

Action Plan for *Atelopus oxyrhynchus*

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BACKGROUND

Species

*Merida's harlequin frog, *Atelopus oxyrhynchus**

Photo



Photo by Pascual Soriano.

Conservation status

The Merida harlequin frog is listed as a Critically Endangered (CR A2ace) frog in the IUCN Red List based on evidence of a drastic population decline in the last three decades, inferred from the apparent disappearance of its populations. A pathogen fungus causing chytridiomycosis and the current climate change are suspected as the main factors affecting survival of the species, although other synergistic factors may also have played a role, like deforestation and habitat modification, and introduced species like trout. Since exhaustive survey efforts have not been traduced in new records, it is inferred that the species is either possibly extinct or if there is any survival population, it should be very small (<50 mature individuals).

Distribution, population size and trends

The species was found in high numbers in the years 1978 and 1985, but currently it is suspected to be at least 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 was in 2014 in the Sierra de La Culata National park, at an elevation of about 3200 m.asl, suggesting that the species is still around. During the first months of 2020 until September (the onset of the reproductive season), the REVA (Rescue of Venezuelan Endangered Species) Conservation Center conducted surveys to search for this species, but failed to detect any adults or larvae. The species is known to occur in two protected areas (Sierra de La Culata and Sierra Nevada National Parks). Known altitudinal ranges is from 2100 to 3500 m.asl.

Habitat and ecology

*This bufonid species inhabits upper montane cloud forests where it occupies cascading mountain streams to reproduce. It is expected to lay eggs in long strings, like other *Atelopus*. The tadpoles remain unknown. Occasionally, it may be found in more or less open environments due to habitat modification, close to paramo environments. The reproduction of this frog has been associated with the rainy season beginning in May, 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 middles 80's.*

Primary threats

*The major putative threat for *Atelopus oxyrhynchus* is the chytrid fungus (*Batrachochytrium dendrobatidis*) suspected to cause the catastrophic population decline evidenced in the populations. Deforestation and habitat alteration is a major threat, especially outside protected areas. We found evidence of deforestation and associated burning of vegetation where frogs use to be common in the 1970's, in La Culata region, at 3050 m.asl. In a climate study using data from 1975 to 1990 we found (García et al. 2007) that drastic dry periods may have affected populations. Recent surveys in 2020 by a team of the REVA Conservation Center detected signs of flash flooding a cascading mountain stream where the species was formerly abundant, suggesting that this may pose a problem to the reproductive success of the species, as has been also suggested by La Marca for *Atelopus chrysocorallus* and *Atelopus sorianoi*. The presence of trout in a cloud forest mountain stream at 3200 m.asl where a single individual was seen suggests this has been a previously undetected threat for the species.*

Conservation measures required

More surveys are still needed to establish whether this species still persists in its known range. Once any wild population is located, ex situ programs involving captive breeding are among the conservation actions needed for the species, according to the most recent IUCN evaluation. There is need for 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 and environmental education to let know the species.

Current protection

Most of the range of the Merida harlequin frog is protected by the legal figures of national parks (Sierra Nevada and Sierra de La Culata) and the species is considered as Critically Endangered in international Red listings.

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 and an incipient plan to involve communities is underway.

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, that need to be filled and understood. There is also a need to understand the past and putative current populations in the Sierra Nevada National Park, where the record is scanty.

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 of any captive breeding program in the short run may depend on securing minimal funds to keep running the ex situ facilities. Additionally, any obstacles could be overcome by planning ahead what to do with the animals left if the project stops, as well as materials and equipment left in case of an overall failure affecting the continuation of the project.

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 as a grant from organizations such as Amphibian Ark, while funds need to be anchored for a second to a fourth year of operations by additional funding or new ones with other organizations.

PRIORITY ACTIONS

In situ

Habitat management, restoration and/or protection

*Since most of the populations of *Atelopus oxyrhynchus* 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 posed by introduced trout may be controlled by extraction and control of fishes where the frogs are reproducing; habitat restoration may provide suitable habitat for this and other regional frog species in the future.

Distribution surveys

To understand the entire distribution and habitat requirements for the species, there is a need to plan additional surveys and ecological studies to find new populations to be monitored in the future.

Ex situ

Captive management

There will be a need to establish a captive breeding program once animals are found in nature. The primary purpose of the ex situ population will be for reintroduction in the wild. At least 20 founder animals will be required to start the ex situ program. Standard procedures need to be put in place to guarantee genetic diversity and avoid interbreeding within the captive population.

Education and awareness

Public education and raising awareness

There is a need 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 organization in care of the ex situ program needs to secure minimal funds to run the project for one additional year after

receiving funds for an *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. The liberation of animals may be facilitated by the relatively closeness of the localities where the founder specimens are expected to come from.

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