International Primatological Society

IPS Bulletin

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President's Corner

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I hope that this message finds all of you and your loved ones to be safe and well, especially during these challenging times.

Indeed, when the last IPS Bulletin was published in early 2020, none of us could have anticipated the onset and persistence of the COVID-19 pandemic, or how completely it would alter so many aspects of our lives.

First and foremost, of course, has been our heightened concern for the safety and well-being of one another and for the primates and people with whom we work. The pandemic has necessitated major changes in our research and conservation efforts across field and captive settings alike, and it continues to have widespread impacts on the local health and economies of our communities at home and abroad.

The pandemic has also impacted some key IPS-related activities, with the most obvious one being the necessary postponement of the XXVIIIth IPS Congress that we are jointly holding with the Latin American Society of Primatology (SLAPrim). As described in my letter to members in August 2020[1], the meeting is still scheduled for August 15-21, 2021 at all of the same venues in Quito, Ecuador that we had originally planned. We are also still planning to re-open the Congress website in January 2021 for new registrations and for any of you who would like to update an abstract that was already approved and carried over along with your registration by the Scientific Committee, led by Steve Schapiro. Please be assured that the IPS and SLAPrim leadership are continuing to monitor the situation and will work closely with one another and with the local arrangement committee chair, Stella de la Torre. We will keep you informed via emails, IPS postings, and the Congress website as soon as possible if we need to make any additional changes to the Congress plans.

Among the many special events to look forward to when we can finally convene again will be honoring the 2020 IPS Awardees. News of these awardees was posted on the IPS website and Facebook page back in February and March, but in case you missed those posts with so many other things going on, please join me once again in congratulating Professor Vernon Reynolds, the recipient of the 2020 Lifetime Achievement Award, and Dr. Russell Mittermeier, the inaugural recipient of the 2020 Outstanding Achievement Award.

[1]https://ipsquito.com/latest-news/

IPS Officers

Please also join me, again, in congratulating the recipients of the 2020 Special Presidential Awards (in alphabetical order): Prof. Ramesh (Zimbo) Boonratana, Dr. Liliana Cortes-Ortiz, Dr. Leandro Jerusalinsky, and Prof. Inza Koné. I am very grateful to the other members of the Awards committee, which included: John Capitanio, Frans Carlsen, Liliana Cortes-Ortiz, Takeshi Furuichi, Cat Hobaiter (vice chair), Steve Ross (acting vice chair), and Anthony Rylands for their thoughtful considerations.

The results of our 2020 elections were also previously announced, but I hope you will join me (again) in congratulating the next IPS President, Dr. Jonah Ratsimbazafy, and our first Vice President for Equity, Diversity, Ethics, and Inclusion, Dr. Susana Carvalho. Both Jonah and Susana will assume their offices as the last item of business at the next General Assembly, when the second terms of the continuing Vice Presidents of Captive Care (Steve Ross), Communications (Catherine Hobaiter), and Education (Patricia Izar) will also begin. In my role as chair of the Elections committee, I want to thank the other members for their hard work and contributions to this important process. These members were (in alphabetical order): Ramesh Boonratana, Nancy Caine, Marina Cords (vice chair), Alejandro Estrada, Peter Kappeler, Inza Kone, and Melinda Novak.

Very early on in the pandemic (March 15, 2020), the other IPS officers and I issued a statement, translated into three languages, "to call attention to the importance of primatologists to consider the ethics and risks that now raise additional challenges on top of the ones we always face. Extra health considerations are relevant in both field and captive settings, to protect both the primates we are studying and the people with whom we work, especially during these times of increased risk." We also launched an open access document with links to articles, news stories, and blogs related to the impact of the coronavirus on primates and primatological research[2], and we have been posting links to key documents from IUCN and from our affiliate primate societies about best practices and other concerns at our website and vial social media.

[2]https://docs.google.com/spreadsheets/d/1xvoVRXizGByROVdXzpaWciccykB1CuQw6fr1Hm8rB60/edit#gid=0

Please continue to send us links with a brief description to any resources you would like us to share with the international primatological community.

As IPS president, I have been privileged to have more contact with colleagues from around the world than is usually the case. These contacts have been mostly heartwarming, for example, with opportunities to participate in video zoom conferences organized by the Brazilian Operação Primatas about my favorite primate[3] and about Amazonian primates[4] or to join colleagues from SLAPrim in celebrating the second anniversary of the RedBolPrim[5] or to brainstorm with colleagues about future plans for the International Center of Biodiversity and Primate Conservation in China[6]. But this broader international lens has also brought me closer to heartbreaking news ranging from the devastating losses of primates and other wildlife from fires in Corrientes, Argentina, to the unprecedented global impact of the pandemic on everyone's research and conservation activities.

To increase communication and interactions among our international community, IPS officers and invited leaders and representatives from our affiliate societies are contributing to these shared experiences in a special IPS series on "**The Status of Primates, Primatologists, and Primatological Research and Conservation during COVID-19."** As the International Primatological Society, we can provide a truly international forum for diverse voices to speak to both the challenges they have faced and any coping strategies they have found. We hope to use ideas that may emerge from this series to identify additional ways in which IPS might be able to help.

We have already posted the first set of these engaging stories at our Website News page and Facebook page (look for them under the heading: "Covid Chronicles"). We will be publishing additional contributions in this Bulletin and upcoming posts, and we will continue to share additional stories as they reach us.

[3]http://www.iea.usp.br/noticias/conservacao-de-muriquis
[4]http://www.iea.usp.br/eventos/ii-videojornada-conservacao-de-primatas-amazonicos
[5]https://www.facebook.com/RedBolPrim/
[6]http://www.icbpc.org/index.html

Over the next few months, we will set up links so that all of the contributions to the Series can be accessed from our IPS homepage. We expect to be issuing a second call for contributions, so please consider joining us to share your experiences.

Before closing this message, I want to thank the other IPS officers, who have been uniformly interactive and engaged allies in the governance of IPS. You'll read more about each of their IPS-related activities in their respective contributions to this Bulletin, but they deserve additional recognition for their advice whenever I've sought it and their many initiatives. No IPS president could have asked for a better set of partners.

In the meantime, please take care of yourselves, and join me in thinking optimistically about our future.

Best wishes,

Karen B. Strier
IPS President

VP for Communication

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Greetings Primate folk!

Putting this Bulletin together was harder than I expected – re-reading all of our hopes and wishes for 2020 in our last one in January, and hearing from our IPS Officers and primatologists around the world how the pandemic has impacted them.

Please take some time to read our Covid Chronicles in this issue – they do not all make for easy reading, but it is important that we face the realities and risks that Covid19 poses to human and non-human primates alike head-on. We have all had to reassess what we thought we knew, and what we thought was possible. But each person who wrote also expresses hope. I'm writing these last lines in the Bulletin today from my fieldsite in Uganda – hit hard on several fronts this year from Covid to hunting to clear-felling for sugar cane. We not only stopped all research; we were unsure whether after Covid there would be a site to go back to. But we are still here, taking it day by day, but still here.

I'll continue to post updates from primatologists around the world to our social media, follow along at #CovidChronicle.

Hoots and drums from Bugoma,
Cat Hobaiter, VP for Communications

VP for Captive Care

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The IPS Committee on Captive Care was very pleased to receive many excellent proposals for funding this year. The committee voted to approve funding for two projects which represent well the diverse work going on to improve the lives of captive primates around the world. The first was to the Centre for Animal Rehabilitation and Education (CARE) in South Africa for their work to renovate enclosures housing rescued baboons. The project, which includes critical behavioral monitoring activities, will serve to provide enhanced housing for 59 baboons slated for release. The second funded project was to the Pan African Sanctuary Alliance (PASA) which represents a network of 23 wildlife centers across the continent housing rescued primates. The funding will allow PASA to bring advanced primate care training to the entire animal care staff and management of Fernan-Vaz Gorilla Project in Gabon. Though the pandemic situation has affected the timing of these projects, we are pleased to have provided support for both of these worthwhile endeavors.

Steve Ross
IPS VP for Captive Care and Breeding

Secretary General

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I hope that this message finds you and your loved ones healthy and safe. Since my last report in December 2019 our lives have changed significantly because of a pandemic caused by the very way that our species exploits biodiversity. We have seen the capitalist world shutting down because of a virus that warns us that we need to change many, many things in the functioning of most of our modern societies. I do have a naïve wish that the COVID-19 pandemic, (sadly, maybe only) the first of our lifetimes and still ongoing, has the power to open up our eyes. This much needed environmental awakening would be like a miracle for the world's biodiversity as a whole. While we wait for safe vaccines to be discovered, produced, and made available to our population of almost 8 billion people, we have speculated on how long the health, environmental, social, economic… consequences will last for. Although only time has the answer, as both individuals and an organized international scientific society we can, and have the obligation to, contribute to building environmentally-correct and socially-fair answers.

During this time, we had the election of our new President (Jonah Ratsimbazafy, Madagascar) and our first Vice-President for Ethics, Diversity, Equity and Inclusion (Susana Carvalho, UK), and the re-election of the Vice-Presidents for Captive Care (Steve Ross, USA), Communications (Cat Hobaiter, UK) and Education (Patrícia Izar, Brazil). Welcome Jonah and Susana to this amazing team, and congratulations Steve, Cat, and Pat for your second term! Thanks to all of you for accepting the challenge of working for our society!

We had to postpone our Quito meeting to August 2021 and move the coming meetings to odd years. We (IPS officers) have exchanged, literally, hundreds of e-mail messages and met virtually to discuss important issues for making informed and democratic decisions. We thought that it would be very important to hear from our colleagues from primate habitat and non-habitat countries working in the wild or with captive groups about how the pandemic and its restrictions have impacted them. Many colleagues from our associated national and regional primate societies have sent us enlightening essays, which our VP for Communications is publishing in our social media.

Finally, we were very pleased to approve the Bolivian Primatology Network (Red Boliviana de Primatología, RedBolPrim) as the newest IPS affiliate society! Welcome colleagues from Bolivia!

My very best wishes to all,

Júlio César Bicca-Marques
Secretary General

Trea$ury Note$

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It is time to renew your membership in IPS! Just go to the IPS website and login. We offer the option of a two-year renewal. We hope we will be able to open registration again for our next meetings in the new year. Having your membership paid will make the process a bit easier for you.

The treasurer's job is mostly "behind the scenes"—managing our accounts, assuring our tax documents are submitted, and arranging for payments for grantees and meetings. I want to encourage you to support IPS financially in any way you can. This year, Joanna Setchell made a significant contribution to the Conservation Fund from the royalties from her book, *Studying Primates*. Joanna—thank you so much and I encourage those of you who can to follow Joanna's example. This is truly wonderful.

In order to ensure that we continue to do the things we want to do—I urge you both to pay your dues and to contribute in any way you can to our funds. None of the activities of the association happen without you.

Trudy Turner
Treasurer, VP for Membership

VP for Education

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I write this report hoping that primatologists and non-human primates all over the world are safe and well. My deep sympathies to those that faced losses due to the pandemic of covid-19. Undoubtedly, this has been a difficult year for most of us, for different reasons related to the pandemic.

The Education grant competition was delayed due to the uncertainty about the feasibility of many projects and of funding availability. In spite of these difficulties, the Education Committee worked hard to grade the applications that were all highly qualified projects.

Outcome of the 2020 Education Grants:
Lawrence Jacobsen Education Development Grants: This year we had 10 applications from 8 countries across Africa, South and North America, Asia, and Europe (Indonesia, UK (2 applications), Georgia, Uganda (2 applications), EUA, Brasil, and Paraguay). In 2020, only one applicant took the opportunity of feedback on proposals prior to submission from nationals of range-state countries. **We strongly encourage the use of the pre-review process!**

I am very grateful to the dedicated IPS members who assisted with the review and judging for the 2020 Lawrence Jacobsen Education Development grants and the Charles Southwick Conservation Education Commitment Award.
Acknowledgements are due to: Alejandra Duarte, Carla Castro, Carlos Ruiz-Miranda, Inza Kone, Zarin Machanda, Simplicious Gessa, Renata Ferreira, Thomas Breuer, Mewa Singh, Misato Hayash, Suchinda Malaivijitnond, Laura Marsh, Joana Ferreira da Silva, Martin Kowalewsky, Rachel Ikemeh.

We awarded US$ 3,242 in two grants (only one included Community Conservation Initiatives in the application):

Rebecca Smith (Paraguay): Participatory Education for Primate Conservation in Paraguay, the Forgotten Heart of South America

Vitoria Nunes (Brazil): @operacaosapajus: Media, Photo and Video Exhibition as a Tool to Combat Capuchin Monkeys Illegal Housekeeping and Trade in Rural Communities of Northeastern Brazil

Charles Southwick Conservation Education Commitment Award: This award is dedicated to recognize the contribution to conservation education of individuals living in primate habitat countries. This year we received five nominations which were all truly outstanding! The Education Committee had a hard time on selecting the awardees.

We awarded US$ 4,000 in two grants this year:
Rahayu "Ayu" Oktaviani, Javan Gibbon Research and Conservation Project, Indonesia

Stanislaus Kivai, Co-Director of the National Museums of Kenya Chyulu Hills Fieldschool on Environmental Ecology and Sustainability, Kenya

We keep encouraging primatologists working in primate habitat areas to nominate members of the local community that have made a significant contribution to conservation education. This recognition is particularly important in times of covid-19, when primate conservation efforts must be reinforced.

If any IPS members are interested in serving on the Education Committee, or have specific issues they would like addressed, please contact me at patrizar@usp.br.

Patrícia Izar; VP for Education

VP for Research

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The global pandemic has certainly affected primate research dramatically, especially fieldwork. In that context, it gives me special pleasure to bring happier news of the 2020 research grant competition, which finished up in May, with a slight Covid19-related delay. Although many of the successful applicants had to postpone fieldwork, we can still look forward to the results of their interesting projects, even if these take a little longer than usual to come through.

The final competition included 61 proposals from researchers affiliated with institutions in 15 countries (Argentina, Australia, Benin, Brazil, Cameroon, Canada, Germany, Indonesia, Japan, Madagascar, Mexico, Netherlands, UK, USA and Viet Nam).

We awarded a total of $14,951 in 10 grants, though many successful applicants have had to postpone fieldwork because of the pandemic. The successful applicants included MA and PhD students and one post-doc. Their projects are listed below, along with the country of their affiliation, with an asterisk indicating range country nationals.

- Emily Glotfelty (USA): "Behavioral responses to increased population density and reduced food abundance in *Colobus vellerosus* over a twenty-year period"
- Molly Hirst (USA): "Sperm morphological variation in a natural primate hybrid zone (*Alouatta palliata x A. pigra*)"
- Abdullah Langgeng* (Japan): "Investigating the effects of Japanese macaque hot spring bathing behavior on parasitism and gut microbiome"
- Sara Lucci (USA): "The relative effects of environmental conditions and parental identities on coat color development in *Colobus vellerosus*"
- Megan Mah (Canada): "Multimodal fruit foraging and interspecific sensory variation in wild sympatric monkeys"
- Emily Nonnamaker (USA): "Do microbes contribute to olfactory signals of ovulation in baboons?"
- Alicia Rich (USA): "Variation in hormone receptor expression between two primate environments"
- Jack Richardson (USA): "Sex differences and the role of social play in development of wild mountain gorillas"
- R. Gustav Steinhardt (USA): "Space use and social influence in cooperatively breeding primates"
- Tessa Steiniche (USA): "Endocrine effects of anthropogenic pollutants in wild primates"

The Research Committee offers pre-submission feedback on draft proposals from nationals of range countries. We received only two such requests this year, and would welcome more. If you know applicants who would could benefit, please help us get the word out: we would like to diversify the awards more, and realize that access to mentorship can vary considerably.

Finally, if you are interested in joining the Research Committee and helping with proposal evaluation, please contact me. We can always use more volunteers and want to represent our international society well at this level too.

Marina Cords,
VP Research

VP for Conservation

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We are grateful to all previous grantees for their wonderful reports; please keep them coming!

My deepest thanks also go to the IPS Conservation Committee members for their time and help with this granting cycle which has been overshadowed by the COVID-19 pandemic. Our hearts and thoughts are with all who have in one way or another been affected. This pandemic has faced us with the profound reality of the risks of zoonoses and theirs drivers, especially the wildlife trade and the unprecedented rates of deforestation which we are witnessing globally. This pandemic has also provoked a profound rethinking of the sustainability of conservation initiatives and programmes particularly reliant on tourism and the necessity to continue to strengthen in-country capacity for the conservation of non-human primates and their habitats. I see these challenges as an awakening, but also as a unique opportunity to work together to promote more effective and participative initiatives aimed at conserving non-human primates globally.

This year, we received a total of 37 excellent applications for our **IPS Conservation grants**. Each proposal was reviewed thoroughly by three committee members; reviewers provided feedback and a score out of 20 based on a set of established criteria; each application was then ranked based on the mean z-score; we were hence able to recommend funding for five proposals for a total amount of $7,369. The following were the successful grantees:

- Le An: *Conservation critically endangered Delacour's langur (Trachypithecus delacouri) in Kim Bang forest, Ha Nam province, Vietnam*
- Filipe Silva: *Conservation of Novaes' Bald-headed Uakari, Cacajao calvus novaesi, Amazon Rainforest, Brazil*
- Giselle Narváez Rivera: *¿A dónde se fue el mono colorado? An ethnoprimatological approach to assessing the status of an endangered primate in Talamanca, Costa Rica*
- Elida Gamero: *Genetic, taxonomy and conservation of the Critically-Endangered Margarita capuchin (Sapajus apella margaritae) endemic to Isla de Margarita in Venezuela*
- Victoria Martinez de Zorzi: *The black-horned capuchin (Sapajus nigritus) in Misiones, Argentina: a model to understand how habitat fragmentation affects population genetics*

We also received applications for the **Galante Family Winery Conservation Scholarship**. The conservation committee is delighted to have identified a winner in this granting cycle in Tarik Kabir.

Tarik Kabir is a wildlife conservationist and primatologist in his home country of Bangladesh. The scholarship of $2,500 will help him pursue a PhD programme at the Universiti Sains Malaysia exploring the "*Ecological and Behavioral Adaptations of the Western Hoolock Gibbon (Hoolock hoolock to Fragmented and Degraded Habitats in Bangladesh*" under the direct supervision of Dr. Nadine B. Ruppert with external support from Dr. Thad Q Bartlett, University of Texas, San Antonio, USA, Dr. Susan Lappan, Appalachian State University, USA and Dr. Susan Cheyne, Vice -Chair, IUCN Section on Small Apes. The outcomes of the proposed PhD project will contribute to preparing the Western Hoolock Gibbon Conservation Action Plan, identifying the most threatened gibbon habitats in Bangladesh and developing a habitat restoration program.

Finally, I would like to draw your attention to the Non Human Primate COVID-19 Information Hub which contains key resources, information and links for those working at the human - non human primate interface. Please do consult the useful information therein; it is critical that we avoid putting non-human primates at risk and adhere to best practise guidelines in this regard.

Thank you. Please stay well and healthy,

All the best, Tatyana Humle

IPS Covid Chronicles

The Status of Primates, Primatologists, and Primatological Research and Conservation during COVID-19

A special series launched by
the International Primatological Society
August 2020

This special, IPS-sponsored series, **"The Status of Primates, Primatologists, and Primatological Research and Conservation during COVID-19," is intended to provide a forum to share with one another some of the ways in which the COVID-19 pandemic has impacted our lives.** As the International Primatological Society, we aim to provide a true international venue for diverse voices to speak to both the challenges they have faced and any coping strategies they have found. We hope to use ideas that may emerge from this series to identify additional ways in which IPS might be able to help.

These are "our" stories, told by our primatologist friends and colleagues around the world. They document living global experiences during an unprecedented time in the history of primatology, with as-yet-to-be determined consequences for the primates, our research and conservation efforts, and the people with whom we work.

Brazil

Karen Strier, President IPS, Co-ordinator, Muriqui Project of Caratinga

For me, the most difficult consequence of the pandemic has been not being able to return to the field. I miss other traveling, too, and of course, I am still very sad about having had to postpone our IPS-SLAPrim meeting by a full year. But I am longing, desperately, to be back in the forest with the muriquis, and I miss seeing my students and friends in Brazil.

We suspended all visitation at my field site early on, but fortunately the Brazilian team that was already in the field when the pandemic was declared was able to stay and continue with their observational research. Thanks to them, the continuity in our systematic monitoring of the muriquis could be maintained for what is now moving into its 39th year. We have had reasonably good wi-fi at the field station, so were able to hold regular video calls to stay in touch. But even with these advantages, there have still been some significant barriers.

The first barrier was that neither of the two former Brazilian students (Dr. Carla Possamai and Fernanda Tabacow) who provide key technical guidance were able to get back into the field since March. They helped the field team as much as they could by maintaining near-daily Whatsapp contact, but their expertise in finding the muriquis when individuals or groups go missing was sorely missed.

The second, related challenge was associated with our decision to postpone the arrival and training of the new pair of Brazilian students who had been selected for the 2020-2021 field team. Ordinarily, we have an intensive training period during the dry season months of June and July, when 3-4 new team members overlap with the 3-4 outgoing team members and learn from them how to recognize all of the muriquis by their natural markings and to navigate the forest, collect behavioral data, and complete the monthly

monitoring reports. I would also, ordinarily, be in the field with them in June. However, in addition to the international restrictions that prevented me from traveling there, the coronavirus was rapidly spreading in major Brazilian cities and we thought it was too risky for the new team members to travel to this rural community and the Reserve in Caratinga, Minas Gerais. Instead, we waited until mid-August, nearly 2 ½ months later, to begin the process. This was possible, in part, because two members of the 2019-2020 team had already committed to remaining on the Project for a second continuous year.

By the time the new team members arrived, everyone had had months of experience with all of the safety protocols established by the Brazilian health and wildlife authorities (e.g., mask wearing, social distancing, hand washing and sanitizing, etc.). Nonetheless, we arranged for a local laboratory to come to the field station to provide two types of Covid-19 tests to all of the occupants of the research station, and we gave our cook paid leave until everyone was cleared.

By late August, the new team's training got officially underway. However, as is typical for the season shift from winter to spring, climbing temperatures and longer daylengths lead to more active muriquis that also tend to travel further. All of these seasonal changes make it more physically demanding to keep the monkeys in view, and a period excessive heat with no rainfall compounded the strain. We were all worried about the risks of forest fires, like the ones raging in the Amazon and the Pantanal, and elsewhere in South America. Thankfully, though, the spring rains finally came, bringing cooler temperatures, lower fire risks, and water for the muriquis to drink.

There is great comfort in knowing that the monkeys and the people who live and work in and around the Reserve are currently safe. However, there are trade-offs for the local community-based Eco-tourism program that the Brazilian NGO administering the Reserve was in the process of launching when the pandemic struck. Eco-tourism represents an essential revenue source for the basic maintenance activities of the Reserve as well as for the local families that offer lodging and meals. The absence of this revenue has had real economic consequences for the Reserve and the community. At the same time, however, we know that as Brazilian travel and health advisories begin to relax, we will need to find ways to navigate the re-opening of the Reserve to visitors while also ensuring the safety of the people and wildlife alike.

One of my most valued constants throughout all of these months has been the incredible support I've had from friends and colleagues in Brazil. From commiserating about missing the muriquis to sharing the burden of difficult decision-making, it was thanks to people like Dr. Sérgio L. Mendes, Dr. Fabiano R. de Melo, and Ramiro Abdalla Passos, as well as Carla and Fernanda and the current team of students, that it has been possible to remain excited and optimistic about our ongoing research and conservation efforts on behalf of the muriquis.

Karen B. Strier
President, IPS
Co-ordinator, Muriqui Project of Caratinga
Director of Research, Preserve Muriqui
21 October 2020

Brazil

Patrícia Izar, IPS VP for Education

The focus of my research is the investigation of behavioral plasticity of robust capuchin monkeys. To achieve this goal, I conduct comparative studies in three field sites in different regions/biomes of Brazil. In these three field sites I coordinate a team of students and field assistants that are members of the local communities with particular cultural knowledge on the local wildlife. The outbreak of covid-19 led our government conservation agency to recommend the cessation of all types of field work as a first response, what has

recently been relaxed to allow naturalistic observation and non-invasive studies. Because members of local small communities usually work as field assistants in our projects, I was allowed to keep a certain level of monitoring of our study groups of capuchin monkeys through their work. This was important because we were very worried that the absence of researchers in the field could stimulate illegal hunting and other damaging anthropic activities. Data collection by me and the students is still under restriction by recommendation of our university, due to the necessary long distance travel. This long time away from the field is painful although I have been lucky to be able to monitor the groups and I know that for now they are safe and well, as well as the fields assistants and their families.

I worried and still worry a lot about the safety of local people because I study capuchin monkeys in remote regions where there is poor access to hospitals and health facilities. In addition, access to good, scientific based, reliable information about covid-19 is also restricted. I was worried that the politics of misinformation adopted by the Brazilian president, making use of TV and WhatsApp to spread fake news, could be particularly harmful for those communities. I shared these worries with my students and we decided to work on producing educational material using informal language and easy to follow information conveyed in short videos that could be sent using WhatsApp. We are still producing these short videos that were sent to some key actors from our local communities and spread by them. We also shared these videos with primatologists and field biologists all over Brazil. I do not know if and how effective this action was. Covid-19 took longer to reach these regions but it is now widespread and still increasing in number of new cases. However, these cases arrived trough relatives coming from big cities to visit their families and no one from our close communities has had contact with the virus yet and they are trying to follow the practices to avoid the transmission. In a certain manner, this was a positive impact of covid-19: increasing the salience of the partnership between local communities and academic primatologists as key for primate conservation, for biome conservation, culture conservation and for the survival of life forms on Earth.

Up to now covid-19 has impacted somewhat the continuity of my field research and the students work at the university, which is still closed. I am very worried about the future of primatology research in a country where there has been a profound cut in funding for basic science, even before the pandemic outbreak. We are now facing a government that operates against all conservation policies that were developed over many years; we see an enormous increase in forest cutting and fires. The fact that most people that work with conservation, with field biology, with education, are the ones following the social distancing measures is probably contributing for this accelerated destruction. This, for me, is an unexpected negative impact of covid-19 on conservation

I am now practicing social distancing and working at home for seven months. My understanding of the impacts of covi-19 changed along this period and I feel that we will still learn more and more about it for a long time. Covid-19 has shown once again the ugly face of inequality across the world and the consequences of this inequality to humans and non-humans. I hope we human primates may recognize our responsibility for these consequences and reach a true understanding of what is necessary for conservation.

Canada

Amanda Melin, University of Calgary

Amanda Melin, Department of Anthropology and Archaeology & Department of Medical Genetics, University of Calgary, Canada

The potential risk to nonhuman primates of infection by SARS-CoV-2 - the novel coronavirus causing COVID-19 - is of concern to primatologists working around wild and captive primates around the world. In an effort to provide information to decision makers at all levels, my coauthors – Mareike Janiak, Frank Marrone III, Paramjit Arora, James Higham – and I investigated the likelihood of initial susceptibility to

SARS-CoV-2 infection for different major radiations and species. We used approaches from comparative genomics and protein-protein interaction modeling to predict binding affinity for SARS-CoV-2 to the viral target receptor, ACE2, which is expressed on cell surfaces across the body. Our results, forthcoming in Communications Biology, strongly suggest that catarrhines - all apes, and all monkeys of Africa and Asia - are likely to be highly susceptible to SARS-CoV-2. Our results offer potentially better news for monkeys in the Americas (platyrrhines) and tarsiers. Differences in amino acid residues at binding sites are modeled to reduce the binding affinity between SARS-CoV-2 and ACE2 by ca. 400-fold. We find lemurs to be more variable, and some species may have more human-like risk. Overall, while some species are modeled to be at lower risk than humans, we urge extreme caution in using our analyses as the basis for relaxing policies regarding the protection of platyrrhines, tarsiers or any strepsirrhines. With many primates existing in small populations, the introduction of a new highly infectious disease is a critical threat. Our results suggest that dozens of nonhuman primate species, including all of our closest relatives, are likely to be highly susceptible to SARS-CoV-2 infection, and vulnerable to its effects. Major actions may be needed to limit the exposure of many wild primate populations to humans.

Colombia

Xyomara Carretero-Pinzón, Zocay Project

How the COVID-19 has affected the Zocay Project in Colombia?

By Xyomara Carretero-Pinzón, MSc, PhD. www.zocayproject.com

The Zocay Project (Proyecto Zocay in Spanish) is a project focused on the long-term monitoring of primate populations in different sized fragments on private farms in the Colombian Llanos. This project is in a landscape where cattle ranching, palm oil plantations, small annual crops and petrol exploitation take place and are the main drivers of habitat loss and fragmentation. This project was started in 2004 by biologist Xyomara Carretero-Pinzón, PhD. Several undergraduate theses have been completed as part of this project. Now, most people involved are undergraduate students. Colombia had been in a national lockdown from March 24 to September 1st, 2020, with none or limited movement allowed. Therefore, the undergraduate projects stopped during this period with some students having to change their thesis topics.

The national lockdown involved no travelling at all (until now) between towns and cities inside the country, and data collection for our long-term monitoring of primate populations in the study area was also stopped. As our last field trip was in February, we could count the new infants from this year's season of Colombian squirrel monkey and dusky titi monkey births. However, since then, there has not been any data collected in the study area. Apart from local peoples' reports in some farms, where the monkeys have been seen near to the houses in May, July and August.

As part of the goals of this project for 2020, we started some monitoring of Colombian squirrel monkeys in Villavicencio city, the biggest city in the region, and although there were some difficulties because of the movement restriction we have some data collected on some groups, although with less periodicity than we used to have in the San Martin area.

An addition to the concerns related to our restrictions at the moment to collect data, is the possibility that our travelling to the study area can affect the local people and monkeys through spread of the virus. COVID-19 is a virus that can move across species and therefore it is a potential risk for monkey populations in the study area and in all-natural habitat where they live. So, although we want to continue with our project and long-term monitoring of monkeys, for now our activities are limited and constrained to anecdotal data.

With the opening of the country in September and the lifting of movement restrictions we hope to re-start our long-term monitoring of primate populations next month as this we week we reached an agreement with the landowners to start research activities again in the area.

Côte d'Ivoire

Inza Koné, President of the African Primatological Society

Impact of the COVID-19 crisis on the community-based conservation project of endangered monkeys and their habitat in South-eastern Côte d'Ivoire

Inza KONE
President of the African Primatological Society
Co-vice chair of the Africa Section of the IUCN-SSC Primate Specialists Group
2020 Special IPS Presidential Award winner

My main project is about community empowerment for the conservation of the Tanoé-Ehy forest and its endangered primates in South-eastern Côte d'Ivoire. That project has been negatively impacted by the COVID-19 crisis. Indeed due to that crisis, poverty has exacerbated in the region in the region while project activities have slowed down significantly. Unfortunately this coincides with a growing demotivation of some key community leaders, which weakens the community-based associations and jeopardizes the entire process.

The Tanoé-Ehy Forest provides habitat for a number of highly threatened primate species and is a top priority area for primate conservation in West Africa. The community-based management project of that forest was initiated in 2006 and now involves 11 neighboring villages. The main components of the project are community organization and capacity building, awareness raising by peers, surveillance and biomonitoring, forest designation process as a community reserve, and support to local development. As the economy of the region is largely based on transboundary trade with neighboring Ghana, it has been highly impacted by the closure of the border as an anti-COVID-19 measure. As a consequence, poverty has reached a level that leads local authorities to request support for humanitarian actions. In that context, it is difficult to keep telling people not to hunt or not to cut trees in the Tanoé-Ehy forest without flanking measures. Of note is that, even some of the key community leaders feel discouraged as illustrated by the recent resignation intention of the President of the paramount community-based association. Thus, surveillance and awareness raising activities led by community members have been reduced drastically. Even the initial enthusiasm of women and other community members for green value chain development activities promoted by the project is now challenged due to lack of market.

As a consequence of all these, an increase of poaching pressure and deforestation is repeatedly reported. Deforestation is practiced through chainsaw milling and the failed trees are transformed into planks on site. These planks used to be carried by boat to Ghana by crossing the Tanoé River. Recently, thousands of planks coming from the Tanoé forest in destination of Aboisso, a big Ivorian city were seized, suggesting that a national market was being developed. Of note is that there has not been any lockdown in country. Only Abidjan was cut from the rest of the country because most COVID-19 cases are from Abidjan. As for poaching, we had recent evidence of an increase of commercial hunting with a shocking reappearance of monkey meat on the local market. Recently, the project received support by IUCN Save Our Species and was co-funded by the European Union to revitalize the community empowerment process in 12 months and to deal with the direct

and indirect drivers of the various threats posed to the forest and its unique inhabitants.
Besides that, as the President of the African Primatological Society (APS), I was sad about the postponement of the 2020 IPS-SLAPrim meeting. As a consequence of this, the 2021 meeting of APS will be postponed and from 2022 on, APS will be holding its meetings during even years.

España

Miguel Llorente, President de la Asociación Primatológica Española

La primatología española en pausa

Dr. Miquel Llorente
Presidente de la APE – Asociación Primatológica Española / *Spanish Primatological Society*

Tras un otoño en el que junto con nuestras compañeras y compañeros portugueses organizamos el **VIII Iberian Primatological Conference** en Lisboa nadie se esperaba que pocos días antes del inicio de la primavera nuestras vidas fueran a cambiar tan repentinamente. El **COVID-19** —del que teníamos noticias desde el mes de diciembre de 2019— se convertiría en pocas semanas en una pandemia que afectaría a la práctica mayoría de países del mundo y de manera global a todas las esferas de nuestras vidas. Su impacto sanitario, económico o social está siendo devastador. La primatología no ha quedado al margen. Para comenzar, el pasado 9 de abril el coronavirus se llevó a uno de los primatólogos más importantes de nuestro país, a **Fernando Peláez del Hierro**, uno de los fundadores de la APE y Presidente entre los años 2012-2014. Nuestro más sincero pésame a toda su familia, colegas de profesión y para todas las personas que convivieron con él y lo apreciaban.

Tampoco han quedado al margen los diferentes proyectos de investigación desarrollados por investigadores españoles tanto en cautividad como en estado silvestre, en territorio español y en otras partes del mundo. Los **centros de recuperación** españoles (Primadomus, Rainfer y Fundació Mona) han visto interrumpidas sus actividades y han cerrado sus puertas durante casi cuatro meses de confinamiento para intentar reducir las probabilidades de contagio de sus animales. El impacto económico que esto ha tenido sobre estas instituciones ha sido enorme, poniendo en riesgo la viabilidad y continuidad de algunos de ellos. También los programas académicos se han visto afectados. Las estancias de prácticas de los estudiantes del Máster en Primatología de la Universitat de Girona —el único sobre la temática que se ofrece en el sur de Europa— han tenido que interrumpirse, cancelarse o aplazarse.

Las organizaciones como la APE jugamos un papel fundamental no solo en la promoción de la investigación y conservación de los primates sino también en la divulgación. Por ello, en nuestro último Boletín (https://issuu.com/apespain/docs/boletinape_27_1__2020) hemos dedicado la portada al coronavirus, incorporando además diversos artículos y un dossier especial (https://issuu.com/apespain/docs/especialcovid_2020) sobre el tema que esperemos que sirvan para concienciar a nuestros socios, socias y a toda la población sobre la importancia de la conservación de los primates y de sus hábitats naturales como mecanismo para evitar futuras pandemias.

España

Jordy Galbany, Codirector de Investigación del Insituto Jane Goodall España

Investigación y conservación de los chimpancés de Dindefelo, Senegal, en tiempos de COVID-19

Jordi Galbany, en nombre del Instituto Jane Goodall España (IJGE)
Codirector de Investigación del Instituto Jane Goodall España (IJGE) / *Jane Goodall Institute Spain (JGIS)*
Vicepresidente de la APE - Asociación Primatológica Española / *Spanish Primatological Society*

El Instituto Jane Goodall España (https://janegoodall.es) trabaja desde 2009 en Senegal, principalmente en la Reserva Natural Comunitaria de Dindefelo (RNCD) -de la cual es asistente técnico-, así como en el norte del Fouta Djallon desde 2012 (Guinea), donde las comunidades humanas cohabitan con la subespecie de chimpancé *Pan troglodytes verus*, críticamente amenazada de extinción, y otras especies de primates en un hábitat mosaico de sabana que incluye zonas agrícolas. Esta estrecha coexistencia provoca competencia por recursos entre humanos y chimpancés, especialmente por los puntos de agua, frutos silvestres y otros productos del bosque. Este alto grado de cohabitación genera un potencial riesgo de zoonosis, incluyendo la posible transmisión del coronavirus desde las poblaciones humanas a los otros primates. Debido a la situación provocada por la COVID-19 y a la aplicación del protocolo de aislamiento del personal del IJGE, que conllevó la suspensión de las salidas de campo por parte del equipo de investigación, durante seis semanas no se pudo realizar el monitoreo etoecológico de los chimpancés ni evaluar un probable incremento de la actividad humana en estas zonas. Desde principios de mayo el equipo del IJGE ya está de nuevo trabajando en terreno, realizando patrullas diarias con estrictas medidas de seguridad e higiene, siguiendo recomendaciones específicas de la IUCN. Se han retomado con normalidad las tareas de registro de evidencias indirectas, obtención de imágenes con cámaras trampa y registro de actividades humanas.

Por otro lado, la prohibición de las visitas ecoturísticas a la reserva desde marzo impide la generación de recursos económicos para el mantenimiento del personal de la RNCD. Por ello, en esta fase tan crítica, el IJGE está aportando fondos y formación -además de asistencia técnica- al personal de la RNCD. Hasta la fecha no se han confirmado casos positivos de COVID-19 en la Comuna de Dindefelo, pero el IJGE sigue realizando una tarea de sensibilización y apoyo sanitario en la zona, donde ha colaborado con las autoridades mediante la impresión de pósteres, compartiendo información puerta a puerta sobre la prevención de la COVID-19. El IJGE también ha comprado y distribuido jabón y lejía para familias de 27 pueblos y aldeas, y mascarillas de tela para la población más necesitada de diversos pueblos, con el fin de asegurar medidas básicas de prevención; y ha instalado estaciones de lavado de manos en espacios públicos del pueblo de Dindefelo. En la Estación Biológica de Dindefelo, el IJGE también ha estado elaborando mascarillas desechables para distribuir, y además ha contribuido con la compra de alimentos que fueron repartidos entre familias de la zona.

Madagascar

Kathy West, Photography Inspiring Children in Conservation

Photography Inspiring Children in Conservation (PICC)

Supporting lemur conservation through visual arts during the pandemic

Photography Inspiring Children in Conservation (PICC) is based on the concept of engaging with the natural world through visual arts. The program goal is to inspire students to become conservation leaders within their communities by providing them with knowledge of primate ecology, as well as local conservation issues and solutions.

During the full PICC program students gain skills in photography, illustration, and storytelling, providing an effective foundation upon which they may seek conservation-oriented careers.

PICC 2020 students from Ambodiforaha, Masoala, Madagascar. Photo by Pascal Elison

PICC 2020 Ambodiforaha students watching a red ruffed lemur. Photo by Pascal Elison.

Opportunities during COVID-19

Creating an opportunity to educate Malagasy students in lemur conservation in spite of the pandemic, IPS member **Kathy West** (US) and **Pascal Elison** (Madagascar) worked together to design a condensed version of the PICC program for summer 2020 using coloring worksheets and blank page journals. This 10-day "mini-PICC" program focused on the art of "truly seeing" and the power of sketching, and through those new skills, with Pascal's guidance, gathering new knowledge and appreciation of the plants, animals and ecosystems in their local forests. (See **here** for a full description of the 2020 program.)

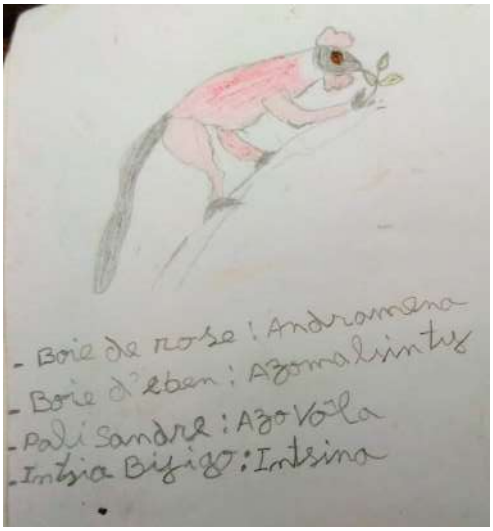
Although brief, this first PICC session in the forests of Masoala was an unqualified success! The teaching materials, hikes and experiences excited and engaged the children, educated the teacher, informed and pleased the parents, and delighted the local lodges that rely on ecotourism. The children have already expressed interest in continuing their sketching and the teacher is going to be leading the children one to two days a week in forest lessons, even during the school holidays.

PICC was designed with a goal of building local capacity for sustainable conservation through educating and

empowering both students and the broader community, including local teachers and elders. The pandemic has provided us with an opportunity to elevate the contributions of an Ambodiforaha village (Madagascar) teacher and guide by giving them the platform to lead, learn and experience this curriculum on their own. We are grateful to PICC donors, including the American Society of Primatologists, for funds to supply the students with notebooks, art materials, snacks and worksheets, and to pay Pascal his professional wages.

Pascal Elison teaching PICC 2020 students from Ambodiforaha, Masoala, Madagascar

We are excited about expanding these efforts with the full PICC program in the post-pandemic future (see PICCmadagascar.org for program details), including teaching the children the skills of photography, writing and journal sketching, and then publishing these students' creative works in a book with local sales to go to conservation funds. When tourists are able to return to Masoala National Park, there will be a large contingent of enthusiastic student ecotourism hosts for their area! **Thank you for joining us in our conservation efforts**



PICC 2020 student drawing of red ruffed

PICC is partially supported by a grant from the American Society of Primatologists Conservation Committee and through private donations. We are currently fundraising to be able to conduct the full PICC program in Madagascar in 2021, and are happy to arrange a PICC session for your primate research area!

To see how you can help, please visit our Support Us page or contact us directly. Photography Inspiring Children in Conservation is a 501(c)(3) nonprofit organization. All donations are tax deductible. Note: All PICC activities were conducted within local Malagasy health guidelines.

Thailand

Ramesh 'Zimbo' Boonratana, Mahidol University

Um…where does one start writing, especially when there's so much to say, but none that really makes much sense? After much pondering, I realise it is not as easy as I initially thought would be. Like most, I'm missing international travel – be it to my research and conservation sites or visiting an ageing mother residing in a neighbouring country. In all, I feel the ongoing COVID-19 has been a messy jumble of psychedelic multi-dimensional ball of cobwebs – all badly intertwined and simultaneously confusing, evoking various emotions depending on the immediate situation or stimulus.

Angry that we, as conservation practitioners, have been unable to prevent the pandemic (and its consequences) – which we have already foreseen and predicted, but failed to drive our science into authoritative actions and policies. Angry at how some governments are failing miserably in their handling of the situation. Thrilled that China and a few other countries are (fingers-crossed) banning and clamping down on wildlife trade. Happy to see and read news of wildlife flourishing and ecosystems recovering, and surprised to see how fast they recover when humans are no longer in the equation. For the first time in many years, felt alive breathing unpolluted urban air, but simultaneously upset with the amount of non-biodegradable wastes piling up both on land and in water. Stressed that authorities are either slow or not availing of this remarkable opportunity in developing legislation and policies for biodiversity conservation and ecosystem protection. Angry at unscrupulous leaders who quietly approved concessions for logging, mining, and other disastrous activities in wilderness areas (protected or otherwise), and businesses and individuals who encroach and extract biodiversity resources and further destroy ecosystems. Bewildered and simultaneously angry at people abandoning their pets – those very animals that gave them unlimited joy and comfort. Sad that people, businesses and governments are waiting to go back to the 'normal' – it was the 'normal' that led to the ongoing issues.

At the start of the lockdown, I naively thought I would have more time to focus and catch up on my writing. Unfortunately, I ended up spending more time reviewing the submissions of others – others are being productive! Which frequently led to a sense of self-disappointment. Nevertheless, the lockdown has compelled me to acquire new online skills, innovate my teaching and students' assessments, and design assignments that students could publicly display and be proud. Also, 'forced' innovation also allowed me to remotely achieve some aspects of my conservation efforts in North Borneo. It also allowed me to connect with conservation practitioners, academicians, and research scholars residing in different parts of the globe through online meetings and webinars. The downside of online teaching and meetings are various ailments associated with office syndrome – from prolonged hunching over and staring at the laptop.

On a happier note, my small kitchen garden is now yielding foods to its owner and the various animals and insects living in the vicinity, and that I finally achieved the long-overdue household chores. With that, I shall indeed be looking forward to the promise of IPS Ecuador.

U.S.A

Steve Ross, IPS VP for Captive Care, Director Lester Fisher Centre for the Study and Conservation of Apes at Lincoln Park Zoo

Primates, zoos and a global pandemic

S.R. Ross, Director of the Lester Fisher Center for the Study and Conservation of Apes at Lincoln Park Zoo, Chicago, USA
VP for Captive Care, International Primatological Society

Among the most frequent questions I get about my work at the zoo in the context of the global pandemic is "do the chimps miss the people?" I find it a curious question given that in the previous two decades during which I have worked at the zoo, the questions tend to be along the lines of "aren't the chimps stressed out by all the visitors at the zoo?"

But I suppose this accurately represents the complicated nature of visitor-primate interactions that are a daily part of primate life in zoological parks around the world. Indeed there is a robust literature on the topic but the results vary from visitors inducing quite negative effects for zoo-housed primates to very little effect at

all (the latter best characterizes what we have found in our studies at Lincoln Park Zoo, specifically with the chimpanzees and gorillas).

In pre-pandemic days at Lincoln Park Zoo, the chimpanzees and gorillas were viewed by over 3 million visitors annually, so it's difficult for me to imagine that they did not notice when virtually overnight, and now for the most recent 6 months, those millions of visitors simply stopped coming. But those are not the only changes they have experienced as a result of the pandemic. For two decades, we conducted what is among the longest running consecutive studies of captive primate behavior, collecting systematic behavioral observations virtually every day. Such observations ceased when zoo scientists began to "work from home" in March. Perhaps even more impactful was the cessation of our daily cognitive studies in which the chimpanzees, gorillas and Japanese macaques all voluntarily participated in a variety of touchscreen-mediated research almost every weekday. Such studies have taught us a lot about how primates think, learn and feel, but we are also aware of their ability to enrich the lives of our subjects as well.

Most zoos have closed to the public for many months now and those accredited zoos with a variety of scientific, education and conservation initiatives have been forced to pause or reorganize those efforts in the face of reduced or absent funding and staffing. Unlike art museums, zoos could not simply turn off the lights and send their staff home. Unlike field sites, our primates remained dependent on our care even when the scientists had to leave. These have been difficult times.

We are so appreciative to the dedicated care staffs that continue to provide excellent care at accredited zoos around the world. At Lincoln Park Zoo for instance, it's been tremendously difficult for our scientific staff to be away from the primates with whom we collaborate, but we are grateful that they are still thriving and receiving the care, training, enrichment and veterinary coverage they deserve. Plans are already underway to restart many of our scientific studies at the zoo and I am pleased to say that our conservation efforts (working with the Goualougo Triangle Ape in the Republic of Congo) have been able to continue virtually unwavered to date though of course they are facing their own challenges there in the field.

Recently I returned to the zoo briefly and saw some of my old ape friends and got a taste of an answer to the question posed to me so often. Each ape reacted a little differently to me when I approached their indoor-outdoor exhibit. Some excitedly rushed outside when they spotted a familiar but long-absent face. A female gorilla named Rollie whom I have known for 20 years, and who has excelled in our touchscreen studies, seemed especially excited to see me. Others only turned a brief glance in my direction and then went back to patrolling the perimeter of their yards or drawing jelly from their artificial termite mound. Like for us humans, the circumstances imposed on us by the pandemic have affected each individual primate differently.

For scientists at the zoo, we are all still very much in the midst of determining how we will continue our efforts to study, care for, and protect primates worldwide in this new reality. But if we know anything about primates, it is that they are incredibly adaptable and I expect that such behavioral flexibility will be the key to our success as well.

Report for IPS Galante Conservation Scholarship

By Deogratias Tuyisingize

In 2019, I was awarded the IPS Galante Family Winery Conservation Scholarship in support of attending training courses at the University of California, Davis (US) to improve my understanding of various methodologies for primate conservation and overall biodiversity conservation work. These methods included techniques used in biological data analysis related to my doctoral work on the conservation ecology of the Golden Monkey and its habitat.

From September 30th to December 11th, 2019, I worked at the University of California Davis (UC-Davis), with guidance from my advisor Dr. Damien Caillaud, on data analyses that allow me to strengthen my doctoral work. I took ANT 291 (Data Analyses using R), a graduate level class in statistics focusing on linear modeling, generalized linear modeling, mixed-effects models, time series analyses, and spatial statistics. I also focused on UWP104E, another graduate level class in scientific writing skills focusing on writing scientific papers, popular articles, and rhetorical analysis. Moreover, I attended seven research seminars in Animal Behavior and Anthropology to broaden my understanding of ecological problems and theory.

During my stay at UC-Davis, I analyzed all my Ph.D. data and started working on three separate paper manuscripts:

1. Diet and ranging patterns of golden monkeys (*Cercopithecus mitis* spp *kandti*) in two high altitude forest fragments.
2. Surviving in the fragments: Correlates of birth and mating seasonality in golden monkey, *Cercopithecus mitis* spp *kandti.*
3. Distribution and conservation status of the golden monkey *Cercopithecus mitis* spp *kandti* in Rwanda.

I also prepared an abstract to be presented as a virtual presentation in a symposium at the 29th IPS conference to be held in Quito, Ecuador, between 16-22nd August 2020 (postponed to August 2021), where I will provide a talk on "Surviving in the fragments: Correlates of birth and mating seasonality in golden monkey, *Cercopithecus mitis* spp *kandti* in Rwanda", accepted abstract number 14408.

After completing the training in December 2019, I returned to the Dian Fossey Gorilla Fund International/ Karisoke Research Center in Rwanda, to continue my research on primates, to finalize and publish my findings, and to further mentor and train Rwandan conservation professionals.

Today, results from data analysis and manuscripts prepared while I was at UC Davis are being used to finalize the ongoing preparation on the "golden monkey conservation action plan" that would strengthen local and regional efforts to protect these monkeys. The action plan highlights the conservation status of golden monkeys and their habitats and outlines conservation priorities. This is a resource for managers, conservationists, and decision-makers. The final document will be sent to the International Union for Conservation of Nature (IUCN) primate specialist group to be validated, after which it may be implemented from 2021 to 2026.

Given that there is no institution in Rwanda that offers the training at doctoral level that I received from UC Davis, I was motivated to share my newly obtained knowledge and skills through the continued mentoring of young aspiring Rwandan primatologists and conservationists. Specifically, I started training young conservationists in biological data analyses and helped young graduates in turning their BSc. field projects into peer-reviewed manuscripts. I also assisted in the internal training of Fossey Fund staff who permanently help in the conservation of gorillas and its habitat. Specifically, I provided a short workshop on 'Basics in Ecology and Conservation of Primates' and assisted with basic R training for biological data analysis.

The IPS Galante Family Winery Conservation Scholarship (US$2,500), was used to help cover accommodation, flight and visa expenses, with the Dian Fossey Gorilla Fund International (DFGFI) matching this support with 3,500 for a total budget of $6,000 US.

The manuscripts resulting from this project will soon be submitted for publication in international scientific peer-reviewed conservation journals such as the *American Journal of Primatology, International Journal of Primatology, Oryx* or the *African Journal of Primatology.* In addition, several presentations will be provided during conservation forums in Rwanda and at the monthly Karisoke Science Seminar at the Karisoke Research Center. I would like to thank my supporters: IPS Galante Family Winery Conservation and the Dian Fossey Gorilla Fund International for the support that made it possible for me to substantially improve the quality and quantitative progress on my doctoral theses, a thesis which will hopefully contribute to the conservation of a threatened primate.

Report from Research Grant Recipient
Lais Moreira

A multi-modal approach to understanding sexual signaling in spider monkeys (*Ateles geoffroyi*)
Lais Moreira

INTRODUCTION

Successful reproduction in animals requires functional genitalia. However, many species exhibit genitalia that is not only functional, but is instead exaggerated, adorned, and/or colorful[1]. The clitoris is a common feature of the external genitalia of all female mammals. Intriguingly, however, the morphology of the clitoris varies significantly across the Class. Hedgehogs (genus *Erinaceus*), moles (genus *Talpa*) and spotted hyenas (genus *Crocuta*), for example, have a prominent, pendulous and erectile clitoris, while other species, including humans and tammar wallaby (genus *Macropus*), have a short one[2]. This diversity in morphology is also present within the Order Primates[3]. In most apes and catarrhine monkeys, the clitoris is relatively small and in some cases not visible[3]. In contrast, some strepsirrhines (lemurs and lorises) have an enlarged clitoris[4] or even a small bone, similar to the baculum found in the penis of many mammals[3]. However, the most dramatic morphology is found in the Atelinae subfamily of platyrrhine primates, in which the clitoris has become significantly enlarged[2]. Among atelines, spider monkeys (genus *Ateles*) have a pendulous clitoris, which the largest of any primate species, and resembles the male's penis[5] (Figure 1). In some species (e.g. black-handed spider monkeys, *Ateles geoffroyi*), the clitoris is also conspicuous in color against the pelage[6]. This variation in clitoral morphology across is suggestive of an evolutionarily pliable trait, which raises questions about the adaptive value of the increased size and conspicuity in *Ateles* and other Atelines.

Due to their direct role in reproduction, genitalia are often involved in socio-sexual communication[8–10]. A longstanding hypothesis posits that the enlarged pendulous clitoris of spider monkeys functions as a scent-depositing organ that is used for chemical communication of fertility[7]. This hypothesis was inspired by behavioral observations of male spider monkeys frequently manipulating the female's large clitoris and then sniffing their hands; this behavior is absent in other platyrrhine monkeys with smaller clitorises[8,9]. The potential importance of chemical communication in Atelines is further underscored by anatomical features, such as the increased size of the olfactory bulb relative to other diurnal primates[10] and the presence of apocrine scent glands in their sternal region[3,11]. However, the perception of olfactory signals might be difficult to gauge acutely from a distance[12]. At distances beyond arm's reach, visual signals may be important and color variation is used by in many animals –including catarrhine primates – in honest signals of fertility[13–17]. The hypertrophied clitoris of spider monkeys is also reported to vary in color and in turgescence[2], a condition that may converge on the colorful and robust sexual skin present in catarrhines. Given the likely roles of both chemical and visual signals in sexual communication, spider monkeys offer a unique opportunity to investigate the mechanisms potential for mammalian multi-modal signaling in a sexual context. However, we currently lack fundamental information on the variation in color (chroma, brightness) and odors (volatile organic compounds), how they vary with respect to the estrous cycle, and whether they are attended to by conspecific males. These data are necessary for testing hypotheses of signal function and evolution.

Here, I studied a habituated population of captive and free-ranging black-handed spider monkeys (*Ateles geoffroyi*) to answer the question: **Do chemical and visual changes in the clitoris signal female fertility in spider monkeys?** I collected color-calibrated images from clitoris, scents from clitoris and sternal gland, and saliva from females for four months. This is part of a larger project in which I will combine analyses of color-calibrated images, chemical analyses of scents, and salivary hormone analysis, to investigate the potential role of visual and olfactory cues in sexual communication in a platyrrhine species.

Figure 1 Enlarged and pendulous genitalia of female spider monkeys (*Ateles geoffroyi*) from two different angles: **A** Lateral view; **B** Front view.

METHODS

Study Site I studied a population of captive (n= 3 females; 4 males) and free-ranging (n= 4 females; 3 males) black-handed spider monkeys (*Ateles geoffroyi*) at UMA Hilda O'Farril, environmental management unit maintained by Universidad Veracruzana, Catemaco, Mexico. The captive animals were kept in outdoor enclosures and exposed to natural environmental conditions and foods[22]. These monkeys are accustomed to sensory ecology testing[23].

Data collection

With few exceptions (described on Table 1) all sampling was collected from all adult females six days a week for four months (June – September 2019).

Assessment of intra-cycle variation in fertility from salivary hormones I collected saliva (n = 330 samples) using a swab (Salimetrics®) slightly sweetened with honey to make it attractive to the animals. The swabs were centrifuged at 4000 rpm for 10 minutes to recover the saliva, which was transferred to 2ml microtubes, and stored in a -20°C freezer.

Assessment of visual cues I collected color calibrated digital images of the clitoris using a characterized camera to measure the color and swelling of the clitoris[19] (n = 306 images). I used the sequential method in which an image of a color card (X-Rite Colorchecker®) was taken right after taking a photo of the clitoris from the same angle and position of the first photo (Figure 2). The color card was used to calibrate the image color during analysis.

Assessment of chemical cues To collect body scents, I rubbed sterile gauzes on the clitoris (n= 127) and sternal gland (n=249) of females for 10 seconds. For each sampling bout, I collected two swabs, one for chemical analyses, and one for use in behavioral testing. I stored all swabs individually in sterile glass vials in a -20°C freezer[24]. Importantly, all gaps in saliva, sternal and clitoral odor sampling were very short (< 2 days), ensuring good coverage of fertility cycles. Additionally, I collected samples of air from the animal's housing area as controls and handled these in the same manner as all scent samples before or after the sampling procedure.

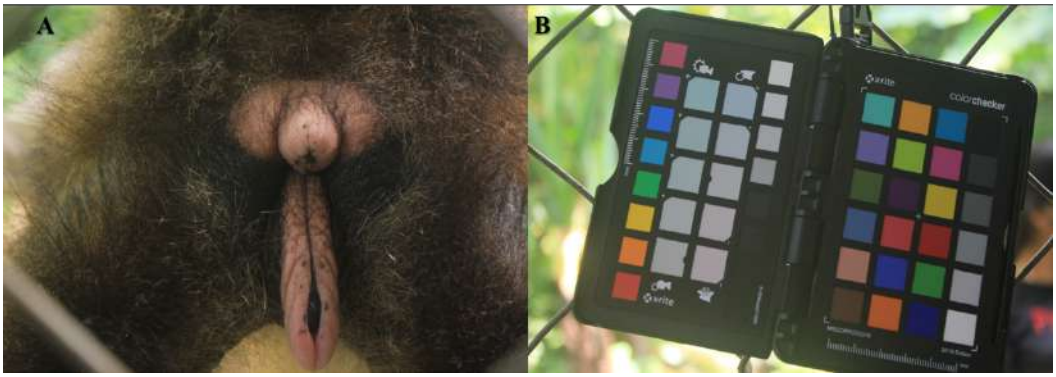


Figure 2 Example of sequential method used to collect color calibrated images of clitoris. First image of clitoris was taken (**A**) followed by image of color card (**B**).

Table 1 Summary of data collected from June to September 2019

Animal ID	Saliva	Digital Images	Sternal Swab	Genital Swab
Camila	44	38	36	27
Chavela	51	48	4	0
Frida	73	67	71	52
Kika	21	18	15	12
Mari	68	62	58	31
Margarita	63	64	62	1
Matli	10	9	3	4
Total	**330**	**306**	**249**	**127**

CURRENT WORK AND FUTURE DIRECTIONS

Assessment of intra-cycle variation in fertility I will conduct hormone analysis in August 2020, at the Primate Reproductive Endocrinology Lab, New York University under supervision of my co-supervisor James Higham. I will extract and measure salivary progesterone (P4) using enzyme-linked immunosorbent assays (ELISA)[25,26]. The patterns of analytes of progesterone will be used to define the ovulatory (OV) and non-ovulatory (NOV) periods - which includes pre- and post-ovulatory periods - of each female[27]. I have recently received the import and export permits from USA and Mexico, respectively, and the salivary samples will be shipped in April.

Assessment of visual cues I am currently working on the color and size analysis. I have filtered all the images to be used in the color and size analysis. To assess conspicuousness of genitalia, I will use the software Image J, with the Image Calibration and Analysis Toolbox[28,29]. I will extract the reflectance spectra from the images, which will be used to model the color (chroma and luminance) contrast among genital regions, in the visual space of the black-handed spider monkey[30]. Using the same software and toolbox, I will measure the size of the clitoris, using as standard the size of the animal's anal region (Figure 3).

Assessment of chemical cues In order to quantify and qualify the VOCs and SVOCs present in the swabs collected, I will extract odors from the swabs in 2ml of solvent (7:3 pentane to dichloromethane) and concentrate the samples to approximately 0.5ml using a gentle nitrogen flow[31]. I will inject the concentrated extract into a benchtop GC-MS (Agilent 6890N). To identify the presence and amounts of VOCs and SVOCs present in the samples[32], I will use the Automatic Mass Spectral Deconvolution and Identification System (AMDIS) combined with the National Institute of Standards and Technology (NIST) library database. My collaborators and I have already verified the promise of these samples using GC-MS analyses and have tentatively identified several organic compounds, including 5-amino-1-pentanol ($C_5H_{13}NO$) and 2-hydroxy-3-methylbutanoic acid ($C_5H_{10}O_3$). All the GC-MS analyses will be done in July 2020 at the Max Planck Institute for Evolutionary Anthropology in collaboration with Dr. Anja Widdig.

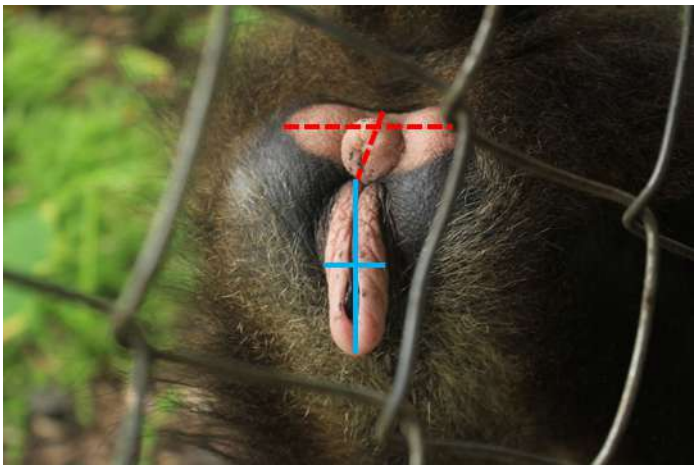


Figure 3 Example measurements of clitoris length and width (solid blue lines). I will use the anal region (dashed red lines) as a size calibration. All anal measurements for all individuals were measure in vivo using a ruler.

BUDGET REPORT

I was awarded with $1,500 from the IPS Research Grant to cover a large portion of the transportation and local costs for the first part of my research, which included a four-month (120 days) field season to collect saliva, odors and images. I flew from Calgary (Canada) to Mexico City (Mexico). Within Mexico, I used local transportation (bus) from Mexico City to Xalapa, and from Xalapa to Catemaco. An NSERC Discovery Grant awarded to my supervisor, Amanda Melin, also provided funding for a portion of the transportation and for the field equipment. The collaboration with the Universidad Veracruzana provided housing and transport to/from the field site within Catemaco. The Universidad Veracruzana also has local research assistants' program and I was fortunate to work with two excellent researchers during the period of the project.

REFERENCES

(1) Langerhans, R. B.; Anderson, C. M.; Heinen-Kay, J. L. Causes and Consequences of Genital Evolution. *Integr. Comp. Biol.* **2016**, *56* (4), 741–751.

(2) Hayssen, V.; Orr, T. J. *Reproduction in Mammals: The Female Perspective*; Johns Hopkins University Press, 2017.

(3) Dixson, A. F. *Primate Sexuality: Comparative Studies of the Prosimians, Monkeys, Apes, and Humans*, 2nd ed.; Oxford University Press, 2012.

(4) Hill, W. C. O. *Primates, Comparative Anatomy and Taxonomy.*; Edinburgh University Press: Edinburgh, 1962; Vol. 4: Cebidae, Part B.

(5) Drea, C. M.; Weil, A. External Genital Morphology of the Ring-Tailed Lemur (*Lemur catta*): Females Are Naturally "Masculinized." *Journal of Morphology* **2008**, *269* (4), 451–463.

(6) Wislocki, G. B. The External Genitalia of the Simian Primates. *Human Biology* **1936**, *8* (3), 309–347.

(7) Campbell, C. J.; Gibson, K. N. Spider Monkey Reproduction and Sexual Behavior. In *Spider Monkeys*; Campbell, C. J., Ed.; Cambridge University Press: Cambridge, 2008; pp 266–287.

(8) Gerald, M. S. Scrotal Color in Vervet Monkeys (*Cercopithecus aethiops sabaus*): The Signal Functions and Potential Proximate Mechanisms of Color Variation, University of California, California, 1999.

(9) Kücklich, M.; Weiß, B. M.; Birkemeyer, C.; Einspanier, A.; Widdig, A. Chemical Cues of Female Fertility States in a Non-Human Primate. *Sci Rep* **2019**, *9* (1), 13716.

(10) Young, M. M. I.; Winters, S.; Young, C.; Weiß, B. M.; Troscianko, J.; Ganswindt, A.; Barrett, L.; Henzi, S. P.; Higham, J. P.; Widdig, A. Male Characteristics as Predictors of Genital Color and Display Variation in Vervet Monkeys. *Behav Ecol Sociobiol* **2020**, *74* (2), 14.

(11) Klein, L. L. The Ecology and Social Organization of the Spider Monkeys, *Ateles belzebuth.*, University of California, Berkeley, 1972.

(12) Pastor-Nieto, R. Gooming, Kinship, and Co-Feeding in Captive Spider Monkeys (*Ateles geoffroyi*). *Zoo Biology 20*, 293–303.

(13) Campbell, C. J. Patterns of Behavior across Reproductive States of Free-Ranging Female Black-Handed Spider Monkeys *(Ateles geoffroyi*). *American Journal of Physical Anthropology* **2004**, *124* (2), 166–176.

(14) Stephan, H.; Frahm, H.; Baron, G. New and Revised Data on Volumes of Brain Structures in Insectivores and Primates. *Folia Primatologica* **1981**, *35*, 1–29.

(15) Campbell, C. J. Fur Rubbing Behavior in Free-Ranging Black-Handed Spider Monkeys. *American Journal of Primatology* **2000**, *51*, 205–208.

(16) Rigaill, L.; Higham, J. P.; Lee, P. C.; Blin, A.; Garcia, C. Multimodal Sexual Signaling and Mating Behavior in Olive Baboons (*Papio anubis*). *American Journal of Primatology* **2013**, *75* (7), 774–787.
(17) Emery, M. A.; Whitten, P. L. Size of Sexual Swellings Reflects Ovarian Function in Chimpanzees (*Pan troglodytes*). *Behavioral Ecology and Sociobiology* **2003**, *54*, 340–351.
(18) Deschner, T.; Heistermann, M.; Hodges, K.; Boesch, C. Female Sexual Swelling Size, Timing of Ovulation, and Male Behavior in Wild West African Chimpanzees. *Hormones and Behavior* **2004**, *46* (2), 204–215.
(19) Higham, J. P.; MacLarnon, A. M.; Ross, C.; Heistermann, M.; Semple, S. Baboon Sexual Swellings: Information Content of Size and Color. *Hormones and Behavior* **2008**, *53* (3), 452–462.
(20) Rigaill, L. Multimodal Signalling of Ovulation in Human and Non-Human Primates. *BMSAP* **2014**, *26* (3–4), 161–165.
(21) Dubuc, C.; Winters, S.; Allen, W. L.; Brent, L. J. N.; Cascio, J.; Maestripieri, D.; Ruiz-Lambides, A. V.; Widdig, A.; Higham, J. P. Sexually Selected Skin Colour Is Heritable and Related to Fecundity in a Non-Human Primate. *Proceedings of the Royal Society B: Biological Sciences* **2014**, *281* (1794), 20141602–20141602.
(22) Hernandez-Salazar, L. T.; Laska, M.; Luna, E. R. Olfactory Sensitivity for Aliphatic Esters in Spider Monkeys (*Ateles geoffroyi*). *Behavioral Neuroscience* **2003**, *117* (6), 1142–1149.
(23) Nevo, O.; Orts Garri, R.; Hernandez Salazar, L. T.; Schulz, S.; Heymann, E. W.; Ayasse, M.; Laska, M. Chemical Recognition of Fruit Ripeness in Spider Monkeys (*Ateles geoffroyi*). *Scientific Reports* **2015**, *5*, 14895.
(24) Drea, C. M.; Boulet, M.; Delbarco-Trillo, J.; Greene, L. K.; Sacha, C. R.; Goodwin, T. E.; Dubay, G. R. The "Secret" in Secretions: Methodological Considerations in Deciphering Primate Olfactory Communication: Methods in Deciphering Olfactory Communication. *American Journal of Primatology* **2013**, *75* (7), 621–642.
(25) Heugten, K. D. A.; van Heugten, E.; Timmer, S.; Bosch, G.; Elias, A.; Whisnant, S.; Swarts, H. J. M.; Ferket, P.; Verstegen, M. W. A. Fecal and Salivary Cortisol Concentrations in Woolly *(Lagothrix ssp.)* and Spider Monkeys *(Ateles spp.)*. *International Journal of Zoology* **2009**, *2009*, 1–9.
(26) Higham, J. P.; Vitale, A. B.; Rivera, A. M.; Ayala, J. E.; Maestripieri, D. Measuring Salivary Analytes from Free-Ranging Monkeys. *Physiology & Behavior* **2010**, *101* (5), 601–607.
(27) Hernández-López, L.; Mayagoitia, L.; Esquivel-Lacroix, C.; Rojas-Maya, S.; Mondragón-Ceballos, R. The Menstrual Cycle of the Spider Monkey (*Ateles geoffroyi*). *American Journal of Primatology* **1998**, *44* (3), 183–195.
(28) Troscianko, J.; Stevens, M. Image Calibration and Analysis Toolbox - a Free Software Suite for Objectively Measuring Reflectance, Colour and Pattern. *Methods in Ecology and Evolution* **2015**, *6* (11), 1320–1331.
(29) van den Berg, C. P.; Troscianko, J.; Endler, J. A.; Marshall, N. J.; Cheney, K. L. Quantitative Colour Pattern Analysis (QCPA): A Comprehensive Framework for the Analysis of Colour Patterns in Nature. *Methods Ecol Evol* **2019**, *11*, 316–332.
(30) Osorio, D.; Smith, A. C.; Vorobyev, M.; Buchanan-Smith, H. M. Detection of Fruit and the Selection of Primate Visual Pigments for Color Vision. *American Society of Naturalists* **2004**, *164* (6), 696–708.
(31) Nevo, O.; Valenta, K.; Tevlin, A. G.; Omeja, P.; Styler, S. A.; Jackson, D. J.; Chapman, C. A.; Ayasse, M. Fruit Defence Syndromes: The Independent Evolution of Mechanical and Chemical Defences. *Evol Ecol* **2017**, *31* (6), 913–923.
(32) Nevo, O.; Razafimandimby, D.; Jeffrey, J. A. J.; Schulz, S.; Ayasse, M. Fruit Scent as an Evolved Signal to Primate Seed Dispersal. *Science Advances* **2018**, *4* (10), eaat4871.

Report from Conservation Grant Recipient Elida Emperatriz Gamero

Recipient: Elida Emperatriz Gamero, Margarita Capuchin Project
Professional Research Assistant (PAI) and graduate student (M. Sc.) at the Venezuelan Institute of Scientific Research (IVIC), Research Fellow at the Center for Conservation Genomics, Smithsonian's National Zoo & Conservation Biology Institute.

Project: Genetic bases for the conservation of the Critically-Endangered Margarita Capuchin (*Sapajus apella margaritae*) endemic to Isla de Margarita, Venezuela.
Year of the award: 2018

INTRODUCTION

Among capuchin monkeys, one of the most endangered is the Margarita capuchin (*Sapajus apella margaritae*). This capuchin is unique because it is the only primate endemic to any Caribbean island (Margarita Island), but it faces the same threats that many other highly threatened primates face, including habitat loss, illegal pet trade and potentially inbreeding due to small population size (~500 individuals). Margarita capuchins are also captured for the illegal pet trade, and the few that remain in the wild may be at risk of hybridization with escaped mainland capuchins brought to Margarita as pets. Results from previous systematic studies support the Critically Endangered status of the Margarita Capuchin (Ceballos, 2015); however, as is noted on the IUCN Red List, "whereas all other tufted capuchins are considered to be [full] species (following Silva Jr., 2001), the taxonomic status of the Margarita capuchin has yet to be reviewed, " and it is still classified as a subspecies. Without this understanding, effectively dealing with the threats of inbreeding and hybridization are impossible. A revision of the taxonomy and evolutionary history (systematics) of the Margarita capuchin is therefore crucial to its conservation, and it is urgently needed in the context of an ongoing integrated conservation effort, the Margarita Capuchin Project (http://margaritacapuchinmonkey.wordpress.com/). Recent work upending the systematics of the entire genus (Lynch-Alfaro et al, 2012, Lima et al, 2017), makes our work all the more urgent and timelier, and provides crucial context for our work.

The molecular genetic tools that we are developing in this project will allow us to clarify this taxon's systematics to determine what its scientific name should be. This information is essential for the design and implementation of adequate conservation strategies for this capuchin monkey and its habitat. The molecular genetic tools that we are developing will also be important for future non-invasive monitoring of this monkey's habitat use. These genomic techniques can help us determine how this capuchin arrived on Margarita Island and how it is related to other capuchins and give us the tools to understand the potential problems of inbreeding and hybridization.

GOALS

The main goal for the Margarita capuchin conservation genetics project is to propose a phylogenetic hypothesis about the origins of the Margarita capuchin in the context of a rapidly changing phylogeny for Capuchin genera, and to use this to understand how this primate arrived on its island home, suggest appropriate systematic changes, as well as to develop markers to understand individual movements, and the threats of hybridization and inbreeding. With this knowledge in hand, we can build a comprehensive recovery plan also addressing the problems of illegal wildlife trade, habitat loss and fragmentation, and human-wildlife conflict, building on solutions discovered by others working in capuchin conservation across the region.

Due to the complexity of the project and logistics limitations, the project has been planned in phases. The first phase has finished and is described in this report. That first phase included: sample collection and transportation from Venezuela to the USA, subselection and inactivation of samples for analyses in phase two, and DNA extraction from the samples selected. These were all essential previous steps to accomplish my master's thesis goals that correspond to phase two for the whole project.

The main goal for my master's thesis is to propose a phylogenetic hypothesis about the origins of the Margarita capuchin in the context of a rapidly changing phylogeny for capuchin genera, to use the phylogenomic reconstruction to date the divergence with other mainland capuchins and to understand the mode and tempo of their colonization to Margarita Island.

METHODS AND RESULTS

During the first phase of the project, we collected in Venezuela genetics samples from capuchin monkeys and transported them to the Smithsonian Institution (SI) with all appropriate permits, including from the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and Centers for Disease Control and Prevention (CDC). See note at the end of this section about challenges during sample transportation.

These were the genetic samples collected: non-invasive samples (feces and hair) from wild Margarita capuchins; blood, feces, hair, saliva from captive Margarita capuchins; and bones and tissue of capuchin monkeys Sapajus and Cebus from museums (figures 1, 2, 3). Since my arrival in Washington DC in March 2019, I have worked extensively with my project supervisors and other Genomics Lab and National Zoological Park staff to reorganize the schedule of project activities to adjust for delay caused by sample transport and permits. I inactivated the samples brought from Venezuela to comply with CDC requirements. This procedure was carried out in the appropriate laboratories of the Smithsonian MSC (Figure 4) so that they could be properly stored, and I could extract the DNA.

Figure 1. Collection of non-invasive samples on Isla de Margarita.
Figure 2. Collection of bones and tissue of capuchin monkeys from museums (Photo Emperatriz Gamero).

a

b

c

d

Figure 3. Boxes and tubes containing: a) fecal samples of Margarita capuchin monkeys (*Sapajus apella margaritae*); b) hair and tissue samples from Margarita capuchins and other capuchin monkeys (*Sapajus apella, Cebus olivaceus, Cebus albifron and Cebus brunneus*) collected from Venezuelan museums; c) blood samples of Margarita capuchin monkeys and d) detailed view of the cryotube containing the sample.

For inactivation of the samples I used DNA/RNA Shield Reagent which is a DNA and RNA stabilization solution for nucleic acids in any biological sample. This DNA and RNA stabilization solution preserves the genetic integrity and expression profiles of samples at ambient temperatures and completely inactivates infectious agents (viruses, bacteria, fungi, & parasites). The unique DNA and RNA stabilization solution also prevents degradation from freeze-thaw cycling and unexpected freezer failures (figure 5).

Sample sub-selection: we selected 70 samples (table 1) from the total of 269 transported to the USA, to conduct the analyses for my master's thesis.

Figure 4. Inactivation of samples in the laboratory.

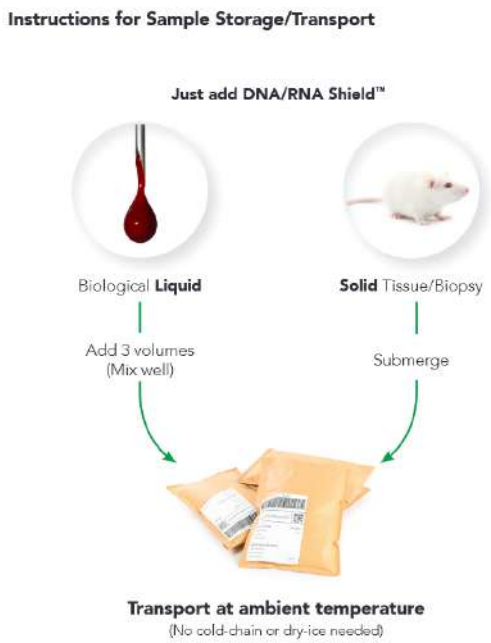


Figure 5. Use of the DNA/RNA Shield Reagent with inactivated infectious agents (viruses, bacteria, fungi, & parasites). This method is used for sample transportation and/or storage. In our case it was used to comply with CDC requirements for sample storage and analyses at the Smithsonian Institution. Figure from www.zymoresearch.com.

Table 1. Samples selected for the lab analyses for my master's thesis.

Previous species designation	Present (recent) species designation	Sample origin	# individuals sampled	Type of sample	# samples inactivated at MSC*	# samples to sequence
Cebus apella margaritae	*Sapajus apella margaritae*	Isla de Margarita (Margarita capuchin pets) and Venezuelan zoos (captive, unknown origin)	14	Modern (14 blood; 10 also have DNA already extracted)	4	14
Cebus apella margaritae	*Sapajus apella margaritae*	Isla de Margarita	18	Museum (8 skin, 17 skulls, some of same individual)	0	25
Cebus apella	*Sapajus apella apella*	Amazonas (museum) and Venezuelan zoos (captive)	5	Museum (1) /Blood (4; all have DNA extracted)	0	5
Cebus apella apella	*Sapajus apella apella*	Amazonas	2	Museum (1 skull, 2 skins)	0	3
Cebus olivaceus brunneus	*Cebus brunneus*	Miranda	17	Museum (2 skulls)	0	8
Cebus albifrons leucocephalus	*Cebus leucocephalus*	2 Táchira y 1 Zulia	3	Museum (3 skins)	0	3
Cebus albifrons unicolor	*Cebus albifrons*	Amazonas	3	Museum (3 skulls)	0	3
Cebus olivaceus	*Cebus olivaceus*	Bolívar y Monagas	10	Museum (2 skins)	0	2
Cebus olivaceus nigrivittatus	*Cebus olivaceus*	Amazonas	2	Museum (2 skulls)	0	2
Cebus olivaceus olivaceus	*Cebus olivaceus*	2 Bolívar y 2 Delta Amacuro	4	Museum (2 skulls, 2 skins)	0	4
Cebus olivaceus? o hibrido	*Cebus olivaceus? o hibrido*	Isla de Margarita	1	Captive (1 bood, 1 ADN)	0	1
				TOTAL	4	70

MSC: Museum Support Center.

From the 70 samples selected (table 1), I have already extracted and purified DNA from all modern samples in the Center for Conservation Genomics (CCG) at National Zoological Park (NZP) (20 blood samples). During DNA extraction I was not able to obtain enough DNA from 6 of the samples. It is not clear if this low yield is due to the initial conditions of the samples or to the interaction with the inactivator mentioned before, or to the transportation and storage condition before the inactivator was added. This problem was reported to the commercial house (Zymo) and they recommended another kit to increase the yield in the DNA extraction of the problem samples. This kit did not help to increase DNA yield. We are currently working on other alternatives to achieve the concentration required for those six samples. Once the DNA is extracted, the next step is the preparation of genomic libraries, then we will sequence them.

Other activities conducted during this period:

- Review and update of protocols and literature
- Purchase of kits for laboratory work.
- Visa renewal paperwork and meetings for the second semester
- Preparation and submission of funding proposals
- Meeting with Dr. Jessica Lynch Alfaro who is an Associate Professor in Institute for Society and Genetics (ISG). Her research focuses most strongly on understanding the diversity within capuchin monkeys (*Sapajus* and *Cebus*) and incorporates phylogenomic and biogeographic analyses. The purpose of this communication was to discuss our methods to make sure that my results can be compared with the ones that she and her team have reported after their continuous and invaluable research on capuchin monkeys. In this regard, we wanted to make sure that I use the right markers for my lab work and to continue our research in collaboration.

- As an added value to my experience, we have weekly laboratory meetings with the intention of overcoming any obstacles that arise in the development of each student's project. On February 4th I presented and received great feedback on the progress of my project. I was also able to participate in two courses: "Workshop introduction to SI/HPC (Hydra)" and the "Crash Course! Grant Writing, Funding Sources, & Budgeting".

- To continue our involvement in Venezuelan conservation activities, on January 24th this year we, as the Margarita Capuchin Project team, participated in the First Congress of Protected Areas of the Nueva Esparta State. This conference was organized by the National Parks Institute (Inparques) in the city of Porlamar on Margarita Island. During this event, we presented research, education and actions for the conservation of this capuchin monkey and its mountainous and fragmented habitat, to achieve an ecological balance for its wildlife and human population. Our presentation was "Margarita Capuchin Project: a long-term vision for the conservation of the Margarita capuchin monkey and its habitat".

Note about challenges during sample transportation from Venezuela to the Smithsonian Institute.

The process of bringing the genetic samples from Venezuela resulted longer and more complicated than expected. The safety requirement for primate samples transportation are very strict. It was required that the Smithsonian Institution (SI) obtain Biosafety Level # 2 (BSL2) certification before it could receive the samples. Once the SI received this accreditation and all required paperwork was in order, we shipped the samples from Venezuela on schedule, but they were held by US authorities for longer than anticipated while FedEx helped to rectify the errors made by customs with paperwork. Following sample arrival, we confronted additional delays due to additional requirements imposed by the CDC, as well as the medical monitoring I was required to undergo to work safely with these samples.

IMPLICATIONS FOR CONSERVATION

The Margarita Capuchin Project, of which my master's thesis is part of, is a collaborative project with the main goal of the conservation of the Margarita capuchin and its habitat. To achieve the long-term conservation of the Margarita capuchin monkey, it is necessary to attack its various threats: increase and reconnect their habitat, eliminate their illegal hunting as a crop pest and for the pet trade, as well as the traffic of monkeys

from the mainland, define conservation units, and understand potential problems of hybridization and inbreeding. The results from the first phases of the conservation genetic project in particular lays the genetic foundation for the conservation of the Margarita capuchin via defining conservation units and will have an impact on the management of this endemic capuchin on Margarita Island. In particular, if we find a specific status is more appropriate for this taxon, it will have an impact for conservation strategies regarding building a comprehensive recovery plan also addressing the problems of illegal wildlife trade, habitat loss and fragmentation, human-wildlife conflict, building on solutions discovered by others working in capuchin conservation across the region.

Finally, we also expect to be able to develop a rich array of SNP markers which will be useful in future phases of the project when we plan to study individual movements, inbreeding, and hybridization. The relevance of these potential results is both basic and applied; they will advance our understanding of phylogeographic processes in neotropical primates.

ACKNOWLEDGMENTS

Thanks to the support of IPS among other organizations we have been able to advance the proposed objectives to complete the genomic analyzes as part of my master's thesis project and will produce key information to guide effective conservation efforts in the framework of the Margarita Capuchin Project. The support from IPS Conservation Grant in particular allowed me to travel from Venezuela to the US and to buy some of the essential kits needed to start my laboratory work. Thanks also to Instituto Venezolano de Investigaciones Científicas (IVIC), Smithsonian Institution (SI), The American Primatological Society (ASP), The Society of Systematic Biologists (SSB), The National Geographic Society (NG), Crowdfunding support and FedEx for taking good care of the samples during their transportation.

REFERENCES

Ceballos-Mago, N., E. Gamero, K. M. Rodríguez-Clark, R. Martínez, M. Pernía, M. (*in press*). Métodos de campo para la recolección de muestras genéticas no-invasivas de mono de Margarita, *Sapajus apella margaritae* (Field methods to collect non-invasive genetic samples of the Margarita capuchin monkey, *Sapajus apella margaritae*). In: B. Urbani, N. Ceballos-Mago (Eds.). La Primatología en Venezuela. Caracas: ACFIMAN (Academia de Ciencias Físicas, Matemáticas y Naturales) / Editorial Equinoccio (Universidad Simón Bolívar).

Ceballos, N. (2015). *Sapajus apella ssp. margaritae*. The IUCN Red List of Threatened Species 2015: e.T4079A70611848. http://dx.doi.org/10.2305/IUCN.UK.2015-1.RLTS.T4079A70611848.en. (viewed Feb 2, 2018).

Ceballos-Mago, N. y Chivers, D. (2013). "A Critically-Endangered capuchin (*Sapajus apella margaritae*) living in mountain forest fragments on Isla de Margarita, Venezuela". En: *Primates in Fragments: Complexity and Resilience* (Marsh, L.K. y Chapman, C.A. eds): 183-195. Springer Press. New York.

Ceballos-Mago, N. (2010). *The Margarita capuchin Cebus apella margaritae: a Critically-Endangered monkey in a fragmented habitat on Isla de Margarita, Venezuela*. Tesis de Doctorado. University of Cambridge, Cambridge, UK. 164 pp.

Ceballos-Mago, N., González, C. E y Chivers, D. (2010). "Impact of the pet trade on the Margarita capuchin monkey *Cebus apella margaritae". Endangered Species Research*, 12:57–68

Ceballos-Mago, N., Chivers, D. (2010) Local knowledge and perceptions of pet primates and wild Margarita capuchins on Isla de Margarita and Isla de Coche in Venezuela. *Endangered Species Research* 12: 57-68.

Ceballos-Mago, N., Muller, D., Dumont, D. (2008) Mono de Margarita (Documentary). Margarita capuchin Project. https://margaritacapuchinmonkey.wordpress.com/documentary-documental/.

Cummings, N., King, R., Rickers, A., Kaspi, A., Lunke, S., Haviv, I., and Jowett, J. (2010) Combining target enrichment with barcode multiplexing for high throughput SNP discovery. *BMC Genomics*, 11: 641.

Kenny, E.M., Cormican, P., Gilks, W.P., Gates, A.S., O'Dushlaine, C.T., Pinto, C., Corvin, A.P., Gill, M., and Morris, D.W. (2010) Multiplex target enrichment using DNA indexing for ultra-high throughput SNP detection. *DNA Research*, 18: 31–38.

Faircloth BC (2015) PHYLUCE is a software package for the analysis of conserved genomic loci. Bioinformatics, doi:10.1093/bioinformatics/btv646.

Faircloth, B.C., McCormack, J.E., Crawford, N.G., Harvey, M.G., Brumfield, R.T., and Glenn, T.C. (2012) Ultraconserved Elements Anchor Thousands of Genetic Markers for Target Enrichment Spanning Multiple Evolutionary Timescales. *Systematic Biology*. 2012 Oct 1; 61(5):717-26.
Gamero García, E. E., K. M. Rodríguez-Clark, N. Ceballos-Mago, R. Martínez, M. Pernía (*in press*). Protocolo de descontaminación en estudios genéticos de muestras no invasivas de *Sapajus apella margaritae (*Decontamination protocol in genetic studies of non-invasive samples of *Sapajus apella margaritae)*. B. Urbani, N. Ceballos-Mago (Eds.). La Primatología en Venezuela. Caracas: ACFIMAN (Academia de Ciencias Físicas, Matemáticas y Naturales) / Editorial Equinoccio (Universidad Simón Bolívar).
Kenny, E. M., Cormican, P., Gilks, W.P., Gates, A.S., O'Dushlaine, C.T., Pinto, C., Corvin, A.P., Gill, M., and Morris, D.W. (2010) Multiplex target enrichment using DNA indexing for ultra-high throughput SNP detection. *DNA Research*, 18: 31–38.
Lim, H. C. and Braun, M. J. (2016), High-throughput SNP genotyping of historical and modern samples of five bird species via sequence capture of ultraconserved elements. Mol. Ecol. Resour, 16: 1204–1223. doi:10.1111/1755-0998.12568
Lynch Alfaro J. W., Boubli J. P., Olson L. E., Fiore A. D., Wilson B, Gutiérrez-Espeleta GA, Chiou KL, Schulte M., Neitzel S., Ross V., Schwochow D., Nguyen MTT, Farias I., Janson CH & M. E. Alfaro (2012). Explosive Pleistocene range expansion leads to widespread Amazonian sympatry between robust and gracile capuchin monkeys. *Journal of Biogeography* 39:272–288.
Lima Marcela G. M., Janet C. Buckner, Jose de Sousa e Silva Junior, Alexandre Aleixo, Amely B. Martins, Jean P. Boubli, Andres Link, Izeni P. Farias, Maria Nazareth da Silva, Fabio RÖhe, Helder Queiroz, Kenneth L. Chiou, Anthony Di Fiore, Michael E. Alfaro and Jessica W. (2017). Capuchin monkey biogeography: understanding Sapajus Pleistocene range expansion and the current sympatry between *Cebus* and *Sapajus*. *Journal of Biogeography* 44:810–820.
Mamanova, L., Coffey, A.J., Scott, C.E., Kozarewa, I., Turner, E.H., Kumar, A., Howard, E., Shendure J., and Turner, D. J. (2010) Target-enrichment strategies for next-generation sequencing. *Nature Methods,* 7:111-118.
Márquez, L. & Sanz, V. (1991) *Evaluación de la presencia de Cebus apella margaritae (Hollister, 1914) en la Isla de Margarita*. Trabajo de grado de Licenciatura, Universidad Central de Venezuela, Caracas, Venezuela.
Martínez, R. A., Moscarella, R., Aguilera, M. & Márquez, E. (2000) Update on the status of the Margarita Island Capuchin, *Cebus apella margaritae*. *Neotropical Primates,* 8, 34-35.
Ottocento R, Marquez L, Bodini R, Cordero R (1989) On the presence of *Cebus apella margaritae* on Margarita Island, Northeastern Venezuela. Primate Conserv 10:19-21.
Moncada R (2007) Evaluación del impacto generado por la fauna silvestre sobre los cultivos en conucos en el P. N. Cerro El Copey, Isla de Margarita (Edo. Nueva Esparta). Trabajo Especial de Grado, Universidad Central de Venezuela, Caracas.
Rodríguez-Clark, K. M., J. E. Maldonado, D. Ascanio, E. Gamero, L. Ovalle, J. Pérez-Emán, M. J. Braun (2011) Using genetics to understand and conserve the Red Siskin (*Carduelis cucullata*). *Journal of the National Finch and Softbill Society* 28 (4): 25-30.
Rohlf, F. J. (2000). NTSYSpc numerical taxonomy and multivariate analysis system, version 2.2. Exeter Software, Setauket, NY.
Sanz, V. & Márquez, L. (1994) Conservación del mono capuchino de Margarita (*Cebus apella margaritae*) en la Isla de Margarita, Venezuela. *Neotropical Primates,* 2, 5-8
Silva Jr., J. de S. 2001. Especiação nos macacos-prego e caiararas, gênero *Cebus* Erxleben, 1777 (Primates, Cebidae). Doctoral Thesis, Universidade Federal do Rio de Janeiro.

Report from IPS Lawrence Jacobsen Development Grant Recipient
Rahayu Oktaviani

IPS Lawrence Jacobsen Development Grant Report
Communicating Research Findings into Classroom to Raise Awareness on

Endangered Javan Gibbon (*Hylobates moloch*)

Rahayu Oktaviani
Javan Gibbon Research and Conservation Project Email: rahayu_oktaviani@yahoo.com

We have been focused on scientific research about behavior and ecology of Javan Gibbon since our organization was founded as part of the conservation effort to save this species in one of the remaining habitats in Citalahab forest, Gunung Halimun Salak National Park. However, we realized there is a gap between research activity and conservation practice especially to approach local community and young generation. It is crucial to communicating the result of research in a simple and easy way to engage the public, so that we can develop a positive attitude towards Javan gibbon, raise the awareness through knowledge and gather more support, especially from the young generation.

Introduction

In order to promote the conservation of Javan Gibbon, we developed lesson material based on our research activity in form of an activity book about Javan Gibbon' behavior and ecology and integrated this activity with our conservation education program. We expected the knowledge obtained from this activity may increase children's awareness and appreciation for the local treasure of endemic species that exists nowhere else on the planet.

Originally, we aimed two primary schools as target for this activity, however after a discussion with Gunung Halimun Salak National Park (GHSNP) officials; they expected us to reach another school in the boundary of NP and our activity was ended up at three primary schools as below:

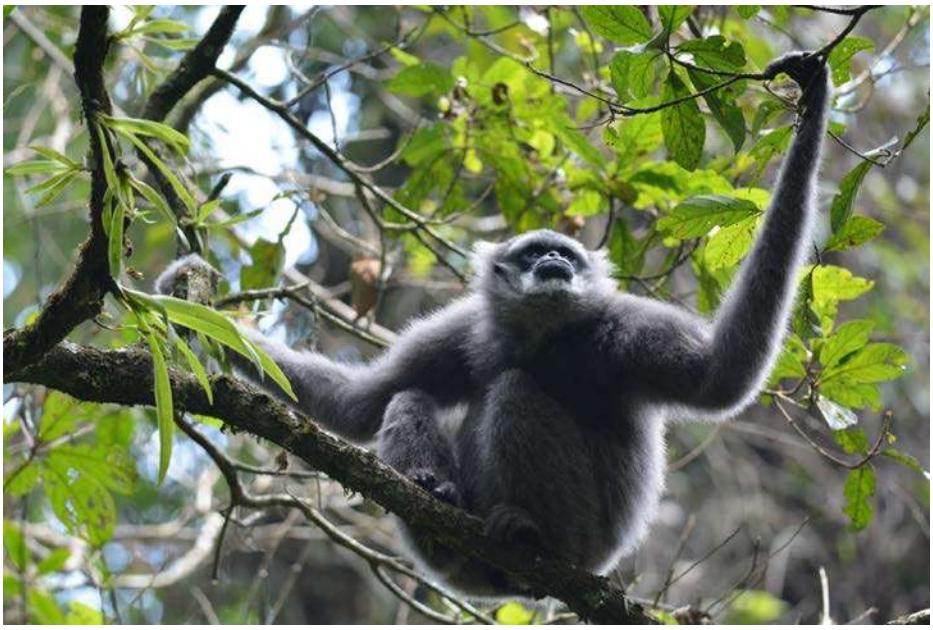
Project activities

Malasari 3 and Rimba Kencana has been part of our regular conservation education program that we initiated since 2018. The program is running two times a month for each school and we have integrated our lesson plan in local school system. Developed

an activity book supported by Lawrence Jacobsen Education Grant was a good way to engage school children and increase knowledge that provide information about our research activity and the behavior and ecology of Javan gibbon, threats and the solution.

Inspired by two individuals of Javan gibbon that we have monitored regularly, we named the book after them: Adventure with Asri and Kimkim. The activity book is consists of interactive and informative lesson to provide knowledge in a fun and engaging way for children. Completed with large illustration, we covered topic such as (1) similarity between human and javan gibbon, (2) daily behavior of javan gibbon, (3) type of equipment brings by researcher in the field, (4) canopy

structure and wildlife, (5) coloring page, (6) crossword puzzle and ended with (7) conservation message about what we can do to conserve this species. All of the topics are based on our research activity in the field.



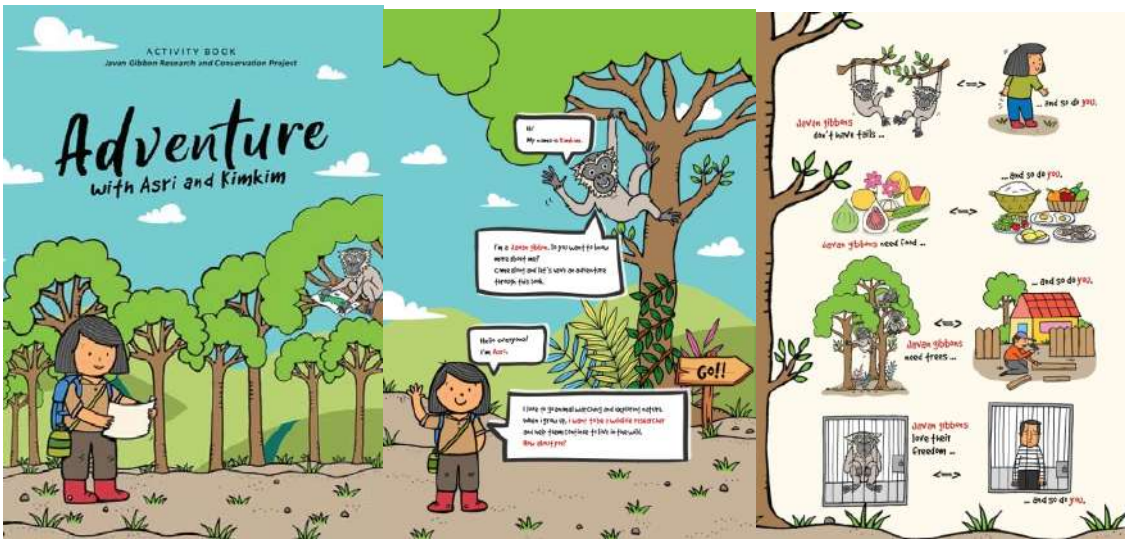
Picture 1. Kimkim, one of the individuals from Group B that we monitor regularly and inspiration of the story.

The activity was running from August to September 2019 that divided into two meeting per school, each meeting lasted 90 minutes and we targeted fifth to sixth graders with age rage from 10 to 13 years old to be involved in this activity.

The first meeting was covered by pre test to gather their knowledge and perception concerning Javan gibbon and its habitat, continued by presentation that explained about Javan gibbon's behavior, threats and its role in the ecosystem. One of our local field assistant was joined the activity and led the presentation based on his experience in the field, added with six volunteers from IPB University and State University of Jakarta and one NP official. The second meeting was addressed to complete the knowledge about Javan gibbon by filling the activity book and continued with post test. All of the students presented for both meetings and the children showed high interest and excitement to the activity book and actively take part.

We printed 170 copies (105 copies for school children in targeted schools, 25 copies to NP, 25 copies for teachers and 15 copies was handed out to the kids nearby our project site who didn't attend the education program) and we published the book in two languages: Indonesian and English. The activity book can be access for public and free to download through this link: **http://bit.ly/JavanGibbon_ActBook.** by published it in two languages and giving free access for everyone, we expected to reach more people and allows for increased dissemination of information about conservation of Javan gibbon for audiences in Indonesia and foreign countries. On the first open access, it was downloaded for more than 187 times.

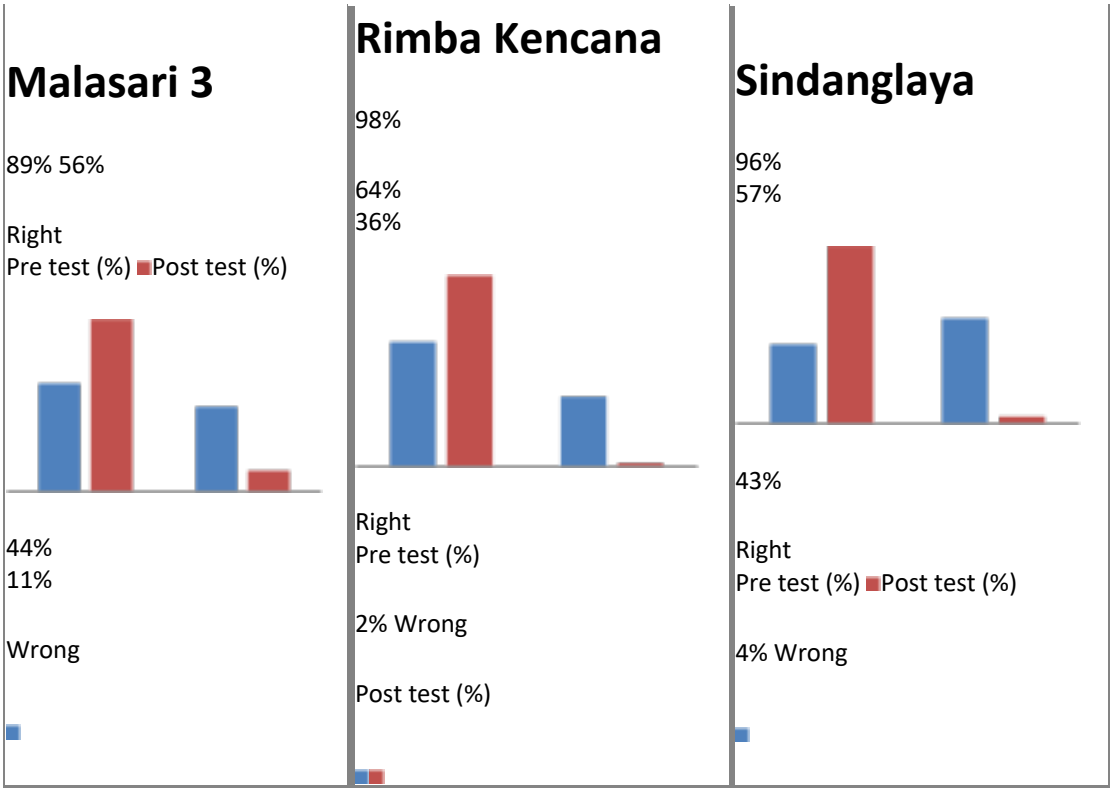
Picture 2. Some contents in activity book "Adventure with Asri and Kimkim



Picture 3. Children in three primary schools filling activity books together with our team

Pre and post program survey assessment was used to measure the participant's change in knowledge and perspective concerning Javan gibbon conservation. We saw positive changes to participant knowledge and perspective regarding Javan gibbon at all three school targets. Children in villages who have early access to conservation education program (Malasari 3 and Rimba Kencana) had higher knowledge since the beginning of activity and more positive perspective than children in the villages not exposed to the conservation education program (Sindanglaya). We realized it is necessary to continue the program in a long term and expand more school target to give positive impact to young generation.

Evaluation



We also conducted the evaluation for the content of activity that distributed to adults (teachers, parents and respondents who downloaded the book through the link we given). 83% of the respondents were very satisfied with the content of the activity book and 17% of the respondents were satisfied. All of respondents stated it added their knowledge about Javan gibbon as well as their children in a fun way. 30% of the respondents' favorite the content about similarity between human and gibbon while 20% chose information about type of gibbons' behavior, coloring page was chosen by 15% of respondents and other 15% chose cross word puzzles and connecting dots. We received several feedbacks regarding the activity book, such as: (1) To complete the book with answer page and (2) Make it in series and publish it regularly.

Figure 1. Participants scored higher on knowledge and perspective on the post-test than on the pre-test.

We believe local involvement may improve conservation impacts, therefore we extent our reach to community members in our project site. The integration of people with their natural surroundings is a key to raise the awareness of the importance attributed to nature, motivating protection attitudes and behaviors. Our project site is located in the middle of Citalahab Village in GHSNP that is known to be ecotourism destinations that managed locally. Some local community members are working as ecotourism service provider as home stay owners and local guide to bring domestic and foreign visitors to explore the forest where Javan Gibbon's lives.

Community Conservation Initiative

Therefore, it is important to increase their capacity and skill while inserting message to conserve the remaining forest as habitat for Javan gibbon and other wildlife so they can

take a positive role as conservation agent and distribute better information to raise awareness for the visitors. The main goal is we expect to establish a better ecotourism site that considers the health of the ecosystem and primate welfare at Gunung Halimun Salak National Park and this initiative is our first step to develop partnership and collaborate with local community.

We organized the training that took a place in one of the home stay belongs to community ecotourism member and collaborated with Aksioma Institite - a local organization which has experience facilitating community development. We developed two days training session that covered lessons and practices in interactive format with topic and basic knowledge related with ecotourism and conservation, interpretation, communication skill and practice to identify and mapping natural and cultural resources around the village and how to conserve the community resources. All of the lesson and practice needed active participation from participants to communicate and share knowledge to each other. In total, 25 community members were joining (8 females, 17 males) during the two days course.

Picture 4. The training activity to mapping and identify natural cultural resources in the village to promote ecotourism activities.

With support from other organization (Biodiversity Foundation – South Korea), we set up an information board in the village that share the information about Javan gibbon based on the result of our long term monitoring such as: type of foods, sleeping trees and home range, and to strengthen our relationship with local community. We used this opportunity to insert the conservation message during training session while the information board also can be used by local community members to share information about an endemic species and reach domestic and foreign visitors. The community

members were happy to have this information board set up in the village and to show their pride to an endemic species living in the forest nearby their village.

Picture 5. The information board about Javan Gibbon based on our research activity set up in the village

The course was running successfully and finished on a positive note. All participants were stimulated by the training in terms of the knowledge gained. They stated that this type of training is rarely organized before while it is necessary to improve their knowledge, skill and competency to locally manage ecotourism site. Further improvement and follow up is needed, and we are hoping to continue this activity as part of our program in the near future focus on capacity building in bird and primate watching and ecotourism management.

We are grateful to the Lawrence Jacobsen Development Grant that allowed us to conducted our first capacity building with local community, this is our first step to strengthen our relationship with community members as part of our efforts to share and distribute information about our activity in research and conservation activity for Javan gibbon and we will insert it as one of our main program.

The IPS logo has been used on the activity book, banner and certificate that handed out for community members in capacity building activity. We also acknowledged IPS on the JGRCP's social media (@owahalimun) when we posted the conservation education and capacity building activity.

Report from Captive Care and Breeding Grant Recipient
PASA

February 9, 2020

To the IPS Captive Care and Breeding Committee:

On behalf of Lilongwe Wildlife Trust and the PASA family, I would like to express our gratitude for the Captive Care Grant of US$1,500 given to the Pan African Sanctuary Alliance for our Primate Care Training program, which was approved in May 2019. I am pleased to send this final report about the use of the grant. The Primate Care Training program enables primate rescue and rehabilitation centers across Africa to give the best possible care to thousands of great apes and monkeys who have been rescued from the illegal wildlife trade, the bushmeat crisis, and other causes of cruelty which threaten their existence.

PASA's 23 member wildlife centers across Africa are leaders in the rescue, rehabilitation, lifetime care, and conservation of primates. They rescue great apes and monkeys from the bushmeat trade and illegal wildlife trade, in addition to fighting the root causes of the threats to African primates, in order to protect primates and their habitat. By giving long-term care to primates who were confiscated from the illegal wildlife trade, they make it possible for law enforcement agencies to arrest and prosecute traffickers. Sanctuary care is an integral component of their roles in primate conservation. Together, they care for more than 3,000 primates who were orphaned by hunters or were rescued from wildlife smugglers and illegal pet owners. PASA member wildlife centers provide these animals with excellent veterinary treatment, dedicated care, and the opportunity to join natural social groups in large forest enclosures. The centers are committed to giving these primates the quality of life they need.

PASA's Primate Care Training program

Although the wildlife centers are dedicated to giving animals the high- quality care, they are often restricted by the limited resources available to them. Many of these sanctuaries are the only wildlife care organizations in their countries and do not have the funding or connections needed to give their staff advanced training by skilled instructors. However, professional training is essential for the welfare of the animals, most of whom require specialized treatment to recover from the physical and psychological pain they have experienced.

PASA's Primate Care Training Program, which is possible because of partners and supporters including the IPS Captive Care and Breeding Committee, addresses this need by providing the advanced knowledge necessary to improve the quality of life of great apes and monkeys in PASA member wildlife centers.

Thanks to your ongoing support, we send highly experienced instructors to the sanctuaries to provide customized training for all the animal care staff. This has produced significant long-term improvements in the welfare of thousands of rescued primates.

Training at Lilongwe Wildlife Centre

Lilongwe Wildlife Centre in Malawi rescues, rehabilitates, and releases diverse primate species including olive baboons (Papio anubis), yellow baboons (Papio cynocephalus), blue monkeys (Cercopithecus mitis), vervet monkeys (Chlorocebus pygerythrus), and greater galagos (Otolemur crassicaudatus), as well as other species ranging from lions to crocodiles. Because they have diverse species of wildlife, their needs for training are different from most PASA members, and they require training that is specialized to their context.

As the first step in planning the Primate Care Training program at Lilongwe, PASA staff talked with the sanctuary manager and general manager to determine the topics that their staff should be trained in. They identified the following priority areas:

• Understanding primate behavior and social group composition

• Cleaning, hygiene & nutrition, with a focus on preventing zoonotic diseases

• Managing animals with difficult behavior

Lilongwe staff during a training session with flashcards.

• Identifying when an animal may have a health problem and should to be observed or examined by a veterinarian

• Assisting veterinarians (particularly because of the lack of vet techs/nurses)

We then identified an instructor whose expertise matches these topics. Jennifer Feuerstein has 25 of years of experience in animal care, behavior, and health, with a focus on primates. She was the director of a sanctuary with 325 rescued chimpanzees, where she was employed for 12 years and supervised 45 staff, and has abundant experience training primate care staff.

Jen Feuerstein and the sanctuary management discussed the priority topics and developed learning objectives based on each and developed a plan for the training. Jen then went to Lilongwe

Wildlife Centre from 15 to 31 March 2019. She initially assessed the sanctuary's needs, met with the sanctuary manager, and updated the training plan accordingly. Subsequently, she conducted interactive training sessions in order to achieve the objectives, while gaining the trust of the staff.

Jen reported that highlights of her time with the Lilongwe staff included major improvements in the sanctuary's nutrition management and hygiene practices. Working with the staff, she was able to improve their food preparation procedures, develop checklists for cleaning the kitchen and indoor enclosures, and formalize a schedule of staff assignments for these tasks.

Primate behavior and enrichment for the indoor enclosures were other areas of focused training. Jen said the staff were eager to learn about these topics and excited to implement her recommendations. At the end of the program, she was able to leave the staff with several books, flashcards, and other printed materials that they can continue to reference while performing their daily tasks.

Monitoring and evaluation

The Pan African Sanctuary Alliance evaluates the effectiveness of the Primate Care Training program based on structured evaluation forms as well as evidence that the staff valued the training, learned and remembered information presented in the training, and made long-term improvements in their work performance that benefit the wellbeing of the animals.

Lilongwe staff at their graduation ceremony.

After the training was completed, the sanctuary manager and general manager of Lilongwe Wildlife Centre informed PASA that the staff showed significant improvements in job performance, heightened enthusiasm for their work, and a much deeper understanding and appreciation of primate behavior. In a follow-up interview six months later, they reported that this has continued, indicating long-term retention of the lessons.

Participants in the training completed evaluation forms containing the following questions, followed by their average answers. Answer choices ranged from 5 (strongly agree) to 1 (strongly disagree).

In the training, I gained knowledge that improves how I do my job 5.0 It's easy to apply what I learned to my work 4.0 The training focused on the topics we most need to improve on 5.0 The instructor was knowledgeable about the topics in the training 5.0 The language and communication were clear and easy to follow 4.6 There was a good balance between different styles of training 4.9

Conclusion

On behalf of PASA, our 23 member rescue centers, and the thousands of great apes and monkeys in their care, I would like to thank you again for your important support. The IPS Captive Care and Breeding Committee made it possible to start this successful program in 2017 and expand it in 2018 and 2019. Furthermore, you enabled PASA to improve the lives of thousands of primates who were confiscated from the illegal wildlife trade and rehabilitated at PASA member wildlife centers.

Please contact me if you would like more information about the Primate Care Training Program and our use of the grant from the IPS Captive Care and Breeding Committee.

All best wishes,

Gregg Tully
Executive Director
Pan African Sanctuary Alliance

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