

Action Plan for *Atelopus oxyrhynchus*

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BACKGROUND

Species

Merida's harlequin frog, *Atelopus oxyrhynchus*

Photo



Photo by Pascual Soriano.

Conservation status

Listed as *Critically Endangered (CR A2ace)* based on evidence of a drastic population decline in the last 30 years, inferred from the apparent disappearance of most populations. A pathogen fungus causing chytridiomycosis and climate change are suspected as the main factors affecting survival of the species.

Distribution, population size and trends

Although found in high numbers in 1978 and 1985, it is currently an extremely rare species. The last previous record seems to be 1994. Subsequent survey attempts failed to find the species, suggesting a serious population decline. The last recent find of specimens in January 2020 suggest the species is still around but exact locations of this critically threatened species is not included to avoid sharing sensitive information. The species is known to occur in two protected areas (Sierra de La Culata and Sierra Nevada National Parks).

Habitat and ecology

The species inhabit upper montane cloud forests where it occupies cascading mountain streams to reproduce. Reproduction is associated with the rainy season, when reproductive pairs are set finally ending in the posture of long strings of eggs. Some data are known for the diet of this frog, based on a field study carried out in the middle 80's.

Primary threats

*The major putative threat is the chytrid fungus (*Batrachochytrium dendrobatidis*) suspected to cause the catastrophic population decline evidenced in the populations. Evidences of this pathogen in recent found larvae suggest that it is still a problem. Deforestation and habitat alteration is a major threat, especially outside protected areas. In a climate study using data from 1975 to 1990 we found (García et al. 2007) that drastic dry periods may have affected populations. The dryness of water pools where adult frogs may congregate to reproduce and where tadpoles may finish development can be treated by constructing artificial water pools to mitigate this threat.*

Conservation measures required

A subpopulation occurring within the Parque Nacional Sierra de La Culata is called to form the starting point for the establishment of an ex-situ population. More surveys are still needed to establish whether this species still persists in other parts of its known range. Ex situ programs involving captive breeding are among the conservation actions needed for the species, according to the most recent (2010) IUCN evaluation. The REVA Conservation Center, at the Venezuelan Andean city of Merida, is planning to set an ex situ program for this species with a duration of at least three years. REVA also plans to involve the regional branches of the Ministry of Environment and the National Institute for National Parks (INParques) in an in situ program consisting of community workshops, environmental education, and reintroduction program.

Current protection

Most of the range of the species is protected by the legal figures of national parks (Sierra Nevada and Sierra La Culata). The last found populations lie outside but close to the limits of the park Sierra de La Culata, calling for a revision of limits to include within this park the pristine habitat where these animals were found.

Current and previous conservation actions

No current actions are currently underway to conserve this species, except for the fact that most populations live inside protected areas.

Knowledge gaps

There are gaps in our knowledge of the ecology and natural history of the species, relevant to establish an ex situ conservation program.

Challenges and obstacles

One of the obstacles that might stand in the way of achieving the goals of a conservation plan for the species is whether the current socioeconomic and political situation in Venezuela worsens. Sustainability in the short run may depend on securing minimal funds to keep running the ex situ facilities. These obstacles could be overcome by planning ahead what to do with the animals, materials and equipment left in case of an overall failure affecting the continuation of the project, for which REVA is proposing some actions.

Budget and funding sources

Overall costs over the life of the plan runs for about 20,000 US\$ for a three to four years' ex situ and in situ programs. The first year of the ex situ program may come from a grant from Amphibian Ark, while funds are being anchored for a second year of operations by the BIOGEOS Foundations that could be back up with an extension of grant from AArk. Other organizations (such as Global Wildlife Conservation, Philadelphia Zoo and the Mohamed bin Zayed Conservation Fund) could provide additional funding for the long time project.

PRIORITY ACTIONS

Include objectives (clearly defined and measurable), proposed actions and respective time frames, person(s) responsible for each of the following items.

In situ

Habitat management, restoration and/or protection

Since most of the populations live within national parks, there are not many actions to be taken to manage and restore their habitat. Nonetheless, deforestation and habitat alteration may affect some populations and need to be addressed through restoration plans in the near future. Official environmental agencies, regional conservation organizations and community leaders could be involved in the future management of the species and its habitat.

Threat mitigation

The threat pose by climate dryness of pools could be mitigated by constructing artificial water ponds that may allow water to stay in place longer. Construction of pools is stipulated to start at the second year of the conservation program lead by the REVA Conservation Center.

Distribution surveys

To understand the entire distribution and habitat requirements for the species, REVA is planning additional surveys and ecological studies.

Population and conservation status monitoring

REVA will be responsible to coordinate a taskforce component for monitoring of the population in the wild, involving regular visits to the wild populations.

Ex situ

Captive management

The primary purpose of the ex situ population is for reintroduction in the wild. At least 20 founder animals are required to start the ex situ program, that will come from the latest known discovered population. If sufficient founder animals cannot be found, REVA already maintains a lot of (and plan to obtain more) tadpoles coming from as many different places as possible to undergo captive husbandry. Standard procedures will apply to guarantee genetic diversity and avoid interbreeding within the captive population.

Capacity building for ex situ management

REVA Conservation Center already has facilities and trained personnel to manage the captive amphibian conservation programs.

Develop husbandry guidelines

REVA will develop husbandry guidelines or protocols starting with information extrapolated from related taxa from similar habitats in countries like Ecuador (REVA is already in contact with Dr. Carlos Martinez and Luis Coloma for advice).

Reintroduction strategy

Specimens in the REVA facilities are kept under biosecurity protocols already in place to avoid spread of diseases. These include antibacterial, antiviral and anti-parasite treatments, as well as dietary care of the animals, among other considerations. Animals will be reintroduced in the wild after construction of artificial water pools at specific places within the cloud forest, and after the animals are treated in the ex situ facilities to get rid of any remaining potential disease. Since the specimens possess dorsal marks that are distinctive among individuals, REVA will develop an identification system based on photographs, to identify every single specimen to be released. This will facilitate later identification in the field, to be performed by trained personnel from REVA.

Education and awareness

Public education and raising awareness

The REVA Conservation Center plans to develop an education program to assist local communities (through education centers and communal groups), park rangers and local conservation organizations about the threats facing the species and what actions they might be able to take to help reduce threats and protect amphibians in general.

Exit strategy

One of the worst scenarios for the conservation program with the Merida's harlequin frog is if current Venezuelan socioeconomic and political situation worsens. The REVA Conservation Center, through its patron the BIOGEOS Foundation, have secured minimal funds to run the project for one additional year after receiving funds for the ex situ project. In the worst of cases, that the program continuity is compromised, liberation of the captive animals will proceed after meeting minimal biosecurity standards. Since the frogs come from a location close to the REVA facilities, we do not foresee many problems in releasing the animals into the wild. The liberation of animals is facilitated by the relatively closeness of the localities where the founder specimens come from.

REFERENCES

- Angulo, A., Rueda-Almonacid, J.V., Rodríguez-Mahecha, J.V. and E. La Marca (eds.). 2006. *Técnicas de Inventario y Monitoreo para los Anfibios de la Región Tropical Andina. Serie Manuales para la Conservación 2. Conservación Internacional. Bogotá, Colombia. 298 pp.*
- García, I.J., R. Albornoz, E. La Marca. 2007 ("2005"). *Perturbaciones climáticas y disminución de *Atelopus oxyrhynchus* (Amphibia: Anura) en los Andes de Venezuela. Herpetotropicos 2(2):63-71.*
- La Marca, E. 1983. *A new frog of the genus *Atelopus* (Anura: Bufonidae) from a Venezuelan cloud forest. Milwaukee Public Museum, Contributions in Biology and Geology 54:1-12.*
- La Marca, E. 1989. *Faunal Analysis. Pp. 50-54 In T. van der Hammen and D. Mueller-Dombois (eds.). Manual of Methods for Mountain Transect Studies. Comparative Studies of Tropical Mountain Ecosystems. International Union of Biological Sciences - Decade of the Tropics.*
- La Marca, E. 1994. *Proyecto EVE (Especies Venezolanas en Vías de Extinción). Anuario de Investigación 1991, Instituto de Geografía, Universidad de Los Andes: 75-76.*
- La Marca, E. 1995a. *Venezuelan harlequin frogs: in the face of extinction? Reptilian Magazine 3(8):22-24.*
- La Marca, E. 1995b. *Crisis de biodiversidad en anfibios de Venezuela: estudio de casos. Pp. 47-70 In M.E. Alonso (ed.). La Biodiversidad Neotropical y la Amenaza de las Extinciones. Cuadernos de Química Ecológica 4. Universidad de Los Andes, Mérida. 160 pp.*
- La Marca, E. 2001. *Disminuciones de ranas *Atelopus* y *Dendrobatidae* en Venezuela. Disminución de la Población Anfibia en América Latina/ Population Declines of Amphibians in Latin America. Ecosur, Smithsonian Tropical Research Institute y Pontificia Universidad Católica del Ecuador. Quito. Pp. 25-26.*
- La Marca, E. 2004a. *Decline of high Andean frogs of Venezuela. Reptilia 36:26-30.*
- La Marca, E. 2004b. *Der Rückgang von Froschpopulationen in den Hochanden*

- Venezuelas. *Reptilia* 46:34-38.
- La Marca, E., I. García, R. Albornoz, J.E. García-Pérez. 2010. *Atelopus oxyrhynchus*. The IUCN Red List of Threatened Species 2010: e.T54535A11163352.
- La Marca, E. and S. Lötters. 1995. Population declines in Venezuelan *Atelopus* (Amphibia: Anura: Bufonidae). 8th. Ordinary General Meeting Societas Europaea Herpetologica (SEH). Bonn, Germany, 23-27 August 1995. Programme and Abstracts Book, Museum A. Koenig: 77.
- La Marca, E. and S. Lötters. 1997. Monitoring of declines in Venezuelan *Atelopus*. Pp. 207-213 In W. Böhme, W. Bischoff & T. Ziegler (eds). *Herpetologia Bonnensis*. Bonn, Germany.
- La Marca, E. & S. Lötters. 2008. The extraordinary case of the Neotropical harlequin frogs (*Atelopus*): mass extinction within a genus. Pp. 100. In. S.N. Stuart, M. Hoffmann, J.S. Chanson, N.A. Cox, R.J. Berridge, P. Ramani & B. Young (eds.). *Threatened Amphibians*
- La Marca, E. and H.P. Reinthaler. 1991. Population changes in *Atelopus* species of the Cordillera de Mérida, Venezuela. *Herpetological Review* 22(4):125-128.
- 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.
- Lötters, S. 1996. *The Neotropical Toad Genus Atelopus. Checklist–Biology–Distribution*, Cologne: M. Vences & F. Glaw.
- Lötters, S., E. La Marca, S. Stuart, R. Gagliardo and M. Veith. 2004. A new dimension of current biodiversity loss? *Herpetotropicos* 1(3):29-31.
- Mijares-Urrutia, A. and E. La Marca. 2005. Los renacuajos de cuatro especies de *Atelopus* (Anura: Bufonidae) de los Andes de Venezuela. *Croizatia* 6(1-2):33-47.
- Rodríguez, J.P. and F. Rojas-Suárez (eds.). 2008. *Libro Rojo de la Fauna Venezolana. Tercera edición*. Provita & Shell Venezuela, S.A., Caracas.
- Rueda Almonacid, J.V., J.V. Rodríguez Mahecha, E. La Marca, S. Lötters, T. Kahn and A. Angulo (eds.). 2005. *Ranas Arlequines. Conservación Internacional*. Bogotá, Colombia. 158 Pp + 48 Pp unnumbered.
- Stuart, S.N., M. Hoffmann, J.S. Chanson, N.A. Cox, R.J. Berridge, P. Ramani & B. Young (eds). 2008. *Threatened Amphibians of the World*. Lynx Edicions, Barcelona, Spain; IUCN, Gland, Switzerland; and Conservation International, Arlington, Virginia, USA.
- Young, B., K.R. Lips, J.K. Reaser, R. Ibañez, A.W. Salas, J.R. Cedeño, L.A. Coloma, S. Ron, E. La Marca, J.R. Meyer, A. Muñoz, F. Bolaños, G. Chaves & D. Romo. 2001. Population declines and priorities for amphibian conservation in Latin America. *Conservation Biology* 15(5):1213-1223.