RUFFORD SMALL GRANT CONFERENCE AT MESOAMERICA

Science for the Conservation of the Mesoamerican Biological Corridor

Colon Island, Bocas del Toro, Panama

January 17-20, 2020

REPORT

To:

Josh Cole
Rufford Small Grants Director
The Rufford Small Grants Foundation

Presented by:

Pedro G. Méndez-Carvajal
For-Conservation Foundation of Panamanian Primates (FCPP)-Director

Panama, 2020

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Organizing committee

Pedro G. Méndez-Carvajal

For-Conservation Foundation of Panamanian Primates (FCPP)-Director

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Chemical Ecology Project of the Panamanian Primates-FCPP, Director

For-Conservation Foundation of Panamanian Primates (FCPP)

Organizing institution

FCPP

FCPP

Proyecto de Ecología Química
de los Primates de Panamá

With the support of

REPÚBLICA DE PANAMÁ
GOBIERNO NACIONAL

MINISTERIO DE
AMBIENTE

Financing of

The Rufford Foundation
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Abstract

The first Rufford conference in Panama, with the motto, Science for the Conservation of the Mesoamerican Biological Corridor, given in Colon Island, Bocas del Toro, Panama, January 17-20, 2020, had the main objective of exchanging knowledge and experiences among researchers from the Mesoamerican Region awarded by the Rufford Foundation. The invitation was initially extended to 81 researchers from NGOs, Foundation, Universities, awarded by Rufford for the support of research only in Mesoamerica. The first written and digital announcement was sent on June 22, 2019, to the emails issued by the Rufford Foundation website, each of these researchers was asked to promote this digital announcement in their country, in the same way the announcement It was promoted by the web pages of the For-Conservation Foundation of Panamanian Primates (FCPP) and collaborators. A positive response was obtained to the participation of this first Rufford conference in Panama, finally with the financing of the Rufford Foundation the participation of researchers, conservationists and professors, both national and international, was achieved with topics included studies of bat conservation (genetics and conservation), cetacean conservation (distribution, diversity, environmental education and more), ethnobotany and primatology (what Rufford has represented for distribution, diversity, environmental education and more studies for the FCPP). Panamanian researchers with feline conservation and chemical ecology of *Alouatta coibensis trabeata* were involved. Also present were the Regional director in Bocas del Toro of the Ministry of Environment and directors of Protected Areas in Western Panama. Within this conference the use of the Orion Camera System was taught to the participants and guests, which is a sample of how the Rufford funding has helped and can help to create methods for scientific research and promotion of the conservation of the biodiversity with them. In the same way, with the support of the collaborators of the Ministry of Environment of the Isla Colón, the participants were taken to know the Isla Bastimento Marine National Park, Callo Zaptillas. This first Rufford conference was held with great success in Panama, achieving the dissemination of both research and conservation works in Mesoamerica. Finally we are grateful to The Rufford Small Grants Foundation for all their support and funding, the development of these conferences promotes the development of more scientific research creating a basis for the promotion of conservation.

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1. INTRODUCTION

1.1. The Rufford Small Grants Foundation Initiative - Conference Rufford Small Grants.

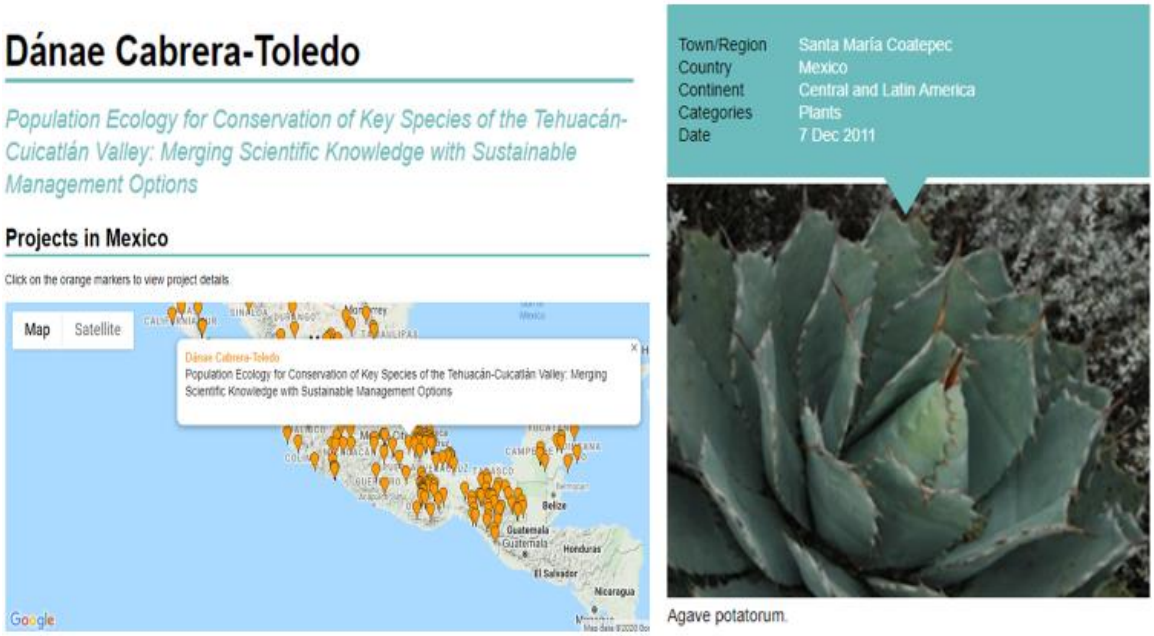
The Rufford Small Grants Foundation holds its first Rufford Small Grants conference in 2012 in Nepal, aiming to bring together Rufford Small Grants scholarship-winning researchers to discuss ideas, issues and create invaluable networking opportunities. Due to the initial success, around 49 conferences and more have been held in different parts of the world (Figure 1.1).

Figure 1.1 Some points where Rufford Small Grants Conferences have been held. (https://www.rufford.org/conferences).

1.2. Rufford Small Grant; some key spreaders for this Conference from Mesoamérica.

The Rufford Small Grants Conference brought together researchers, conservationists, and professors representing all of Mesoamerica. It was a point of dissemination of the work carried out by NGOs, Foundations and Universities (Figure 1.2), all thanks to the support of the Rufford scholarships. Topics included studies of bat conservation (genetics and conservation), cetacean conservation (contribution, diversity, environmental education, and more), ethnobotany, and primatology (what Rufford has recognized for distribution, diversity, environmental education, and more studies for the FCPP).

Figure 1.2. Some ONG,s, Foundations and Universities that represent the invited researchers from different countries of Mesoamerica at the Rufford Small Grant Conference.



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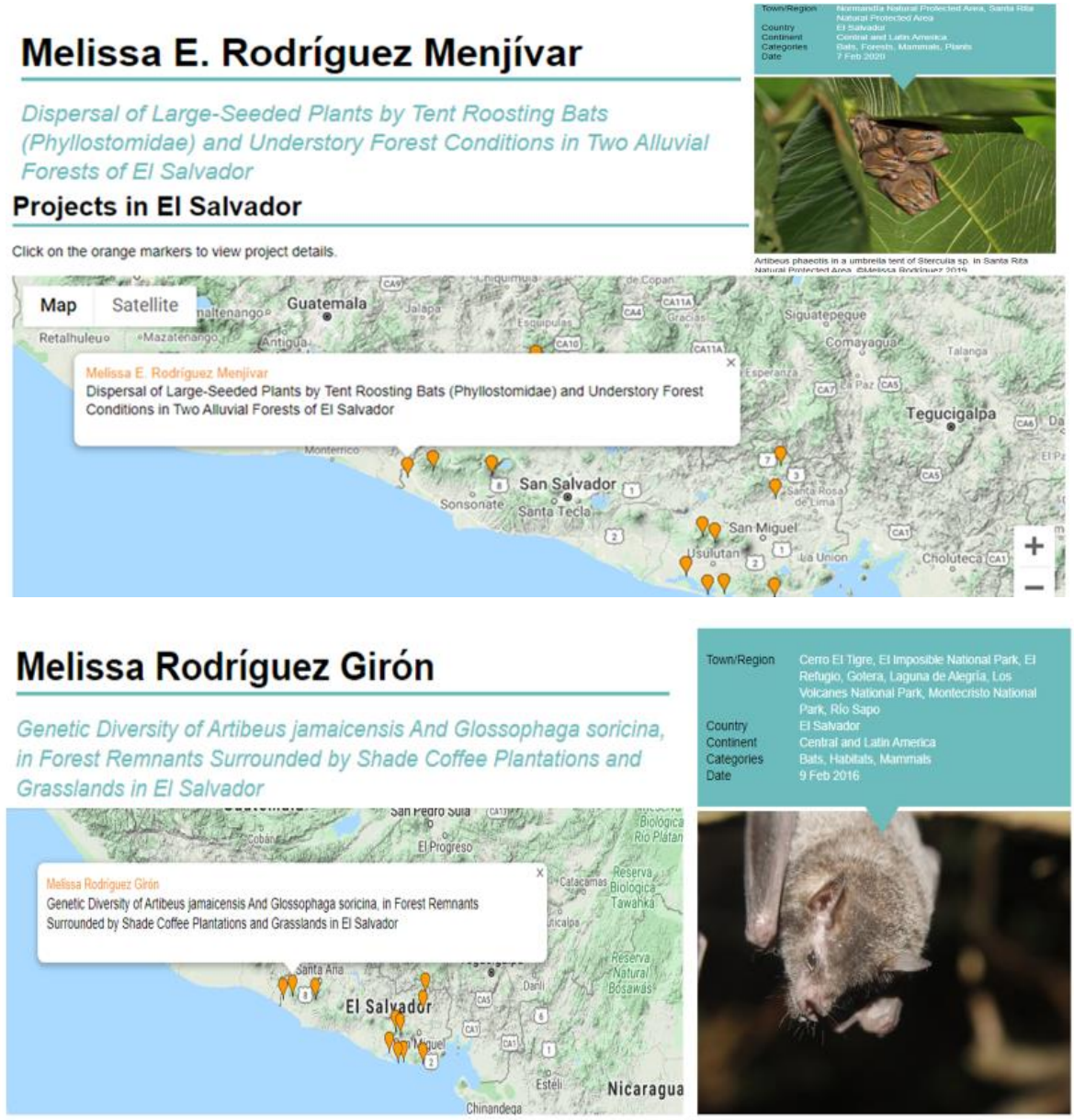

Figure 1.5. Melissa E. Rodríguez Menjívar, Salvador, Dispersion and genetics studies of bats in different parts of El Salvador.

Melissa E. Rodríguez has received two Rufford Small Grant, Genetic Diversity of Artibeus jamaicensis And Glossophaga soricina, in Forest Remnants Surrounded by Shade Coffee Plantations and Grasslands in El Salvador and Dispersal of Large-Seeded Plants by Tent Roosting Bats (Phyllostomidae) and Understory Forest Conditions in Two Alluvial Forests of El Salvador. https://www.rufford.org/projects/melissa_rodr%C3%ADguez_gir%C3%B3n

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Figure 1.7. Jimmy Barrantes-Madrigal, Costa Rica, Invasive frog species study.

Jimmy Barrantes-Madrigal has received two Rufford Small Grant, first Information Campaign for the Management of the Common Coqui Frog in Costa Rica, second is The Common Coqui Frog: A Latent Threat in Costa Rica. https://www.rufford.org/projects/jimy_barrantesmadrigal

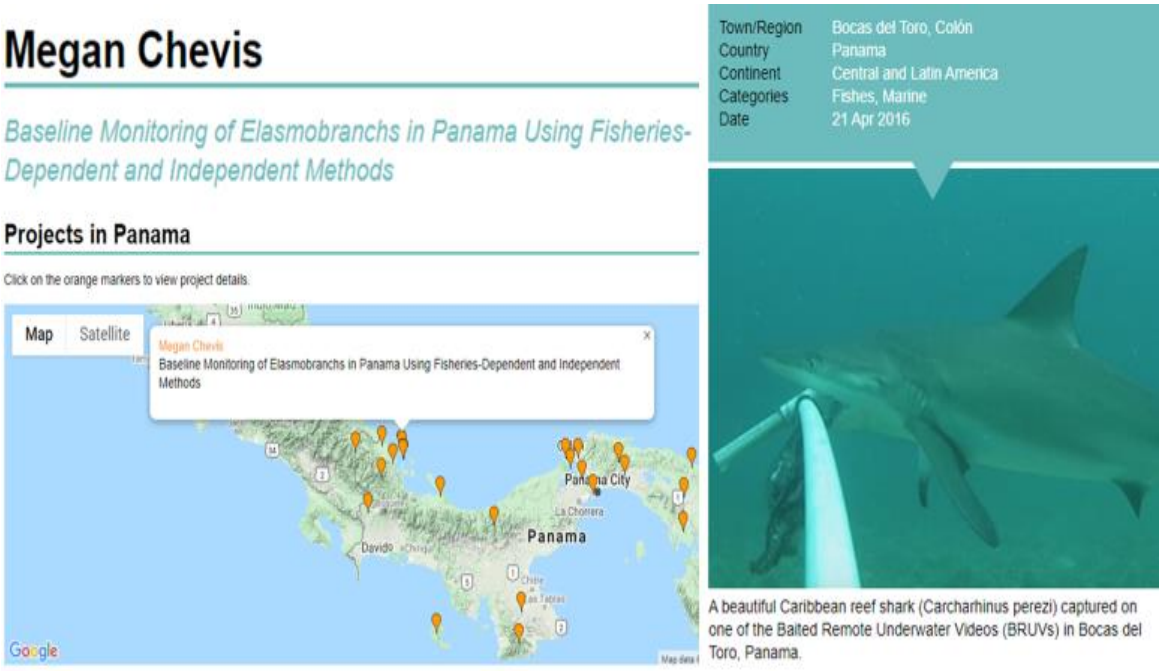

Figure 1.8. Megan Chevis, Panama, Monitoring of Elasmobranchs.

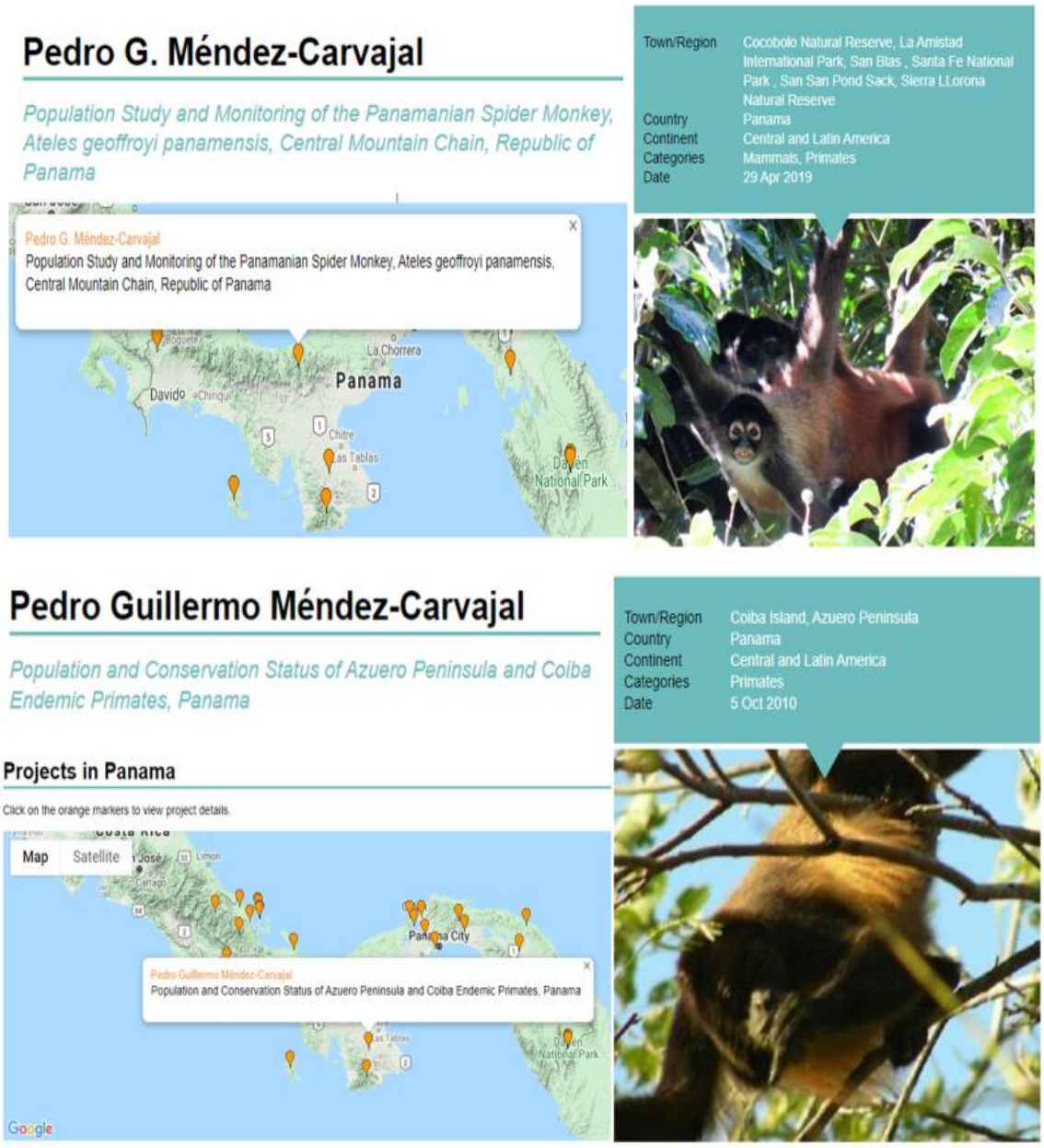

Figure 1.9. Pedro G. Méndez-Carvajal, Panama, distribution, population and conservation of the primates of Panama.

ISLA COLÓN, BOCAS DEL TORO, PANAMÁ

RUFFORD SMALL GRANT CONFERENCE AT MESOAMERICA

Science for the Conservation of the Mesoamerican Biological Corridor

January 17-20, 2020

REPÚBLICA DE PANAMÁ
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The Rufford Foundation

FCPP

1 st. CONFERENCE RUFFORD-PANAMA BOCAS DEL TORO-COLON ISLAND-REPUBLIC OF PANAMA (JANUARY 17 TO 20, 2020)

2. Program

Table 2.1. Program of presentations, activities and visits during the Rufford conference.

Hour	Key spreaders/Activity	Title	Site
19:30-20:30	Cena de Bienvenida		Barco Hundido
Sabado 18, enero 2020			
10:00-10:30	Pedro G. Méndez-Carvajal	What has Rufford been to the FCPP?	SELINAS CONFERENCE ROOM
Coffee Break 10:30-11:00			
11:00-12:00	Darlenys Villarreal	Bocas del Toro Regional Center-Ministry of Environment	SELINAS CONFERENCE ROOM
12:00-1:00	Dario Morales-Cortez	International Friendship Park (PILA)	SELINAS CONFERENCE ROOM
Lunch 13:00-14:00			
14:00-14:20	Megan Chevis	The diversity and distribution of marine megafauna in the Bocas del Toro Archipelago	SELINAS CONFERENCE ROOM
14:20-14:40	Danae Cabrera-Toledo	Population ecology for the conservation of key species in the Tehuacán-Cuicatlán Valley: integrating scientific knowledge with sustainable management options	SELINAS CONFERENCE ROOM
Coffee Break 14:40-15:10			
15:10-15:30	Jimmy Barrantes	Information campaign for the management of the common coquí frog (*Eleutherodactylus coqui*), a species introduced in Costa Rica	SELINAS CONFERENCE ROOM
15:30-16:30	Karol M. Gutiérrez-Pineda	Chemical ecology of Monos Aulladores	SELINAS CONFERENCE ROOM

16:30-17:30	Ricardo Moreno	Advances in Jaguar Research in Panama	SELINAS CONFERENCE ROOM
Coffee Break 17:30-18:00			
18:00-19:00	Mesa Redonda-Debate		SELINAS CONFERENCE ROOM
Domingo 19, enero 2020			
9:00-10:00	Yoaris Aparicio	Involve the Community in the Environmental Impact Assessment	SELINAS CONFERENCE ROOM
10:00-10:20	Joëlle De Weerddt	Presence of two populations of humpback whales (Megaptera novaeanlgiae) in Nicaragua - an economic implication	SELINAS CONFERENCE ROOM
Coffee Break 10:30-11:00			
11:00-11:20	Melissa Rodríguez	Diversity and genetic structure of *Glossophaga soricina* (Chiroptera: Phyllostomidae) in El Salvador	SELINAS CONFERENCE ROOM
11:20-11:40	Abigail Martínez	Assessment of the aerial insectivive bats assembly in oil palm plantations (*Elaeis guineensis*) in the Lacandona Jungle, Mexico	SELINAS CONFERENCE ROOM
CERTIFICATES CEREMONY **12:00-1:00** **SELINAS CONFERENCE ROOM**			
Entrega de obsequios 12:00-1:00 **SELINAS CONFERENCE ROOM**			
Lunch 1:00-3:00			
3:00-6:00	Pedro G. Méndez-Carvajal	Orion Camera System Method	Playa Estrella
Lunes 20, enero 2020			
9:00-3:00	Tomas Mora- Ministerio de Ambiente	Expedition	Parque Nacional Maritimo Isla Bastimento-Cayo Zapatilla
3:00-4:00 Closure			

3. Abstracts

ISLA COLÓN, BOCAS DEL TORO, PANAMÁ

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Science for the Conservation of the Mesoamerican Biological Corridor

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Rufford
Panamá 2020

ASSESSMENT OF THE AERIAL INSECTIVIVE BATS ASSEMBLY IN OIL PALM PLANTATIONS (*Elaeis guineensis*) IN THE LACANDONA JUNGLE, MEXICO

Abigail Martínez-Serena[1*], Ana Ibarra-Macías[1], Tania P. González-Terrazas[2], Kirsten Jung[2], Luis R-Víquez[2] and Rodrigo Medellín[1]

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[2]Institute of Evolutionary Ecology and Conservation Genomics, University of Ulm, Germany 89081
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ABSTRACT: The expansion of oil palm plantations (*Elaeis guineensis*) in tropical regions, as occurs in different countries of Latin America, has caused a great loss of habitat and biodiversity. In Mexico, the cultivation of this palm continues to modify tropical forest areas for agricultural use. The evaluation of the effect that these plantations have on aerial insectivorous bats (MIA's) is essential, given the role of this group as indicators of habitat disturbance. This study compared the species richness, fairness, composition and activity levels of the MIA's assembly between oil palm plantations, forest clearings and the interior of the forest in the Lacandon Jungle, Chiapas. By means of acoustic sampling, simultaneous recordings were obtained in the different habitats during the dry and rainy seasons. Manual analysis was performed to review the recordings with the help of an assisted identification program. In total 11 species and 7 sonotypes were identified. The greatest wealth and equity was for forest clearings. Palm plantations had intermediate wealth between the three habitat types in both seasons. Forest-dependent species (*Centronycteris centralis* and *Pteronotus gymnonotus*) were present only in clearings and within the forest. There was more occurrence and activity of open space species in open habitats (plantations and gaps) than in closed habitats. The conversion of forest areas to oil palm cultivation modifies the MIA's assemblies, altering their composition and activity levels. The government incentive and the demand for palm oil production promote the conversion of natural areas. This disturbance may lead to habitat reduction for forest-dependent species, and be a further threat to species of aerial insectivorous bats that are currently in risk categories nationwide. This type of study is the first in the area and shows the need to establish solutions that take into account the development and care of biodiversity.

KEY WORDS: Aerial Insectivorous Bats, Monocultures, Oil Palm, Species at risk, diversity, conservation.

INFORMATION CAMPAIGN FOR THE MANAGEMENT OF THE COMMON COQUÍ FROG (*Eleutherodactylus coqui*), A SPECIES INTRODUCED IN COSTA RICA

[1*]Jimmy Barrantes-Madrigal

[1]Programa sobre especies invasoras, Fundación Costa Rica Wildlife, San José, Costa Rica. *jimmybarrantesm@gmail.com

ABSTRACT: The common coqui frog is considered one of the 100 worst invasive species in the world. The impacts of its invasion in the Hawaiian archipelago are well known, reaching densities of up to 91,000 individuals per hectare. In Costa Rica, the coquí frog was introduced around the year 1998. Fortunately, its populations have remained concentrated in certain regions of the city of Turrialba and have not reached such levels of invasion. However, the lack of information in local people about the risk that this species represents for native species could be favoring its dispersal. There are reports of people who have intentionally moved this species to other locations and even trade with it. As a result of these events, the presence of a new population established in a neighboring town was recently confirmed, making it urgent to carry out actions to prevent its spread. The objective of the project was to develop an information campaign with two specific objectives: to prevent the spread of the coquí by human actions and to motivate people to make reports on sightings of this species. For this, informative materials such as videos and posters were developed, which were shared in different media to reach the target audience. Informative talks on the project were held with the general public, as well as with officials from the competent authorities, the local committee of the respective biological corridor and members of the academy. The results were evaluated based on the number of reports of movement and sighting of the species.

KEY WORDS: Invasive species, science communication, citizen science, conservation.

DIVERSITY AND GENETIC STRUCTURE OF *Glossophaga soricina* (CHIROPTERA: PHYLLOSTOMIDAE) IN EL SALVADOR

Melissa E. Rodríguez[1,2*], Wieslaw Bogdanowicz[3], Gustavo Gutiérrez-Espeleta[4], José Edgardo Arévalo[4,5], Monika Patrzyk[3] y Bernal Rodríguez-Herrera[4]

[1]Sistema de Estudios de Posgrado, Escuela de Biología, Universidad de Costa Rica, San Pedro de Montes de Oca

[2]Programa de Conservación de Murciélagos de El Salvador de la Asociación Territorios Vivos El Salvador (ATVES)

[3]Museum & Institute of Zoology, Warszawa, POL

[4]Escuela de Biología, Universidad de Costa Rica, San Pedro de Montes de Oca; 5 The School for Field Studies, Atenas, Costa Rica.

ABSTRACT: Habitat reduction can affect the distribution and dispersal of species, which can cause effects on genetic diversity and genetic structuring due to limited gene flow. El Salvador is the most deforested country in Central America, it has only 14% forest cover, the rest corresponds to agricultural and urban areas. The ability of a species to resist habitat loss depends on many factors, including the specific characteristics of the remaining habitat. Using 10 dinucleotide microsatellites, the diversity and genetic structure of Glossophaga soricina based on its flow capacity. The study was carried out on nine remnants wooded in El Salvador. The genetic diversity analyzed was low, finding deviations from the Hardy-Weinberg equilibrium caused by a deficiency of heterozygotes. The greatest allelic richness and heterozygosity were found in El Refugio and Gotera, and the lowest levels in Finca Lutecia. The species has a genetic structure with values close to zero, that is, there is no degree of differentiation among populations despite loss of habitat (Fst = 0.022, 95% CI: -0.088–0.077), due mainly to the amount of gene flow between the sites. A considerable and significant level of inbreeding was found for the sites, reflecting that there may be a biological mechanism inducing inbreeding for this species. The low genetic diversity in Finca Lutecia may be due to the type of urban matrix that surrounds the forest fragment, showing that G. soricina, despite being a generalist species, abundant and with the ability to fly, can be affected in its levels of genetic diversity and that depending on the landscape, could increase the impacts at the genetic level in this and other species.

KEY WORDS: Heterozygosity, gene flow, microsatellites, bats, size of the fragment.

THE DIVERSITY AND DISTRIBUTION OF MARINE MEGAFAUNA IN THE BOCAS DEL TORO ARCHIPELAGO

Megan Chevis*, Leyson Navarro, Ana Batista, Rachel Graham

MarAlliance
*megan@maralliance.org

ABSTRACT. There are currently few quantitative fisheries-independent data on populations of large fish (sharks, rays, grouper, snapper, jacks) in Panama, especially in reef sites on the Caribbean coast of the country. Data on the diversity of species, demographics of populations, and their habitat use are necessary to inform national and regional management plans, as well as evaluate the effectiveness of Marine Protected Areas in protecting large mobile species. The Bocas del Toro archipelago includes various marine habitats including coral reefs, rocky reefs, seagrass beds, and protected lagoons. Here we present the results of standardized monitoring carried out in 45 stations around the Bocas del Toro archipelago to begin to better understand the long-term population dynamics of the marine megafauna. Baited Remote Underwater Videos (BRUVs), underwater visual census (snorkeling transects), and scientific longline were used during 4 years. The results reveal relatively low diversity, abundance, and density of meso and top predators, with higher abundance in the sites that were deeper and more distant from human communities. A combination of different monitoring methods is necessary to fully evaluate the diversity and distribution of the elasmobranchs in the site. Monitoring highlighted 6 species of sharks and 5 species of rays, including species of conservation concern like hammerhead sharks (*Sphyrna lewini* and *Sphyrna mokarran*). Nurse sharks (*Ginglymostoma cirratum*) and southern stingrays (*Hypanus americanus*) were the most common species registered. Results underscore the need to reduce the use of unsustainable gear types in the area to help to reverse declines and reestablish populations of elasmobranchs along the Carribean coast of Panama.

KEYWORDS. Conservation, elasmobranchs, fishing, threatened species

POPULATION ECOLOGY FOR THE CONSERVATION OF KEY SPECIES IN THE TEHUACÁN-CUICATLÁN VALLEY: INTEGRATING SCIENTIFIC KNOWLEDGE WITH SUSTAINABLE MANAGEMENT OPTIONS

Dánae Cabrera Toledo

ABSTRACT. Dioon caputoi (Gymnosperma, Zamiaceae), is a cycad endemic to a very narrow area in central Mexico (Puebla), with very few populations of between 50 and 100 individuals each. It is currently on the IUCN red list, but these plants, like many other cycads, are highly sought after by sneaky collectors who have looted heavily at various times in history. For this reason it is a priority species for conservation in the Tehuacán-Cuicatlán Biosphere Reserve (RBTC), in central Mexico. The dynamics in two populations were studied and it was found that seedlings are scarce and the establishment of seedlings are very sporadic events. However, even when reproductive events are rare, seed production is large (up to 300 seeds per event) with a high germination percentage (> 80%). This led us to conclude that the seed has a potential for harvesting and that, with a minimum of plants reintroduced to their habitat, the risks of local extinction are decreased. In addition, an environmental education course was organized for farmers in this region with the objective of designing strategies for seed management and successfully maintaining a community nursery. On the other hand, we worked with Agave potatorum (Angiosperma, Asparagaceae), another key species in the RBTC where a genetic diversity study was conducted and we found high diversity at the species level, but with highly differentiated populations, which implies a challenge in conservation terms. This is a plant of high economic importance because it is used to produce mezcal in this same region. Currently my research interests seek to have actions that are more involved with the needs of the people who manage their natural assets.

KEY WORDS: Dioon caputoi, Agave potatorum, Population dynamics, Genetic Diversity, Sustainable management.

PRESENCE OF TWO POPULATIONS OF HUMPBACK WHALES (*Megaptera novaeanlgiae*) IN NICARAGUA - AN ECONOMIC IMPLICATION

Joëlle De Weerdt

Asociación ELI-S (ATVES)
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ABSTRACT. The humpback whale (Megaptera novaeanlgiae) is listed as Least Concern, according to the IUCN Red List. Two populations of humpback whales migrate into the breeding waters of the Nicaraguan Pacific in two different seasons. The population of the southern hemisphere comes from Antarctica (discovery 2019) and that of the northern hemisphere comes from the United States. Although the Red List indicates that they are not in danger, the whales must face different types of threats: an interoceanic canal construction plan, the uncontrolled development of whale sightings and the illegal use of bombs as a fishing technique. Since 2016 the ELI-S association has been conducting research on the northern population, which is made up of less than 500 individuals, in order to identify the threats they may face in the present and in the future. In addition to having a research program, the project is involved in the development of an environmental education program. In collaboration with Barrio Planta Project, we teach environmental classes. 150 children participated in our classes and increased their knowledge of the marine environment by an average of 51%. Working with communities is essential for the long-term conservation of animals.

KEY WORDS: Environmental education, Humpback whale, ecotourism, conservation.

4. Activities, Conferences and Workshops

4.1. Day 1.

Friday 17, January 2020

4.1.1. Dinner

4.2. Day 2.

Saturday 18, January 2020

4.2.1. Conferences

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Figura 4.6. Talk for Jimmy Barrantes. "Informative campaign for the management of the common frog coquí (*Eleutherodactylus coqui*), an introduced species in Costa Rica.

Figura 4.7. Guest researcher Karol M. Gutiérrez-Pineda talk about her Project for Chemical Ecology on Howler Monkeys-FCPP.

Figura 4.8. Researcher guest Ricardo Moreno from Yaguara Panama, presenting the advances Avances of Jaguar research in Panama.

4.2.2. Round Table – Debate (Dissemination of research works for the development of bases in the promotion of conservation.)

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Figura 4.10. First Panamanian Rufford Conference participants.

4.3. Day 3

Sunday 19, January 2020

4.3.1. Conferences

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Figura 4.12. Joëlle De Weerdt, talk about the Presence of two populations of humpback whales (*Megaptera novaeanlgiae*) at Nicaragua-economical implications.

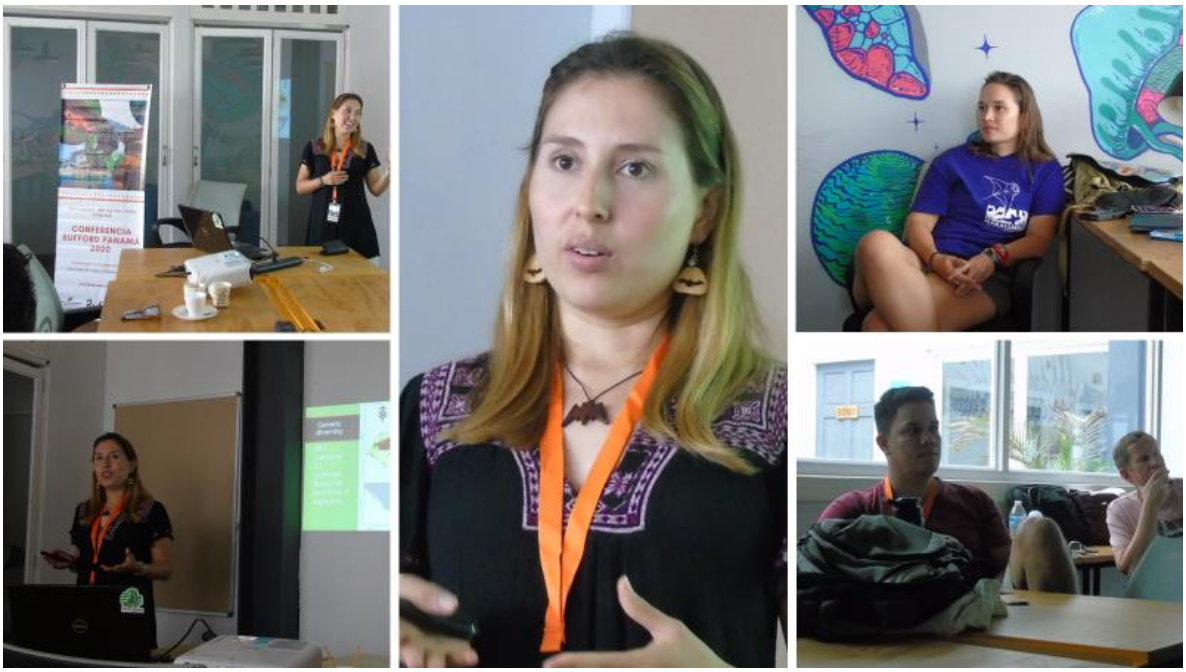

Figura 4.13. Melissa Rodriguez, talk about "Diversity and estructural genetic of *Glossophaga soricina* (Chiroptera: Phyllostomidae) at El Salvador.

Figura 4.14. Abigail Martínez, talk about: Evaluation of the insectivore bats in oil palm plantations (*Elaeis guineensis*) at the Selva Lacandona, México.

4.3.2. Gifts to conference members

Figura 4.15. A gift delivery, a wood carved monkey made by the hands of our Panamanian indigenous people from Emberá, by Pedro G. Méndez-Carvajal FCPP's director to the director of the Rufford Foundation, Josh Cole.

Figura 4.16. Awards for the participants including educational guides, ecological books and others.

4.3.3. Teaching the Orion Camera System (SCO) method.

Orion Camera System (OCS) course, including key nuts learning, use of bow and arrow, and procedure to set a camera trap at the medium forest level with no need of climbing trees.

Figura 4.17. Learning nuts.

Figura 4.18. Learning the right way to shut a bow..

4.3.4. Delivery of certificates

4.4. Day 4

Monday 20, January 2020

4.4.1. Expedition to Cayos Zapatilla

Figura 4.19. Thomas Mora, National Park Bastimento Island's director talking about the efforts to conserve the protected area.

Figura 4.20. Visiting the Cayo Zapatillas refuge at the Bastimento Island National Park. Guided by the director of the park.