make "rocket stoves", which are fuel-efficient wood-burning stoves, out of readily available local materials. These stoves can reduce wood consumption by 50% or more and are designed to have a simple high-temperature combustion chamber containing an insulated vertical chimney-like chamber which ensures complete combustion (high heat and less smoke) prior to the flames' reaching the cooking surface. Having the wood on an elevated grate off the ground allows natural draft through the wood which, like a fan, results in a hotter more vigorous burn.

Recently, we held a rocket stove training with Lanto Andrianandrasana (DLC SAVA Conservation) and Razaka (librarian for the Marojejy library). We began with a theory class explaining the benefits and characteristics of rocket stoves. After lunch, we proceeded to the stove-making area where we had already prepared molds, local clay, sawdust and water as well as pre-manufactured metal top shrouds. The body of the stove was then made by pressing the mixture of the clay/sawdust/water into the molds, after which an afternoon of drying in the shade was sufficient before actual testing with some dry leaves and dead wood.

This type of stove has been made at CER for some years and has sold well. It is suited for areas where there are many down and dead trees, and where black charcoal is expensive and hard to get. We don't encourage the cutting of live trees for cooking, and hopefully the villagers will not participate in that activity.

Pressing mechanism for making "green charcoal".

Our SAVA Conservation initiative will be collaborating with CER, supporting installation of simple hand-operated equipment to make green charcoal, near Marojejy National Park, and also exploring support for rocket stoves. CW

Native Freshwater Fish Farms as a Bushmeat Alternative

By Erik R. Patel, Ph.D., DLC Post-Doctoral Project Director, SAVA Conservation

Hunting of wild lemurs by local residents for food has been documented since the first long-term lemur research began in the 1960s. For example, Sussman and Richard (1986) pointed out that Verreaux's sifaka as "…a large, white sifaka is the easiest target in the South for a lemur hunter…" (p. 89). In recent decades lemur hunting is known to have increased to the extent that "There are very few lemur species which are not eaten on a regular basis" (Ganzhorn et al., 1996, p. 70). Nevertheless, lemur hunting was never considered as extreme as primate hunting on the African continent, but unfortunately that may be changing. Since the latest political crisis in Madagascar began in 2009, bushmeat hunting has increased across Madagascar. Even species long considered protected by local taboos or "fadys" against hunting, such as indri and Tattersalli's sifaka, have been heavily hunted in some regions recently, partly due to an influx of immigrants who are less likely to respect local traditions. In the Marojejy region, we have noticed a worrisome rise in gun-hunting of lemurs even inside protected areas.

Fresh water fish specialist and collaborator, Guy Tam Hyock.

"The goals of the new DLC fish-farming initiative are to provide an alternative protein and income source …while also reestablishing wild fish populations in previously overfished local waters …."

Guy's ponds where he raises native Malagasy fish, overlooking the Andapa basin.

Native Freshwater Fish Farms as a Bushmeat Alternative *Continued*

Improved forest monitoring must be part of any solution since bushmeat traps are actually easily destroyed, but policing alone does not address the fundamental problem of insufficient meat (a staple of the Malagasy diet) in many rural forest-bordering communities. Many organizations have therefore attempted to promote sustainable alternative protein sources, such as poultry or fish. Fortunately, domestic meats are often rated as the tastiest meats.

In the SAVA region, we are fortunate to collaborate with one of Madagascar's leading native fish experts in Mr. Guy Tam Hyock. His organization has been teaching local residents how to build long-lasting fish ponds and breed locally endemic freshwater *Paratilapia* spp. or "fony" for many years. This species is not only endangered, locally endemic and considered tasty; it also breeds easily and eats a variety of readily available village foods such as rice hulls, worms, cow blood and dried shrimp. We hope to expand a sustainable fony fish-farming program to many villages around Marojejy National Park. The goals of the new DLC fish-farming initiative therefore are to provide an alternative protein and income source (villagers may consume or sell 75% of the fish in their ponds) while also reestablishing wild fish populations in local waters (with 25% of pond-raised fish). We've just finished building and stocking our first large fish pond which has generated much local interest, the most common question being "Will you help us build a fish pond like yours?" We will certainly try.

Demonstration pond recently installed will help to generate local interest in fish farming.

Guy and his assistant Fidele recently visited villages near Marojejy to discuss fish farming.

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Marojejy National Park Boundary

Boundary sign in place. Translation to English - "Park Boundary, Do Not Enter, Duke Lemur Center, MNP [Madagascar National Parks]".

Any conservation project requires a balance of activities of delayed and immediate impact potential. An example of delayed impact would be our teacher training program. Environmental education of the youth is essential, but it is not likely to have a conservation impact until those youngsters are near adulthood. On the other hand, direct support to Madagascar National Parks Department (MNP), targeting protection of Marojejy National Park, can have an immediate conservation impact.

In an agreement with MNP, DLC SAVA Conservation is supporting clearly reestablishing the boundary of Marojejy NP, which had become overgrown, with boundary signs deteriorated. The support enables MNP to have new signs made and put in place along 20 km. of the park boundary (see left photo). An unmistakable boundary is an important tool for Park protection – not only does it clearly demarcate the edge of the Park, but it shows that protection is active in present terms. If all goes well with demarcation of this first section of the Marojejy NP boundary, DLC SAVA Conservation will support work on other sections. Partnering with MNP is a vitally important part of our project.

"An unmistakable boundary is an important tool for Park protection – not only does it clearly demarcate the edge of the Park, but it shows that protection is active in present terms."

Newly finished signs for the Marojejy NP boundary.

Mobile American Cultural Center Rolls Into Sambava

By Erik R. Patel, Ph.D., DLC Post-Doctoral Project Director, SAVA Conservation

The U.S. Embassy in Madagascar continues to support the importance of environmental projects around the country. One of the embassy's new initiatives is the Mobile American Cultural Center (MCC) which is a mobile library including many actual books as well as large video displays, laptop computers and Kindle e-book readers. The goal of the MCC is to promote interest in the environment as well as the English language. Our project was asked by the embassy to host the MCC in Sambava (where it will stay for 30 days) and arrange for all preparations, including the inaugural ceremony and reception.

SAVA Conservation's Lanto Andrianandrasana speaking at the exhibit's opening ceremony.

Preparations have been underway for weeks for this large display which weighs nearly 2000 lbs. and arrived by truck in over 50 boxes. Radio announcements we designed in Malagasy have been airing for weeks inviting people to visit the MCC, which is free and open to the general public. A formal ceremony was held with 50 local dignitaries including leaders from the regional government, businesses and non-profit organizations. It was gratifying that the ceremony and reception were very well attended, and raised considerable interest and awareness in the new DLC SAVA Conservation initiative which is represented by several large posters, copies of the newsletters, videos of films playing, and our team members regularly onsite assisting visitors. Each day since the opening, between 50 and 100 visitors pass through, many of whom have expressed real thanks to DLC for sincere efforts to save the deteriorating local environment and many threatened lemurs in this region.

English Classes in Manantenina

"DLC SAVA Conservation is supporting an English class in the village of Manantenina, near the [Marojejy] Park entrance."

Although English classes in a rural setting might seem like an extravagance, Madagascar's slowly growing ecotourism industry is demanding guides and other personnel that can communicate in English. Even isolated natural areas in Madagascar can experience a steady flow of foreign visitors, which provides opportunities for local people, especially if they can speak other languages. Other than French, English is most commonly spoken by visiting foreigners.

English class in session in the library at the village of Manantenina, near the entrance to Marojejy NP.

To make a small contribution to English language capacity in the Marojejy area, DLC SAVA Conservation is supporting an English class in the village of Manantenina, near the Park entrance. Most park guides are from this village, and tourists often pass through. Erik was able to locate a willing and very capable English teacher by the name of "Joxe", who undertook the challenge. His classes were well attended and emphasized practical conversational English with topics specifically related to hosting visiting tourists and researchers. The lessons seem to have made a difference, as Duke Nicholas School student Jennifer Moore, while conducting research in Marojejy this summer (see article this newsletter), was quite impressed with the English capacity of supporting personnel, from the guides to the cook! We hope to continue the classes and perhaps expand them to include basic adult literacy in Malagasy .

(Photo by Nancy Raposa)

(Photo by Charlie Welch)

Parasites Found in Wild Silky Sifakas

By Erik R. Patel, Ph.D., DLC Post-Doctoral Project Director, SAVA Conservation

Sifakas can harbor a variety of endo- and ectoparasites which in extreme cases can impact health and survival. Low levels of parasite infestation are common and may often be endemically stable or commensal without major health impacts (Junge and Sauther, 2006). Type and species of parasite can be very different between wild and captive sifakas. In captive populations, the protozoal parasite *Cryptosporidium* spp. may be the most dangerous but has not yet been found in wild sifakas (Charles-Smith et al., 2010). *Giardia* spp., another protozoal parasite, is less life threatening but can be debilitating for captive sifakas, and it too has not yet been found in wild sifakas (Schopler, pers. comm.)

Wild sifakas have been found to harbor a variety of worms (generally eggs are found in fecal samples, seldom adult worms). Most sifaka worms are nematodes or roundworms such as *Lemurostrongylus* sp., *Strongyloides* sp., *Pararhabdonema longistriata*, *Lemuricola* sp. ("pinworm"), *Biguetius trichoides* ("pinworm"), and *Dipetalonema* sp. which is a filarial or "thread-like" genus. Platyhelminthes or "flatworms" are also sometimes found including "tapeworms" such as *Cestoda*, *Monezia* sp, and *Anoplocephala* sp. In one case, eggs of "thorny-headed worms" (*Acanthocephalan*) were also found in a sifaka. One species of blood parasitic protozoa (*Babezia propitheci*) has been identified in visibly sick wild Coquerel's sifaka (Irwin and Raharison, 2009; Irwin et al., 2010; Junge and Louis, 2005; Junge and Sauther, 2006; Wright et al., 2009).

Silky sifaka mother carrying both her own and another mother's young infant. ***(Photo by Jeff Gibbs)***

Wild sifakas are afflicted by a diverse assortment of ectoparasites as well. Although sifakas grooming serves social functions (Lewis, 2010), their tooth-comb is needed for flies (*Hippoboscidae* and *Ceratopogonidae*), mites (*Psoroptes* sp., *Liponysella madagascariensis*, *Makialges* sp., *Gaudalges* sp.), ticks (*Haemaphysalis lemuris*), and leeches (*Malagobdella* sp.) (Irwin et al., 2010; Junge and Louis, 2005; Junge and Sauther, 2006; Wright et al., 2009). In both captive and wild sifaka populations, parasite infestation increases during the warmer/wetter months. Some evidence also exists that stressed populations inhabiting disturbed, severely fragmented habitats (e.g. blue-eyed black lemurs at Sahamalaza – Iles Radama National Park and Milne-Edwards' sifakas at Ranomafana National Park) may suffer unusually high parasite loads (Wright et al., 2009; Schwitzer et al., 2010).

Little is known about what parasites silky sifakas, one of the rarest lemurs, may be harboring, although *Cestodes* ("tapeworm") eggs have been noted (Junge and Sauther, 2006). Recently, we undertook the first systematic study of silky sifaka parasites. Fecal samples were collected both from our main study group in Marojejy National Park inhabiting a montane primary forest as well as a new group we are studying in the Makira Natural Park inhabiting a frag-

Parasites Found in Wild Silky Sifakas *Continued*

mented, disturbed, and unusually low elevation forest. Fecals from known individuals were collected in the field by me and my team and also during biomedical health exams by DLC veterinarian, Dr. Robert Schopler. Samples were examined microscopically by Dr. James Loudon (Univ. Colorado at Boulder) and Dr. Charles Faulkner (Lincoln Memorial University). All seven of the Marojejy individuals were found to harbor *Lemurostrongylus* sp. infections which was also found in one of the three Makira individuals. This round worm is one of the most common lemur parasites. A larger sample was analyzed from the Marojejy group over a longer duration of time, which may partially account for these presumed site differences. Future work will be needed to determine the impact and intensity of this common infestation on these populations, and identify other parasites they may be harboring. As habitat becomes fragmented and anthropogenic disturbance increases, individual stress may also increase and parasite levels may rise. By monitoring parasite levels we hope to establish what normal parasite loads are under varying conditions so we can identify stressed populations early and institute interventions as early as possible.

Extreme skin depigmentation is characteristic of silky sifakas. ***(Photo by Jeff Gibbs)***

"By monitoring parasite levels we hope to establish what normal parasite loads are under varying conditions so we can identify stressed populations early and institute interventions as early as possible."

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SAVA Conservation-sponsored school visits into Marojejy continue to be a popular environmental education activity for schools in the SAVA region.

DUKE CONNECTIONS

Into the Wild!

By Jennifer Moore, Master in Environmental Management Candidate

I started working as a tour guide at the Duke Lemur Center a year ago, when I began my master's degree at the Nicholas School of the Environment. Ever since I started working there, I knew that I was going to go to Madagascar and see the animals out in the wild. Thanks to the help of Charlie Welch, Conservation Director at DLC, and Dr. Erik Patel, Post-Doctoral Project Director in the SAVA region, I was able to spend my summer in Marojejy National Park in the northeast of Madagascar, within the SAVA region. While I went to Madagascar to collect data for my master's project, which I was successfully able to do, I also learned much about the island and animals and met many fantastic people along the way.

I split my time in Madagascar between two research sites: the tourist region in the central-eastern part of Marojejy National Park and a remote site in the far northwestern part of the park. At each site I had two or three transects, which I, along with my survey team, walked twice either during the day or at night. We recorded all sightings of lemurs, other mammals, and any signs of habitat disturbance. The goal was to compare the two sites in terms of presence, diversity and density of lemurs, as well as the amount and type of habitat disturbance. These sites were chosen because the tourist region is the predominant park region that has visitors year-round, leading us to think there would be less habitat disturbance and thus more lemurs. The other site was very remote (about 20 km. walk from the road, where the cars drop us off!), so we assumed the level of habitat disturbance would be much higher and thus fewer lemurs would be sighted. This turned out to be true, as the density of lemurs was higher in the tourist zone and the amount of habitat disturbance was lower; however, the diversity of lemurs was actually higher in the more remote site. These results will be further analyzed to look at the effect of disturbance on each lemur species to see if some are more resilient to disturbance than

Jennifer, Erik and Manitra with equipment, supplies and 60+ porters to get it all to the research site.

Into the Wild! Continued

others. High-resolution imagery of the area is also available, so I will also classify the imagery in terms of land cover and land use to look for further areas of disturbance within these two regions.

Adjusting to life in Madagascar, and especially the rainforest, takes quite a bit of getting used to. To begin with, there are few drivable roads, so on my first day I was dropped off in the village of Mandena with all my equipment, and the entrance to the park was still about 2 km. away. Before I could venture to the first survey site, I had to hire 65 porters as well as find my survey team, including guides and cooks!

About 8 km. or so later, I reached my campsite, and we settled in for our first five-week survey period. The first week I spent in Marojejy the rain never stopped, and I learned quickly what a leech was. I also learned why all of the locals called my campsite Camp Majavonjavona (meaning "very foggy place"). However, I also saw my first lemurs: white-fronted brown lemurs, red-bellied lemurs, northern bamboo lemurs, greater dwarf lemurs and gray mouse lemurs. In addition, I saw ring-tailed mongooses and many dwarf chameleons! After five weeks at this site, I thought I had seen it all, but then I ventured to my second site. I knew this site was more remote, but little did I know that more remote meant about 20 km. from the nearest road. To reach this site, I traveled through three villages (the children of these villages had never seen a foreigner before!) before reaching the edge of the park. This area of the park was much steeper than the first region and much more open in terms of forest cover. And, thankfully, it was not quite as wet! (Oh, don't worry. It rained plenty — just not every day like at the last site.)However, this site was also my first glimpse at the destruction present within a protected area. I found temporary shelters, lemur and carnivore traps, cut trees including rosewood stumps, and logs left behind. Lemur encounters were fewer in number, but I did get a glimpse at the eastern woolly lemur, a new favorite of mine! In total, we found five new groups of silky sifakas as well, which are one of the rarest lemurs in Madagascar.

Jennifer and her team including guides, cook and Malagasy master's student Manitra (in Texas T-shirt).

My time in Madagascar was definitely an adventure. It was extremely difficult at times, but I enjoyed (almost) every second of it! If you have the time and resources, the SAVA region of Madagascar (including Marojejy National Park) is a definite place to visit. It is a little further off the beaten path, but definitely worth the time and effort to make it up the mountain into the park. And if you go, make sure you say hello to the friends I made over the summer. My guides: Gerlain, Dez and Eduoard; my cook: Primo; the park agents: Augustin and Gil; and my drivers: Dylan and Syed!

Closing Comments

(Photo by Alena Welch)

As I write this, our largest phase yet of the teacher training program is taking place in the SAVA region. The one-week training is actually with school directors (principals), and again carried out by the three experienced trainers from the Madagascar Fauna Group. With SAVA Conservation guidance and oversight, the directors will pass along their newly acquired environmental teaching knowledge and techniques to their teachers. Be sure to read about the training in the next newsletter and also the exciting news of a land purchase by project friend Desiré Rabary, which will enlarge his private reserve of Antanetiambo.

Another thank you to all who support our SAVA Conservation project, thereby making the initiative possible. As the newsletters are now circulated more widely than the first issue, we are including the link for Duke Lemur Center donations. If you find that our project is something that you are interested in supporting, please do designate your donation to SAVA Conservation. Thanks!

http://lemur.duke.edu/tours-gifts/donate-to-the-duke-lemur-center/

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