

### **1. Project Title:**

Fighting back extinction risk: a conservation program for the Venezuelan Andean frog *Aromobates durante*

### **2. Names, institutional affiliation, and email address of project leader:**

Enrique La Marca, Director of the Rescue of Endangered Venezuelan Amphibians (REVA) program of the BIOGEOS Foundation, Venezuela. E-mail: enrique.lamarca@gmail.com.

Member of the IUCN SSC Amphibian Specialist Group of Experts, since 1995.

Member of the ASG Captive Breeding Working Group, since 2017.

### **3. Total funding amount requested from Amphibian Ark in USD\$:**

US\$ 5.000,00

### **4. Executive summary (300 words or less)**

There is a need to establish an ex situ conservation program for *Aromobates durante*, a frog species with a restricted distribution to cloud forests of Sierra de La Culata, a mountain range in Merida state, Venezuela. This project is addressed to rescue populations of this Endangered species through captive husbandry and breeding, as well as liberations into the wild.

The following objectives have been set for the first year of a three-years' program for the species:

- (1) Determine threats, distribution, presence within protected areas, and conservation status.
- (2) Establish an *ex-situ* conservation program.
- (3) Set an *in situ* plan to involve regional communities and education centers through raise of concern about the species and to establish an environmental program.
- (4) Set an *in situ* re-introduction and monitoring program.

To measure effectiveness of the program during first year, we will have these measurable items:

- (1) Update of the conservation status to IUCN and Venezuelan Red Data Book.
- (2) Species Action Plan and Husbandry Guidelines.
- (3) Printed material (leaflets, posters, press note) to raise awareness and show *ex situ* results.
- (4) Video with program results, and article for AArk Newsletter.

### **5. Introduction**

*Aromobates durante* is just part of the high diversity of *Aromobates* frogs (about 20 species). It is a terrestrial and diurnal amphibian that lives along small water courses within cloud forest environments in the Venezuelan Andes of Merida State. As other species within the genus, it has experienced population declines reported since the late 1980's (Young *et al.* 2001, La Marca 2004). The species is currently listed as *Endangered* (EN) under the IUCN Red List categories (La Marca and García-Pérez, 2004) although its current status will probably reveal to be CR.

Fungal pathogen *Bd* and habitat destruction are suspected to have decimated its populations, to the point that the species stopped being noticed in the 1990's. Current habitat is highly fragmented through human activities. There are still relatively pristine forest remnants where the species may be found (Fig. 1), and recent hearing of frog calls near the type locality and attributed to males of the species give hope that there is at least one remaining population and that an *ex situ* program can be established for this threatened frog.



Figure 1. Forest remnants nearby the type locality of *Aromobates durantei* (Photo by E. La Marca).

## 6. Methodology

The *ex situ* program for *Aromobates durantei* will take place within the REVA (Rescue of Endangered Venezuelan Amphibians) Program of the Biogeos Foundation at Merida, Venezuela. In keeping and managing the captive frogs we are following standard biosecurity protocols already in place. The program counts with trained keepers to raise and breed the frogs. *Ex situ* facilities were recently conditioned to keep amphibians from high elevations (La Marca 2018); a small translucent ceiling roof will be installed to allow for natural light; a UV light bulb needs to be replaced.

Field expeditions will be carried out to found specimens and to determine current species' distribution. Places will be reached using 4x4 vehicles and treks into cloud forests of the Sierra de La Culata mountain range above 2700 m.asl. Founder specimens will be gathered from as many places as possible. Transport of frogs from cascading mountain streams to the car will be done in plastic containers with soft ice packs, and a cool box with hard hard ice packs will be employed to transport specimens on car to the REVA facilities in Merida city. Transported tadpoles will have aeration through air pumps wired to a car power electricity inverter.

Measures will be taken to guarantee health treatments and to provide adequate environmental conditions (artificial lighting, temperatures) within climate-controlled spaces. Feeding of captive juvenile and adult specimens will rely on invertebrate food-supply colonies. Feeding requirements will be extrapolated from the known diet of a related congener, *Aromobates alboguttatus*, living in the same mountain range (Piñero and La Marca 1996). Tadpole's maintenance will benefit from known morphology –size, dimensions, mouth parts (La Marca and Mijares 1997). Larval feeding will rely on a food formula developed within the REVA program and already tested with other *Aromobates* species (La Marca and Castellanos 2018).

Reproductive pairs will be kept in glass terraria with watering and fog systems in place to simulate cloud forest conditions. Standard record-keeping protocols will be followed to minimize

genetic problems derived from interbreeding. To stimulate reproduction, frog calls will be recorded in the wild and played back to the captive amphibians. F1 descendants (as metamorphosed froglets, juvenile and sub-adults) will be raised in plastic containers, liberated into the wild and later checked through monitoring.

An *in situ* conservation component will be implemented to raise awareness among the community through talks and printed material, as well as to enforce habitat protection and reforestation where possible. A short video production will be advanced to show the conservation project and its results.

The project will count with the partnership of the University of Los Andes (already providing salary and working and lab space to the project leader; and through student's participation); the NGO Biocontacto (providing veterinary assistance); and the regional branch of the Venezuelan Ministry of Environment (regulating *ex situ* program and participating in the *in situ* action plans).

## 7. Budget

Budget category	Item/amount	Requested from AArk	Other sources/ status
<b>Field activities and field collection</b>	Field vehicle rental \$60/day, 20 days	0	\$1,200 BIOGEOS* (approved)
	Stipends for local participants and guides	0	\$1,500 MBZF** (approved)
	Cool Box	0	\$28
	Hard Ice packs (x4)	0	\$24
	Soft Ice packs (x6)	0	\$40
	Car power electricity inverter (\$120 x1)	\$120	0
<b>Ex situ facility</b>	1st year keeper salaries	0	\$2,500 BIOGEOS (approved)
	Medicines, water treatment and cleaning chemicals	\$400	0
	Disposable gloves (\$100 x3)	\$300	0
	Food and materials for invertebrate cultures 1-year	\$850	0
	Plumbing (valves, couplings, PVC pipe)	\$300	\$700 BIOGEOS (approved)
	Glass terrariums	\$600	0
	Pumps (\$60 x5)	\$300	0
	Plastic enclosures, with lids	\$200	0
	Shelves	\$300	\$500 BIOGEOS (approved)
	Light bulbs, timers	\$980	0
	2 Plastic translucent ceiling & installation	\$100	0
	UV replacement bulb	\$20	0
	Calcium with Vitamin D 1-year supply	\$100	0
	Multivitamins for frogs 1-year supply	\$100	0
	Small Sony digital sound recorder (x1)	\$30	0
Terrarium Fogger Mist Maker (x2)	\$60	0	
ExoTerra Monsoon RS400 Rainfall System (x1)	\$240	0	
<b>Education and in situ activities</b>	Presentations at local education centers, posters	0	\$700 BIOGEOS (approved)
	<i>In situ</i> habitat restoration program	0	\$600 BIOGEOS (requested)
	Short video	0	\$100 BIOGEOS (approved)
<b>Total</b>		<b>\$5,000</b>	<b>\$7,892</b>
<b>Percentage</b>		<b>38.8%</b>	<b>61.2%</b>

\*BIOGEOS Foundation, Merida, Venezuela. \*\*MBZF. Mohamed bin Zayed Species Conservation Fund.

## 8. Literature cited

- La Marca, E. and J.E. García-Pérez. 2004. *Aromobates duranti*. The IUCN Red List of Threatened Species 2004. <http://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T55254A11281790.en>.
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- La Marca, E. 2018. Donation provides for equipment upgrades within the Biogeos Foundation facilities, at the Rescue of Endangered Venezuelan Amphibians program in Venezuela. *AArk Newsletter* 43:16-17.
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- Piñero J. and E. La Marca 1996. Hábitos alimentarios de *Nephelobates alboguttatus* (Anura: Dendrobatidae) en una selva nublada andina de Venezuela. *Revista de Biología Tropical* 44(2):827-833.
- 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.

## 9. Timeline of work

Activity	Sep-Dec 2018	Jan-March 2019	Apr-Jun 2019	Jul-Aug 2019
Field study, collection and video and sound recordings	X	X		
<i>ex situ</i> program	X	X	X	X
<i>in situ</i> program			X	X
Presentation of results				X