

## Rufford Updates

### Community-based Amphibian Diversity Conservation in Yungas Biosphere Reserve in NW Argentina

#### Field and Laboratory Work Update

We carried out three extensive campaigns at key biodiversity localities: Nogalar National Reserve and Baritú National Park, Calilegua National Park, and San Andrés community. During all campaigns, we detected *O. berdemenos* and *O. barituensis*, while *M. rubriventris* was only detected in the first two (although it is known to be present in San Andrés). Each time, we collected photographs, climate and environmental data, morphological data, and genetic samples. Additionally, we conducted multiple short campaigns around San Salvador de Jujuy. The more elusive species, *G. chrysosticta* and *R. gallardoi*, were not detected in any case. For *O. berdemenos*, *O. barituensis*, and *M. rubriventris*, mitochondrial Cyt-b gene sequences were generated. Specifically, we obtained 25 new sequences of *M. rubriventris* from three different locations. For *O. barituensis*, 140 sequences were generated from 20 distinct locations. Finally, for *O. berdemenos*, including the sequences reported in the First RSG final report, we generated a total of 68 sequences from eight different locations.

#### Connectivity Assessment

From this data, we observed that all three species exhibit genetic diversity patterns indicating significant intraspecific diversity in the northern Yungas (a large portion of which lies within the Yungas Biosphere Reserve, YBR). Specifically: *O. berdemenos* shows five units with unique intraspecific diversity (one more than what was reported in the 1<sup>st</sup> RSG), *O. barituensis* has six units (three of which are within the YBR), and *M. rubriventris* presents three genetically differentiated units.

We also reconstructed habitat suitability areas for the three species within the YBR and their overlap with protected areas. *O. berdemenos* has the most restricted suitable habitat, while *O. barituensis* and *M. rubriventris* have broader suitable areas. Furthermore, the genetic distribution of these two species is significantly linked to habitat suitability resistance. Considering only species with larger suitable areas, conservation efforts should be reinforced over 5,287 km<sup>2</sup> (39% of the YBR), of which only 1,005 km<sup>2</sup> (19% of the suitable area within the YBR) lie within protected areas. For all three species combined, the overlapping suitable area amounts to 2,080 km<sup>2</sup> (15.4% of the YBR), of which only 240 km<sup>2</sup> (11%) are within protected areas.

In conclusion, we propose prioritizing areas suitable for all three species that also connect zones of higher genetic diversity with areas of lower genetic diversity. These connections may provide advantages when addressing future threats. Particularly, the region near San Andrés in northern Salta, due to its current environmental conditions and its strategic position connecting protected areas (Baritú National Park, Nogalar Nature Reserve, and Calilegua National Park), should be considered a priority area in future conservation plans.

#### Work with Local Communities

We conducted training workshops on amphibian diversity in the following locations:

- El Arazay community (Salta province),
- Tourism institute Dr. Alfredo Loutaif at Los Toldos (Salta Province),
- Visitor centers of Baritú National Park and Nogalar National Reserve (Los Toldos, Salta province)).

These workshops included distributing quick identification guides to visitors. Additional guides were provided to Baritú National Park and Nogalar National Reserve for visitor use. Similarly, identification guides for the amphibians of Calilegua National Park were distributed to the Ñande Reko community, the Coya-Guaraní Community, and to Calilegua National Park (Aguas Negras Station and Interpretation Center). All these materials are available on our social media and future training workshops are being planned for these entities.

We also established contact with representatives of the Tinkunaku community, whose territory lies near San Andrés (a previously identified priority area). The project was presented to them, and they found it important, fruitful, and necessary for conserving their land. They expressed great enthusiasm about becoming leaders in ecotourism development that is conscious, responsible, and contributes to biodiversity conservation efforts in the Yungas.

Similarly, we held meetings with the Ñande Reko and El Arazay communities. With El Arazay, we accompanied tourism students from the community on a guided tour of the “La Cruz” trail, where they shared the community’s history and the uses of native plants (medicinal, dyeing, food). During the tour, *O. berdemenos* was heard vocalizing, providing an opportunity to discuss its recognition, biology, and threats.

Recognizing the different realities of each community and their varying capacities for ecotourism development, we decided to contact the community of San Francisco. This locality has been developing ecotourism for several years and is one of the most visited sites in Jujuy Province. We met with San Francisco’s tourism representative, who agreed to share their experience to serve as a foundation for developing ecotourism in other communities. We also provided the locality’s tourism center with a quick identification guide for regional amphibians. This collaboration is crucial not only for the community’s contributions but also because San Francisco’s ecotourism guides could be instrumental in searching for the critically endangered species *Gastrotheca christiani*, lost for 29 years, and in monitoring *O. berdemenos*, *O. barituensis*, *M. rubriventris*, and *R. gallardoi* near San Francisco.

## Dissemination

The project participated in various outreach events, most notably the 10th World Congress of Herpetology, where we presented the project “Let’s Talk About Conservation – Yungas” and the main results regarding *O. berdemenos*, summarized as follows:

“In conclusion, we depict that the Confused Robber frog is strongly genetically structured in its geographical distribution, being that this species has an inner hidden diversity with 5 populations that show a unique genetic signature of evolutionary history.

Within this structure, the population A in the northern portion and the population E in the southwestern portion of *O. berdemenos* distribution, coincide with areas that would have been stable during Last Glacial Maximum. In particular, there is strong evidence that the northern stable area could be representing a glacial refugium, due to the high genetic diversity and demographic history of population A. For the population E, the low genetic diversity could be

indicating recent colonization, and it is worth noticing that this in one of the two population of *O. berdemenos* that it is no included inside a protected area.

Finally, our results show the importance of focusing conservation action between 1300 and 2500 masl, mainly the vegetation belt of montane forest. And particularly, the importance of the major intervalleys formed by N-S mountain ranges, which could represent stable climatic areas. We also consider that the population C (San Andrés), which present high diversity for both genetic markers analyzed, a starlike pattern for the Cyt-b haplotype network, and it's not inside any protected area is of conservation priority as part of the already propose Calilegua-Tariquia corridor, connecting less genetically diverse population from the South, to those more diverse in the North."

Additionally, the World Congress provided an opportunity to learn about similar projects and share information about The Rufford Foundation.

We also participated in Reverse the Red (World Species Congress), and had a stand at the National Parks Administration's event celebrating 121 years of national protected areas in Salta city. Finally, we organized a roundtable discussion at the Andean Ecoregions Institute Conference, where colleagues from various disciplines discussed conservation objectives, methods, and challenges.

### Biosphere Reserve Meeting Initiative

We initiated efforts to organize a Yungas Biosphere Reserve Meeting to share conservation projects and programs happening inside the YBR. A survey sent to researchers working inside the YBR received 62 responses, with many offering to help organize the event. Currently, we are resolving logistical challenges with the National Parks Administration (NOA office), though public policies complicate collaboration.

### Field Guide Development

We are advancing the development of a field guide. Meetings were held to define its format, and regional experts were invited to contribute species profiles. We define the list of species to be included in the field guide, which are those whose presence is confirmed for the Yungas of the YBR:

<i>Rhinella arenarum</i>	<i>Boana raniceps</i>	<i>Pleurodema borellii</i>
<i>Rhinella diptycha</i>	<i>Dendropsophus minutus</i>	<i>Pleurodema tucumanun</i>
<i>Rhinella gallardoi</i>	<i>Dendropsophus nanus</i>	<i>Leptodactylus bufonius</i>
<i>Rhinella major</i>	<i>Scinax fuscovarius</i>	<i>Leptodactylus macrosternum</i>
<i>Melanophryniscus</i>	<i>Scinax nasicus</i>	<i>Physalaemus albonotatus</i>
<i>rubriventris</i>	<i>Boana riojana</i>	<i>Elachistocleis haroi</i>
<i>Rhinella rumbolli</i>	<i>Leptodactylus elenae</i>	<i>Dermatonotus muelleri</i>
<i>Ceratophrys cranwelli</i>	<i>Leptodactylus fuscus</i>	<i>Elachistocleis skotogaster</i>
<i>Gastrotheca christiani</i>	<i>Leptodactylus gracilis</i>	<i>Odontophrynus asper</i>
<i>Gastrotheca chrysosticta</i>	<i>Leptodactylus latinasus</i>	<i>Odontophrynus lavillai</i>
<i>Trachycephalus typhonius</i>	<i>Physalaemus biligonigerus</i>	<i>Phyllomedusa sauvagii</i>
<i>Boana marianitae</i>	<i>Leptodactylus aepyta</i>	<i>Phyllomedusa boliviana</i>

*Oreobates barituensis*

*Oreobates berdemenos*

*Telmatobius oxycephalus*

We are also creating a new photo database, capturing high-detail images using a photo box. These images were used to generate life-sized laminated sheets for outreach events. In parallel, we are designing signage for National Parks. For Calilegua National Park, printed materials will be delivered and installed on the “Sky Trail,” where three of the five target species are present. We are awaiting a response from Baritú National Park and Nogalar de Los Toldos National Reserve regarding similar proposals.