Report and Action Plan for the Teleferico rubber frog *(Pristimantis telefericus)*

Original study initiated, under the lead of Enrique La Marca, by:

FUNDACIÓN BIOGEOS PARA EL ESTUDIO DE LA DIVERSIDAD BIOLÓGICA

REVA Rescue of Endangered Venezuelan Amphibians

Sponsored by:

صندوق محمد بن زايد للمحافظة على الكائنات الحية

The Mohamed bin Zayed SPECIES CONSERVATION FUND

Author: Enrique La Marca

Date of completion: 14 October 2018

Coordinator and contact details:
Dr. Enrique La Marca, Ph.D.
enrique.lamarca@gmail.com
Phone: +58-412.5107091

BACKGROUND

Species

Common names:

"Merida cable car frog", and "Teleferico Rubber frog" (in English). "Ranita del Teleférico" (in Spanish).

Scientific name: Pristimantis telefericus (La Marca, 1995) (Amphibia: Anura: Strabomantidae).

Taxonomic Serial No.: 775796 (ITIS Report 2018)

Photos

Figure 1. *Pristimantis telefericus, adult specimen. Photo: Enrique La Marca*

Figure 2. *Pristimantis telefericus*, juvenile specimen. Photo: Enrique La Marca

Conservation status

The species is currently considered as Data Deficient (IUCN 2006). It is neither listed in the Venezuelan Red Data Book of Fauna (Rodriguez and Rojas-Suárez 2008).

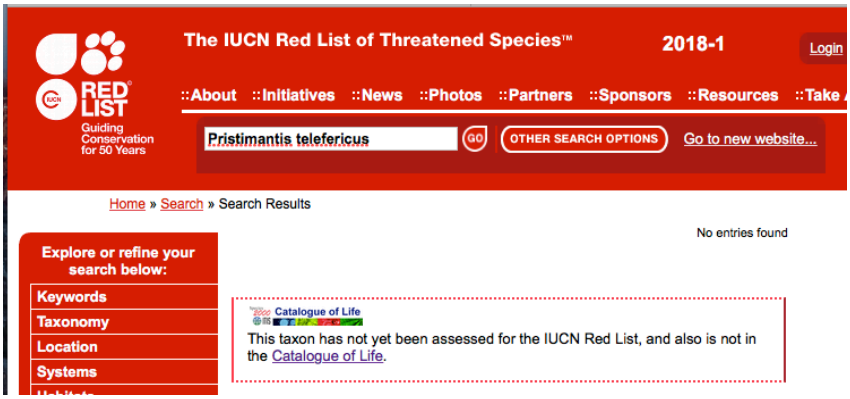

Figure 3. Current conservation assessment for the teleferico rubber frog.

Distribution, population size and trends

Pristimantis telefericus is known only from the vicinities of the Merida cable car ("Teleférico de Mérida") at 3,400-3,500 m. asl (11,200–11,500 ft) in the Sierra Nevada de Merida, in western Venezuela. It had not been seen since 1998 until we rediscovered specimens of this taxon.

The species occurs within the Sierra Nevada National Park. 'National Park' is a category with the highest level of environmental protection in Venezuela. Sierra Nevada was the second National Park decreed in Venezuela, and it is one of the biggest. The range of distribution of the Teleferico rubber frog is very small, in a relatively narrow band of paramo environments between the cable car stations of La Aguada and Loma Redonda, within the Teleferico de Merida tramway (cable-car) system.

The size of the population is not completely known. Initial data gathered through this study sponsored by the Mohamed Bin Zayed Conservation Fund indicates that population size may be small. Known published museum records and live specimens seen in the course of this study give a total number of less than 50 individuals but, given the nature of the rough terrain where it lives, most probably the total population is in the lowest hundreds.

After its description by the author in 1998, the species was not seen again nor new specimens were collected or reported. The species remained elusive in spite of several searches by individual researchers or by personnel associated with the Merida cable car during this century. Specimen records were absent for twenty years, until we finally rediscovered the species in this study.

Figure 4. Researcher Dr. Enrique La Marca with an adult *Pristimantis telefericus* in the field.

Given the low number of known specimens and the lack of a more complete monitoring study, the current population trend is unknown. There is not indication of fluctuation, but the experience of the author in the past and during the course of this study with the number of frog encounters suggest that its population greatly diminished in the last two decades.

Exact locations of individuals of the threatened species are not given, to avoid sharing sensitive information. Nonetheless, pictures and videos of specimens of this amphibian (never photographed before) are being released by the author to the public and specialized media.

Habitat and ecology

The natural habitat of Pristimantis telefericus is high altitude paramo environments, a tropical ecosystem dominated by shrubs, grasses (Poacaeae) and herbaceous plants (most conspicuously those of the genus Espeletia). Most of the individuals have been found under stones. The soil substrate is usually made up of fine sand, undoubtedly the product of erosion of the granitic rocks that constitute the core of the Sierra Nevada geological association that predominates in the central Venezuelan Andes (La Marca 1997), as well as small amounts of silt and clay that most probably allows for water retention.

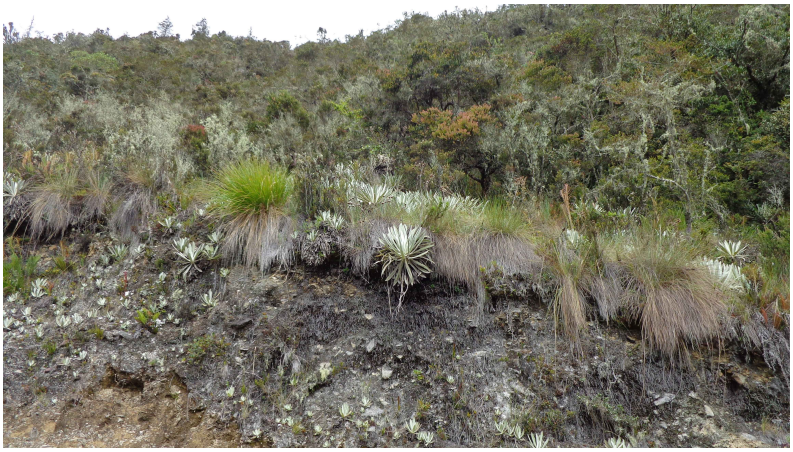

Figure 5. Habitat of *Pristimantis telefericus*.

The most preferred microhabitat for the species are relatively flat and dark stones under vegetation cover, but some specimens were seen below rocks surrounded by mosses in shady places. A single specimen was seen by day standing on an open situation inside a natural ditch. The dark-coloured stones certainly allow for a more rapid warming once they get hit by sunlight, and their flattened structure most probably allow for a more rapid transmission of heat from the rock to the body of the animal staying below. Most animals have been seen by day between 8:30 hours and 11:00 hours. I suspect animals go around paramo vegetation until about 16:00 hours, when temperatures start to drop and frogs return to their under-rock's retreats. Yearly temperatures in paramo environments do not exhibit marked variability. Daily temperatures, on the contrary, vary drastically from near freezing before sunrise to near 25 to 30 degrees Celsius by noon.

Figure 6. Microhabitat where *Pristimantis telefericus* most frequently occurs.

The ecology of the animal is that of a species adapted to extreme cold high-altitude environments. Based on data gathered on available museum specimens, such as egg maturity size (around 2 mm), convoluted oviducts in females and enlarged testes (between 4 and 7 mm) in males, we can infer that reproduction of the species takes place at the onset of the local rainy periods. The most important is perhaps the period after the longer drier period at the beginning of the year, mainly in May. Although we have not found egg masses of this species in the field, we suspect major egg-laying occurring at this first rainy period. The second period of rains is after a very short dry period in middle June that is followed by increasing precipitation by July to October. Females reach sexual maturity at a size close to 31 mm of snout-to-vent length (SVL), while males attain it when corporal size reaches 23 mm SVL.

The suitable habitats for the species occur in a relatively narrow belt between around 3000 m. asl to about 3.600 m. asl. First animals were taken from paramo vegetation, while this research detected its presence in the shrub land between the paramo proper and the upper parts of the cloud forest environment, where we recorded the lowest elevation record for the species.

Primary threats

The construction of the Merida's cable car system by the middle of the preceding century brought severe vegetation changes near the constructed stations. The situation repeated when stations underwent a major change by remodelling. Other than that, there are few trails that are used by mountaineers and by tourists, and occasionally for mule transport. Other than that, one must conclude that the original vegetation must have been like it is today relatively unchanged for many centuries.

Figure 7. La Aguada station of the Teleferico de Merida cable car system showing constructions and vegetation nearby. Source: the Internet (Mukumbarí).

No diseases are known to occur in individuals of this high Andean species. Unidentified ectoparasites and a parasite below skin have been the only ones detected in specimens. Although the deadly fungus Batrachochytrium dendrobatidis (Bd)has been detected in other Venezuelan Andean species, including paramo species, the pathogen has been detected yet in Pristimantis telefericus. I do not discard the possibility that this pathogen affected the local populations; if that was the case, the individuals we found maybe resistant survivors of this emergent disease.

Climate change leading to warmer temperatures and more pronounced and extended dry seasons might be a threat to the species. A climatic study was performed at our lab at the University of Los Andes in Merida, Venezuela, to ascertain climate changes in the region. Due to the lack of long and continuous records of the experimental climate stations along the Teleferico cable car, we relied on a main climatic station located in the city of Merida, close to the localities where the Teleferico rubber frog occur. A fifty years' period analysis was performed, that resulted in the following data:

Temperature: Figs. 8 and 9 show diagrams of change of maximum and minimum temperatures, respectively, for the period 1956-2006 in the Merida-Aeropuerto's climatic station.

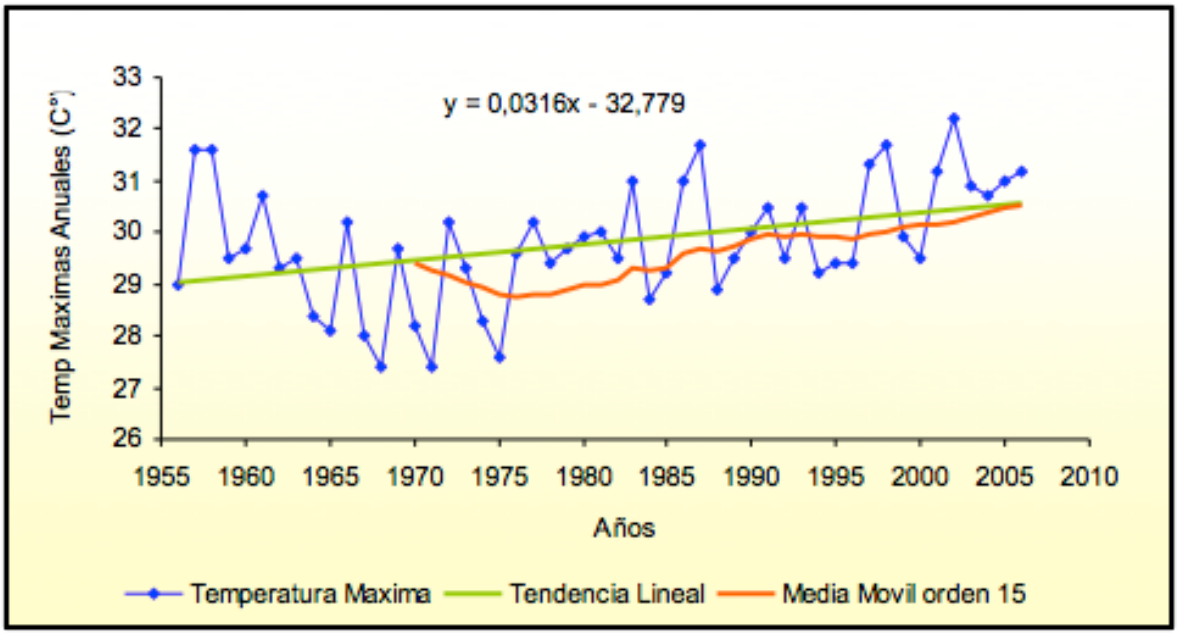

Figure 8: Diagram of maximum temperatures, linear trend and moving average order 15 for Mérida-Aeropuerto climate station. Period 1956-2006.Source: Bracho and La Marca (unpublished manuscript).

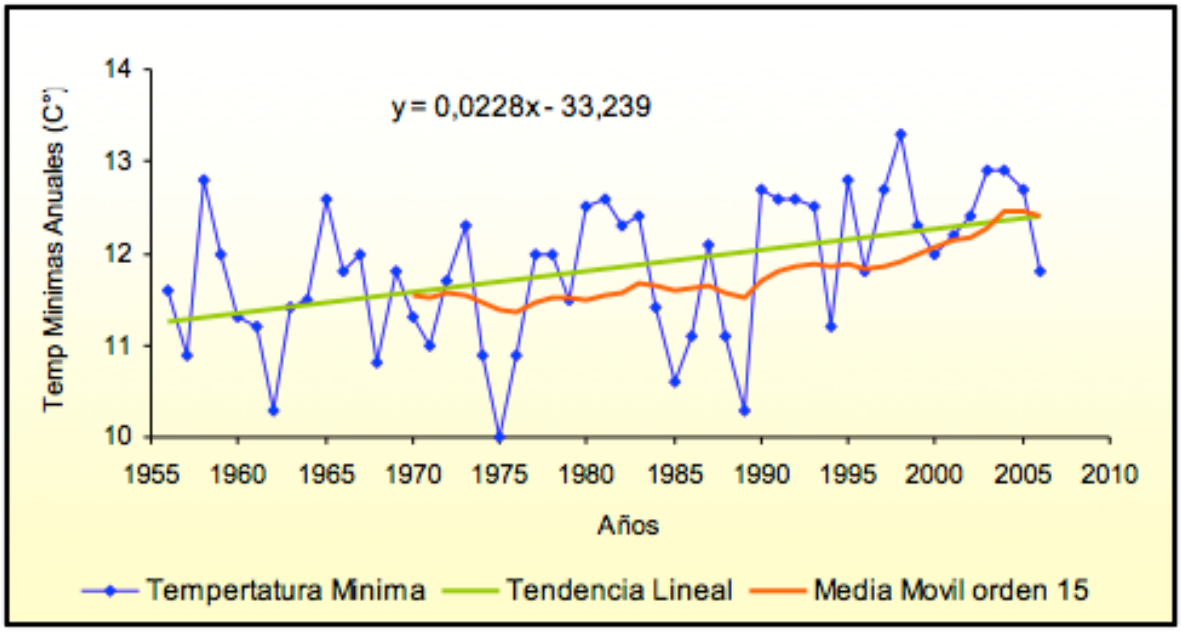

Figure 9: Diagram of minimum temperatures, linear trend and moving average order 15. Mérida-Aeropuerto station. Period 1956-2006. Source: Bracho and La Marca (unpublished manuscript).

In general, the maximum and minimum temperatures reflected an increase between 1,5 to 1.7 ° C for the fifty year's period. This increase in temperatures may influence an altitudinal shift of vegetation fro lower to higher elevations. This conclusion only can be assessed through a multi-temporal satellite image study in the region.

The maximum and minimum temperatures of the Merida terrace show a greater increase from 1980-1983 and 1985-1987, regardless of the trend of each variable. This increase in temperatures coincides with the occurrence of the El Niño Sothern Oscillation (ENSO) phenomenon, that could have influence these changes.

Precipitation: Fig.10 shows the trend in precipitacion for the period 1956 to 2006 in the record gathered in the Merida-Aeropuerto's climatic station.

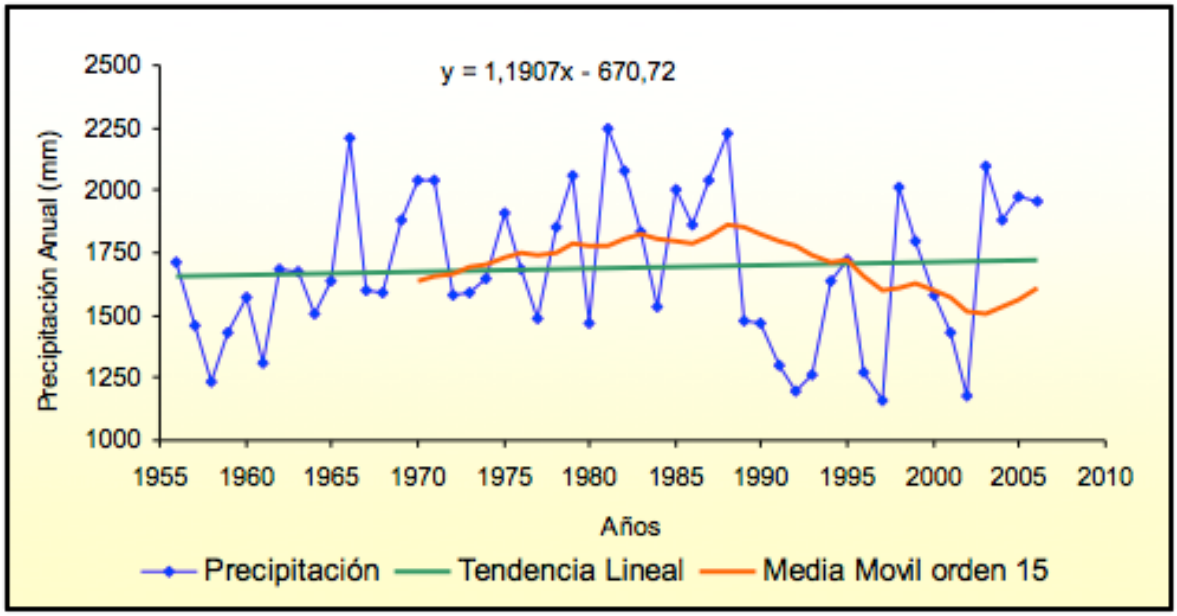

Figure 10. Diagram of Precipitation for the Mérida-Aeropuerto station. Period 1956-2006. Bracho and La Marca (unpublished manuscript).

The precipitation shows a decrease after year 1988, with a slight increase in years after 2000.The observed decrease in rainfall corresponds to severe drought periods brought about by the ENSO phenomenon in those years. The coincidence between the recorded droughts, Bd outbreaks and Venezuelan Andean amphibian declines was discussed by Lampo, Rodriguez, La Marca and Daszak (2006). These conditions may have affected Pristimantis telefericus *as well, and we cannot rule out the possibility that the fungus Bd may have affected the populations of this frog in the past.*

Conservation measures required

I recommend, first of all, that the conservation status for the species be actualized to show its degree of threatening. Later, this species could be included in an ex-situ captive husbandry program in order to obtain offspring to repopulate previously known places and to keep an ex situ stock for conservation purposes. A short-term action would be to start a conservation ex situ program. Ideally, the program should be kept in the country and the region of provenance of the species. In this regard, the Rescue of Endangered Venezuelan Amphibians (REVA) program of the BIOGEOS Foundation, located in Mérida, Venezuela, having experience with this kind of work, is a recommended option.

Current protection

The species lacks any kind of formal protection. Its habitat is currently protected under the figure of a National Park (Parque Nacional Sierra Nevada).

Current and previous conservation actions

There are not actions currently underway to conserve this species, either in situ or ex situ nor there have been any previous actions towards that end. So far, the species was listed as Data Deficient. This is the first initiative to gather ecological and conservation data to preserve the species.

PRIORITY ACTIONS

In situ

The species already lives within a National Park. Measures are needed to monitor population in the wild to detect trends in the future. Additionally, if a reintroduction program is initiated, there will be a need to monitor success of establishment of the new individuals.

Ex situ.

Captive management

It is highly recommended that an ex situ population be established for captive breeding purposes bearing in mind reintroduction. At least 50 individuals of both sexes are required to initiate a founder stock. Animals will come as from many different places as possible. Giving the finding of similar species in nearby paramo environments, it is highly recommended that DNA analyses be performed to ascertain that the individuals belong to the same species.

If sufficient founder animals cannot be found, there is the possibility of rearing eggs in the captive breeding facilities. Most likely the species has direct development, as all the members in the genus whose reproduction habit has been confirmed. Some people will need to be trained to manage the ex situ programs. Husbandry guidelines or protocols will need to be developed for this species, ideally by the conservation centre that will house the founder stock. All specimens and facilities in the captive husbandry program need to adhere to biosecurity protocols.

Education and awareness

Public education and raising awareness

Plans need to be developed to help provide education to the general population about the threats facing this particular amphibians and other amphibians. People need to be taught as how they might be able to help reduce threats and protect amphibians. Public education could be provided via display panels in the Merida's cable car (Teleférico de Mérida) as part of the national park, as well as especial programs in education centres at local communities. The national and the local governments, as well as other stakeholders(for example, touristic enterprises)need to be involved with the development of the conservation plan.

Figure 11. Street art on a main avenue at the city of Merida, depicting an idealized artistic specimen of *Pristimantis telefericus* for public awareness. Photo by Enrique La Marca.

REFERENCES

Literature cited

Frost, Darrel R. 2018. Amphibian Species of the World: an Online Reference. Version 6.0 (Date of access). Electronic Database accessible at http://research.amnh.org/herpetology/amphibia/index.html. American Museum of Natural History, New York, USA.

ITIS (Integrated Taxonomic Informatipn System) Report. 2018. Pristimantis telefericus. https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=775796#null.

La Marca, E. 1997. Origen y Evolución Geológica de la Cordillera de Mérida, Andes de Venezuela. Cuadernos de la Escuela de Geografía, Nueva Época, Nro.1:1-110. Universidad de Los Andes, Mérida.

La Marca, E. 2005. Dos nuevas especies de ranas (Amphibia: Leptodactylidae) de páramo del Parque Nacional Sierra Nevada, Venezuela. Herpetotropicos: 47-54.

Lampo, M., A. Rodríguez, E. La Marca & P. Daszak. 2006. A chytridiomycosis epidemic and a severe dry season precede the disappearance of Atelopus species from the Venezuelan Andes. Herpetological Journal 16:395-402.

Rodríguez, J. P. y F. Rojas-Suárez (Eds.). 2008. Libro Rojo de la Fauna Venezolana. Tercera Edición. Provita y Shell Venezuela, S.A., Caracas, Venezuela. 364 pp.

Other References

Amphibia Web. 2018. Pristimantis telefericus. https://amphibiaweb.org/cgi/amphib_query?where-genus=Pristimantis&where-species=telefericus&account=mol

AndesVenezuela. 2015. La ranita del teleférico de #Mérida, Pristimantis telefericus, está amenazada de extinción. https://twitter.com/enriquelamarca/status/617165872050892800 … https://twitter.com/andesvenezuela/status/617166839169351681

Catalogue of Life. 2018. Pristimantis telefericus. *CoL taxon LSID: urn:lsid:catalogueoflife.org:taxon:76442963-bd00-11e8-940c-fa163e792e6e:col20180921. Available in: http://www.catalogueoflife.org/col/details/species/id/a36f2c72e80feaf9a061ed36a3456388*

GBIF (Global Biodiversity Information Facility). 2018. Pristimantis telefericus. *Available in: https://www.gbif.org/search?q=Pristimantis%20telefericus*

GlobalSpecies.org. 2018. Pristimantis telefericus. http://www.globalspecies.org/ntaxa/2173476

Intreasures.com. 2013. Pristimantis telefericus (Anura - Strabomantidae) Teleferico Robber Frog. http://Intreasures.com/venezuelaa.html

La Marca, E. 2015. Cuando describí esta especie como nueva para la ciencia, nunca pensé que sería un icono en mi amada #Merida #VEN. https://twitter.com/enriquelamarca/status/617165872050892800

Mohamed bin Zayed Species Conservation Fund. 2018. Pristimantis telefericus. Species project number 172516447. https://www.speciesconservation.org/case-studies-projects/teleferico-rubber-frog/16447

Encyclopedia of Lyfe. 2018. Pristimantis telefericus. http://eol.org/pages/7250624/overview.

Wikipedia (WIKI 2). 2018. Pristimantis telefericus. https://wiki2.org/es/Pristimantis_telefericus

Wikispecies. 2018. Pristimantis telefericus. https://species.wikimedia.org/wiki/Pristimantis_telefericus
Wikiwand. 2018. Pristimantis telefericus. http://www.wikiwand.com/en/Pristimantis_telefericus