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## Rediscovery of La Culata's Frog (*Aromobates durantii*), a critically endangered species

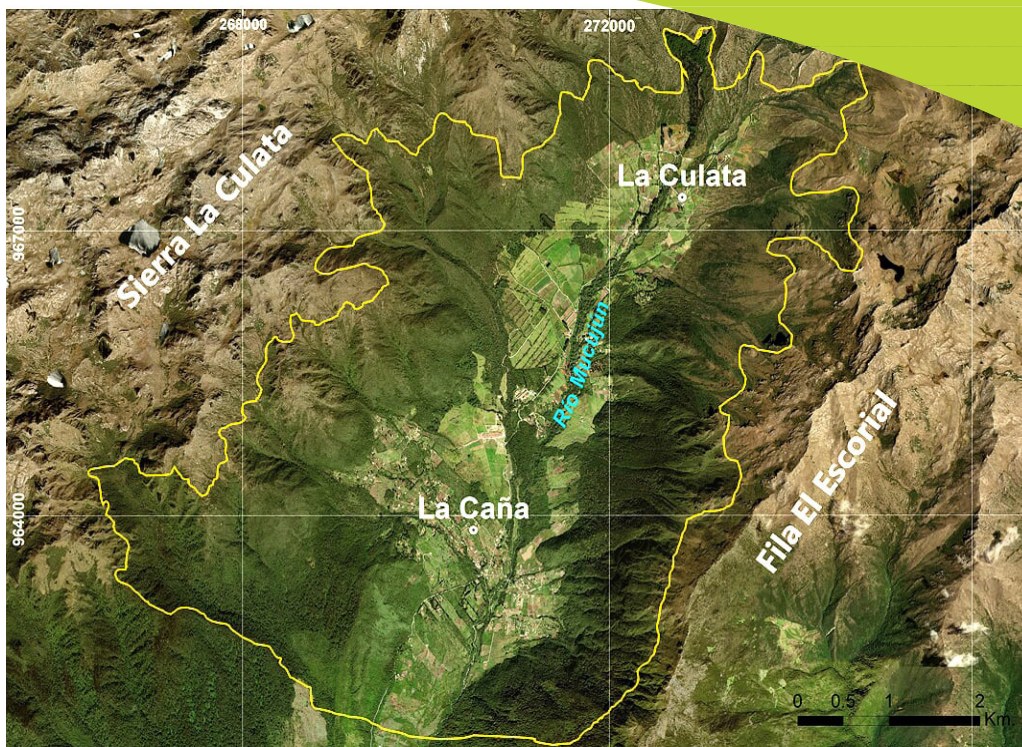
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### History

La Culata's Frog (*Aromobates durantii*) was described in 1985 and a few additional specimens were deposited in museums until the end of that same decade. Subsequently it seems to have disappeared, judging by the absence of visual records or collections after 1990. We do not know what caused the decline or extinction of their populations, even though it is very likely that a set of factors acting in synergy are responsible for this debacle.

In the late 1980s the El Niño phenomenon created unusually dry periods in the Venezuelan Andes. These prolonged and successive droughts may have affected the reproduction and survival of amphibian species in the region. Climate change, reflected in rising temperatures, may have also contributed to the spread of an epidemic caused by the pathogenic fungus *Batrachochytrium dendrobatidis*, detected in several specimens of frogs from the Merida Andes captured at the end of the 1980s.

The range of La Culata's Frog has also been greatly affected by the deforestation that wiped out virtually all the forests at the bottom of the Mucujún river valley, leaving remnants only towards the foothills of the surrounding mountains. The deforested areas were destined for rural use, livestock,



Probable distribution area (yellow polygon) of La Culata's Frog in the Mucujún river basin, northeast of Merida, Andes of Venezuela.  
Base image taken from Google Earth®

agricultural and touristic activities. Crops have been a source of contaminants in the form of agro-toxic compounds that have affected the quality of the waters in the region. Irrational tourism activity and the mismanagement of solid waste in some sectors contribute to the degree of pollution in locations where populations of this amphibian were previously found.

### Rediscovery

Following a conservation program at the REVA (Rescue of threatened Venezuelan Amphibian Species) Center that received support from Amphibian Ark, we rediscovered La Culata's Frog in a small forested remnant with an extension of about 1,000m<sup>2</sup> in the sector called La Culata, in the Libertador District of the State of Merida, Andes of Venezuela. Searches in

Adult female La Culata's Frog. Specimens of this endemic and threatened species can reach up to 32mm in total length.  
Photo: Enrica La Marca.



additional locations have not yielded positive results. It has been almost thirty years since the last time this frog was reported, which makes this finding an important discovery.

There are still a few relatively pristine forest remnants where populations of the species may survive. In this sense, we believe that efforts must be concentrated in potential sites of the El Escorial mountain range, which have not yet been studied because of their relative inaccessibility. Towards the Sierra de La Culata the forests with suitable habitat for this amphibian have been almost completely destroyed. Surveys among local people revealed that in the recent past populations of this species were found in other places from which they have already disappeared. The available information indicates that the species has a distribution area of approximately 20km<sup>2</sup> in the Mucujún river valley, between the towns of La Culata and La Caña, framed between the Sierra de La Culata and the El Escorial mountains ranges. Towards the mountainous foothills, the upper limit of distribution is given by páramo environments. The lower limit is not well determined, especially because of the absence of records and the high degree of anthropogenic intervention in the area.

The population we located in the course of this project confirms that La Culata's frog survives in very disturbed remnants of cloud forest near the paramo limit. The recently discovered population lives in a freshwater spring under the shade of small trees and shrubs, with some introduced pines, with abundance of "curuba" (*Passiflora mollissima*), ferns and mosses; as well as common duckweed (*Lemna* sp.), invasive watercress (*Nasturtium officinale*) and sedges (*Cyperaceae*) that predominate in the aquatic environment. In the surroundings of the town, livestock, horticulture and tourism activities are developed, which have had a major impact on deforestation and pollution, the latter particularly with toxic agrochemicals.

### Conservation status

Based on this finding and the new data collected, there is a need to re-evaluate the conservation status of the species, following the threat categories and criteria established by the IUCN. La Culata's frog is currently considered Endangered (EN) under category B1ab (iii) + 2ab (iii). In the Red List of Venezuela, it is listed as Insufficient Data (DD). The species has regional protection under the regulations of the Mucujún River Protective Basin, even

if it is not under any strict protected area figure, such as a national park.

For this species we determined a geographical range with an extension of presence in continuous decrease and less than 100 km<sup>2</sup>, severely fragmented, with an observed decrease in habitat quality and number of known locations (only three, two of them without current populations). Under these data, we suggest the following new category of threat to the species: Critically Endangered (CR) B1ab (i, iii, iv) + 2ab (i, iii, iv). More simply, it means that this species faces an extremely high risk of extinction in wildlife. It is an endangered animal that must be subject to studies and immediate conservation actions.

Virtually nothing is known regarding the natural history of La Culata's Frog. Our observations reveal that the species prefers humid and very shady places, under the shelter of vegetation and rocks associated with bodies of moving or relatively stagnant waters. In the field we have registered maximum temperatures of 18.3 °C and minima as low as 10.1 °C, with relative humidity between 81% and 58%. The data analysis based on a local weather station indicates that for the region of the Mucujún river valley framed between the towns of

La Culata and La Caña, the mean annual temperature is 10.8 °C (with a minimum average of 6.7 °C and maximum average of 13.0 °C). Similarly, the rainfall record indicates an annual average of 1,430mm (range between 1,110mm and 1,742mm).

### Ex situ program

We started an *ex situ* breeding project with a dozen specimens that we managed to catch. A few evaded capture. The species seems to be uncommon. In captivity we maintain three specimens for each glass terrarium with dimensions of 42 cm long, 30 cm wide and 34 cm high, with a simulated cloud forest environment. We try to keep one breeding pair for each terrarium. The determination of sex by visual examination is difficult. However, adult females have a bulkier belly and are larger than males; and the latter, when they reach reproductive maturity, develop a dark throat as opposed to the females that have them pale colored. Juveniles have a uniform yellowish or cream color.

The terrariums are kept in a cold room specially designed for the *ex situ* breeding colony, with air conditioning regulated at 16 °C; The average water temperature

Humid montane forests in the Mucujun river basin, where *Aromobates durante* lives.

Photo: Enrica La Marca.



in small internal ponds in the terrariums reaches to about 13 ° C. We provide artificial lighting with LED bulbs connected with a timer that simulates the natural photoperiod, and a 100W incandescent bulb that only lights during the hours close to noon. The relative humidity in the terrariums remains close to 80% average. The reproduction of the specimens in captivity has not yet been achieved; although on several occasions we have heard and recorded songs that males usually emit when conditions are darker as lights are turned off.

Some tadpoles caught in the field are developing well, feeding on fish food and prepared food that we have developed in REVA and that we have reported on previous occasions. As a complement to the feeding of the larvae and to provide shelter we have placed aquatic plants (*Elodea* sp. and *Vallisneria* sp.) previously treated for elimination of possible disease vectors. To generate the pH conditions closest to their natural habitat, where a certain amount of plant organic matter such as leaves and logs can be found in the water, we add leaves and cones of alder seeds (*Alnus* sp.) that tends to slightly acidify the water (which is beneficial in several respects, as aquarists know). Tadpoles do not survive at temperatures higher than 14 °C.

Some tadpoles have already metamorphosed and since then they demonstrate a voracious appetite and non-evasive behav-

ior. They feed on fruit flies (*Drosophila melanogaster*) supplemented with calcium and minerals. Adults have secretive habits and maintain a varied diet consisting of fruit flies, flour larvae (*Tenebrio molitor*), juvenile little cockroaches (*Blattella germanica*), as well as larvae and adults of various species of beetles (*Tribolium castaneum*, *Stegobium paniceum*, *Sitophilus oryzae*, and an unidentified *Chrysomelidae* probably of the genus *Bruchus*). Occasionally they are given ants (not identified). In their natural habitat we have registered the following groups of invertebrates: harvestmen spiders, terrestrial and aquatic shelled snails (bivalves, gastropods), slugs, aphids, dipterans, moisture mealy bugs, prawns (little river shrimps), copepods, mayflies, caddisflies, cockroaches, ringed worms and planarians. The wild diet for the species has not been determined.

### Future

We are carrying out some priority actions *in situ* in favor of the species, taking measures to prevent the degradation of the places where it currently lives and implementing habitat restoration actions. The first major effort in this regard was the cleaning of solid wastes that were present in the new site where we found the founder stock for the *ex situ* colony. An urgent measure would be the implementation of a habitat restoration and recovery plan, as well as reforestation with native species. These actions must be accompanied by an

environmental education campaign with local people, which we have already started, that helps to raise awareness about the problems associated with this species.

As with other members of the genus, the main threat to La Culata's Frog is habitat loss. Possible remaining populations would be highly susceptible to specific stochastic threats (such as landslides, extreme drought events, deforestation, contamination by solid and liquid wastes, etc.), which can become a vicious circle of population decline that can lead to eventual extinction. In this sense, the *ex situ* breeding plan that we have implemented in REVA is one of the best immediate strategies that we conceive to address the conservation problem of this frog. The *ex situ* colony will serve for captive breeding purposes with the subsequent objective of serving as a source of frogs for introductions or reintroductions, and it is vital to ensure the future of the species.



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