

ENDANGERED FROGS OF THE CARIBBEAN

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## IN SEARCH OF THE MONA COQUI

Herpetologists Jen Stabile and Rafael L. Joglar report on the conservation status of a highly threatened amphibian from Puerto Rico





An aerial view of Mona Island, situated in the heart of the Caribbean, 66 km west of Puerto Rico and 61 km east of the Dominican Republic.





A data logger being placed in situ on a palm tree trunk.

TEXT AND PHOTOS

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In the heart of the Caribbean, 66 km west of Puerto Rico and 61 km east of the Dominican Republic, lies a small jewel known as Mona. Mona, or Mona Island, is considered by some the Galapagos of the Caribbean. It is rich in both history and biodiversity and large iguanas *Cyclura stejnegeri* roam the island that was once the main destination of pirates and privateers. The Mona Passage, the waters surrounding the island, connects the Atlantic Ocean with the Caribbean Sea. This 129 km stretch of sea is one of the most dangerous passages in the Caribbean, due to deep water and variable tide currents. This is our second trip to Mona Island together, and marks ten years of a dedicated partnership to the conservation of the coqui frogs of Puerto Rico. The coqui frogs, (belonging to the genus *Eleutherodactylus*), are iconic to the Puerto Rican community, and can be found in both the forests and folklore throughout the Puerto Rican islands. Their call is what gives the island its true enchantment (Isla de Encanto), but unfortunately most of the 17 species of coqui are in declining, with three species already extinct. The purpose of our research endeavor was to investigate the biology of the Mona Island

Tree Frog, or Mona Coqui, *Eleutherodactylus monensis* in its natural environment. We also collected 20 specimens (10 breeding pairs) of Mona Coqui to further our captive research efforts. The specific aims of this combined program are to study distribution, population densities, potential causes for decline, reproductive biology, diet, and vocalization. The results of this project will contribute to the documentation of the species status and provide several management and conservation recommendations. Our boat, El Torpedo, left Puerto Real, Cabo Rojo (southwestern Puerto Rico) at 3:00 AM; transporting equipment and our small research group. The boat ride can last anywhere from three to nine hours. It is important to leave for the island at night to avoid the rough late morning and afternoon waters of the Mona Passage. Mona Island belongs to Puerto Rico, and is managed by the Department of Natural and Environmental Resources (DNER) which issues a small number of permits to visit and work on the island. Since it is a natural reserve it does not have permanent residents, only park rangers and biologists are responsible for guiding visitors or participating in research projects. Because of its remoteness, Mona is the most

continued on page 86 >





A pair of the highly endangered Mona Island Tree Frog, or Mona Coqui, *Eleutherodactylus monensis* caught in amplexus.





An immature specimen of the Mona Island Tree Frog, or Mona Coqui, *Eleutherodactylus monensis*. Dorsal coloration differs from that of the adults.





The egg mass typically laid by the Mona Island Tree Frog, or Mona Coqui, *Eleutherodactylus monensis*.

isolated island in the archipelago of Puerto Rico and it is biogeographically unique. As the sun began to rise, Mona slowly came into view in a pure expression of the Caribbean experience. From our small boat we can see the formation of large limestone cliffs and white sand beaches with swaying palm trees teeming with wildlife. You half expect a Pterodactyl to swoop down from the jagged cliff edge and into its coral filled, crystal waters. As we approached closer, deep caves began to take shape in the sea cliffs of this 11 x 7 km kidney- shaped island. Ecologically it is a subtropical dry forest, rich in biodiversity and endemism; similar to what you find in southwestern Puerto Rico, Fajardo, Ceiba, Caja de Muerto, and the islands of Desecheo, Culebra and parts of Vieques. Most terrestrial reptiles and the only amphibian on the island are endemics and their common names have "de Mona" attached indicating that they are exclusive to this island: Coquí de Mona *Eleutherodactylus monensis*; Salamanzita de Monito *Sphaerodactylus micropithecus*; Salamanzita de Mona *Sphaerodactylus monensis*; Siguana de Mona *Ameiva alboguttata*; Lagartijo de Mona *Anolis monensis*; Víbora de Mona *Typhlops monensis*; Culebra Corredora de Mona *Borikenophis [Alsophis] variegatus*; Iguana de Mona *Cyclura stejnegeri*; Culebrón de Mona *Epicrates monensis monensis*; Lucía o Santa Lucía de Mona *Spondylurus monae*; and Lucía or Santa Lucía de Monito *Spondylurus monitae*. The non-endemic reptiles are: Salamanca *Hemidactylus haitianus*, of African origin; and the marine turtles *Carey Eretmochelys*

*imbricata*, Tinglado or Tinglar *Dermochelys coriacea*, Peje Blanco *Chelonia mydas*, Cabezón or Caguana *Caretta caretta* and the extinct Tortuga Terrestre de Mona *Geochelone (Monachelys) monensis*. Overall there are 16 species of amphibians and reptiles and 92 % (11/12) of the terrestrial extant species are endemic. This trip to Mona is different than the last. This time the island is very dry, thanks to El Nino and to the extreme drought most of Puerto Rico has been experiencing. Many of the bromeliads that once held Mona Island Coqui are dead due to the lack of rainfall and humidity. Our work here this time was primarily in the islands caves. As we entered them we encountered historical documents, such as pictographs of Taino or pre-Taino origin. Records of pre-Taino culture, potentially the Casmiroids, inhabiting the Mona Passage date back to 1000 BC. The Taino, descendants of the indigenous South American and Caribbean Arawak, settled on Mona during the pre-Columbian times. They gave the island its original name after a Taino Cacique, or chief, Amona. We proceeded to monitor transects previously established by our research team, taking data on temperature, moisture and vocalization patterns. We heard sounds of both dripping water and low repetitive chirps. These sounds are produced by the only amphibian found on the island, the Mona Coqui. This one just like the other 17 species of Puerto Rican frogs of the genus *Eleutherodactylus* is characterized by direct development,

continued on page 88 >





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Detail of one of the petroglyphs which can be found on Mona Island.

which means that they metamorphose directly into miniature coquis without going through a tadpole stage. On Mona, these frogs lay their eggs on vegetation, under rocks or under fallen leaves. The Mona Coqui is endemic to Mona Island and little is known of its current population status. The IUCN consider it a vulnerable species because its range is restricted and the effects of introduced predators on the island. In addition to its small range of only 57 km<sup>2</sup> our research group is also concerned with chytridiomycosis (Bd) already present on Mona, alteration of habitat and climate change. To assist with data collection when we are not present on the island, we have set up an automated recorder to monitor call patterns. This recorder has a battery life of roughly 20 days, and can take up to 10,000 one minute recordings throughout the designated time slot.

Although the island was extremely dry, we were still able to collect 10 pairs of Mona Coqui and they have been transported safely back to the San Antonio Zoo. Our primary objectives for obtaining this captive colony are to establish captive populations to ensure survival in case of a catastrophic event in its natural environment, learn about its reproductive biology, and increase public awareness about the global amphibian crisis. Having worked with a small population in captivity already, we know that the Mona Coqui is unique in its reproductive behaviors as compared to other Puerto Rican coqui species. The male and female both assist in digging out the nest concavity used for oviposition. During the building of the nest, the male appears to cease calling and advertising for another

mate. This reproductive act witnessed by the male and female is uncommon and requires more research to fully understand this unique characteristic. Other immediate research goals include developing karyotype for the Mona Coqui. Vocalization and call patterns are also currently being recorded and processed, which will allow for an accurate account of this species level of activity and density as well as reproductive behaviors. Biological and historical documentation of the Mona Coqui will assist in the further implementation of conservation efforts for this unique amphibian species.

It is said that a trip to Mona Island will change your life. Time stands still on Mona, it is an island that lives in the past. Traces of history waiting to be explored are scattered throughout the isolated landscape. Christopher Columbus is thought to have "discovered" Mona Island in 1493, but the island was home to pre-Hispanic inhabitants, Taino and maybe pre-Taino. The Taino culture came to an end on Mona Island in 1578, 85 years after being discovered. During the late 1500's and for the three centuries following, the island was abandoned to pirates. If you venture into some of the caves on Mona you will find evidence of the original discoverers of the island. The Taino pictographs in Cueva de Espinar and Cueva Negra depict bats, other mammals (perhaps monkeys), birds, lizards and frogs. A testimony that we may have had something in common with Mona Island's first inhabitants: a shared interest in the islands wondrous biodiversity.





The large and herbivorous Iguana de Mona *Cyclura stejnegeri* is a typical endemic.



The island's dry coastal environment also hosts large numbers of crabs.



Culebrón (or Boa) de Mona *Epicrates monensis monensis*, an endemic species .



A beautiful specimen of the endemic Salamanita de Mona *Sphaerodactylus monensis*.

The dry, eroded limestone rocky coastline is rich in karst formations.





The typically wind- and water-eroded limestone cliffs of Mona face the azure Caribbean sea and offer a multitude of habitat niches in their karst crevices and caves.