amphibian ark

keeping threatened amphibian species afloat

Newsletter

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Above: AArk Rabb Fellowship winner, Dr. Le Thi Thuy Duong, works with flying frogs in Vietnam (pg. 2). Below: AArk participates in the Atelopus Survival Initiative ex situ symposia at the XII Latin American Herp Congress in Bolivia (pg 5).





Hoppy Holidays!

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Congratulations to Le Thi Thuy Duong, 2023 George and Mary Rabb Fellowship Winner

Becca Brunner | Program Director, Amphibian Ark

Amphibian Ark's George and Mary Rabb Fellowship supports early or mid-career scientists and conservationists in research-based professional development that furthers amphibian conservation. This annual Fellowship (\$5,000 USD) is awarded to one person each year who address species research priorities indicated in the IUCN Amphibian Red List, AArk's Conservation Needs Assessment (CNA) process, and/or the Amphibian Conservation Action Plan (ACAP). Applicants must have completed their PhD within the last 8 years.

This year's winner is Dr. Le Thi Thuy Duong from Vietnam National University in Ho Chi Minh City. Her project is entitled "Estimates of occupancy and habitat preference of the vampire flying frog (Vampyrius vampryrus) and Vietnam flying frog (Rhacophorus calcaneus)."

Duong completed her PhD in 2021, studying diet patterns and environmental shifts in amphibian communities in southern Vietnam. Now a Lecturer and Researcher at Vietnam National University, she is currently developing a research program that contributes to amphibian conservation in Langbian Plateau, the southernmost part of Truong Son Mountain range in Vietnam. Beyond research, Duong is also passionate about training and mentoring young scientists; she currently supervises one graduate student and two undergraduates.

Duong will focus on two treefrog species with the Rabb Fellowship funds: the Vietnam flying frog and the vampire flying frog. Although these 'flying frogs' actually cannot not fly, they can glide through the canopy by using the extra-large webbing between their fingers and toes like parachutes. (And the vampire flying frog is named as such because its tadpole has fangs!) Both of these species are endemic to Vietnam and listed as Endangered on the IUCN Red List, yet we know very little about their ecology or population status. Duong aims to conduct intensive monitoring via incidental observations as well as by placing PVC pipes in various areas (a technique that has been known to attract treefrogs as refugia).

Duong works with two fascinating species: the vampire flying frog (left) and the Vietnam flying frog (right). Both are endemic to Vietnam and classified as Endangered (IUCN Red List). Photos: Le Thi Thuy Duong



Dr. Le Thi Thuy Duong is AArk's 2023 George and Mary Rabb Fellowship Winner!

"Our team has been working on amphibian biodiversity and conservation in Southern Annamite of Vietnam, where there is one of the greatest concentrations of threatened amphibian species in the world. With the support from Amphibian Ark's George and Mary Rabb Fellowship, this project will gather baseline information on population status and ecology of two target species throughout their known range in order to inform future conservation management decision making." -Dr. Le Thi Thuy Duong

Amphibian Ark is proud to honor the legacy of George and Mary Rabb by supporting the research and conservation efforts of Duong and her team.



AArk participates in the XII Latin American Herpetological Congress, supporting *ex situ* symposia and three grantees

Luis Carrillo | Director of Training, Amphibian Ark

COVID affected everything, even conferences. The Latin American Herpetological Congress (LHC) resumed after a 4-year hiatus in Cochabamba, Bolivia this November. More than 250 people participated from countries all over the world: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Venezuela, Panama, Costa Rica, Guatemala, Mexico, the Dominican Republic, USA, Spain, and Switzerland.

In addition to the Congress in general, Amphibian Ark participated in multiple symposia: 1) Amphibian ex situ conservation in Latin America, 2) the High Andean Amphibians: Conservation status of amphibians of the genus Telmatobius and conservation actions, and 3) the Atelopus Survival Initiative Workshop.

Symposium: Amphibian ex situ conservation in Latin America

Amphibian Ark helped organize this symposium with the Bolivian Amphibian Initiative. The objectives of this symposium were to: a) share accomplishments and challenges of *ex situ* conservation programs within the region, b) share the importance and value of good planning when establishing an *ex situ* conservation program, and c) understand the needs and challenges within Latin America to establish new amphibian *ex situ* conservation programs.

Twenty people representing 15 institutions participated in this symposium. The symposium

opened with several participants' presentations where successes and challenges in regards to program planning were presented, followed by a round-table discussion on how AArk could help the different institutions achieve their goals. Some of the most relevant requests were: more postings and updates in AArk WhatsApp groups, further promotion of personnel exchange and alliances among the different conservation centers, and more information about the different tools that AArk offers.

Participants of the Amphibian *ex situ* conservation in Latin America symposium, Ied by AArk's Luis Carrillo. Photo: Luis Marin da Fonte





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Workshop: Atelopus Survival Initiative (ASI)

The Atelopus Survival Initiative is a collaborative and coordinated regional effort to implement substantial, long-term conservation measures to prevent the extinction of harlequin frogs (Atelopus spp.), one of the most threatened groups of amphibians— 83% of the 99 Atelopus species are listed as Critically Endangered, Endangered or Vulnerable on the IUCN Red List.

The second ASI reunion was held during XII Latin-American Herpetological Congress to take advantage of the meeting of members already attending the Congress. AArk offered participants and ASI members all of our management tools for *ex situ* conservation.

During the workshop, participants shared information on their work with Atelopus species and also gathered in working groups to review and update the Harlequin Action Plan – the document that guides the work of ASI members.



AArk Workshop Attendance Grantees

AArk also financially supported 3 ASI members that manage Atelopus *ex situ* conservation programs. Through our Workshop Attendance grant, three women were funded to attend the Conference and the ASI workshop. These three grantees provided the following quotes about their experience at the workshop and congress:

Andrea Terán, Center Jambatu, Ecuador – "Participating in the Atelopus Survival Initiative (ASI) workshop allowed for sharing information about this proposal with professionals interested in participating and collaborating in the conservation of harlequin frogs".

Margarita Lampo, Center for the Reproduction and Investigation of Harlequins (CRIA), Venezuela – "Despite the socioeconomic challenges facing the region, there is considerable potential to address the conservation of these critically endangered amphibians. Our biggest challenge lies in attracting funds to support these conservation efforts in the region".

Paola Molina, Parque Explora, Colombia – "Attendance at the workshop brings with it a series of benefits that for now are intangible but are aimed at strengthening the strategic relationship with institutions and researchers, and motivating and projecting our team as leaders in Atelopus conservation and learn first-hand about other conservation achievements".

<u>Above</u>: Participants of the Atelopus Survival Initiative meeting in Bolivia. <u>Below</u>: Paola Molina, one of AArk's Workshop Attendance Grantees, with Luis Marin. Photos courtesy of ASI and Paola Molina



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Continued breeding success for the Rancho Grande harlequin toad in Venezuela, an AArk grant funded program

Margarita Lampo | Center for the Reproduction and Investigation of Harlequins (CRIA), Venezuela

On November 5th, the first Rancho Grande harlequin toad (*Atelopus cruciger*) juveniles born in captivity metamorphosed into healthy juveniles at the Center for the Reproduction and Investigation of Harlequins [Centro para la Reproducción e Investigación sobre Arlequines (CRIA)]. These juveniles were part of a batch of ~500 eggs laid on July 19th. Despite the high incidence of the Spindly Leg Syndrome—a condition associated with calcium deficiency resulting in thin or deformed limbs— in a previous cohort, these new tadpoles showed no evidence of this syndrome.

With the implementation of a new tadpole diet combining dandelion leaves (Taxaracum officinale) and a commercial brand fish food (Soilent Green by Repashy®), tadpole survival increased from 60% to 90% and the incidence of Spindly Leg Syndrome was reduced to less than 1%.

The juveniles are active and growing rapidly. As of December 10th, CRIA cares for 180 healthy juveniles, while more than 300 tadpoles are currently developing and awaiting metamorphosis in the incoming weeks.

Through an Emergency Grant from Amphibian Ark, we were able to purchase a portable power station (EcoFlow®) to offset the recurrent power outages at Leslie Pantin Zoo, which were causing temperatures to exceed the maximum tolerance for tadpoles. With the equipment installed, we relocated 100 tadpoles from Caracas, 10 of which have already metamorphosed to healthy juveniles.

<u>Top</u>: Rancho Grande harlequin toad juveniles—an exciting stage of the ongoing success story for this species.

<u>Middle</u>: CRIA purchased a new portable power station through an Amphibian Ark Emergency Grant to deal with recurring outages. <u>Bottom</u>: The newest cohort of *Atelopus cruciger* tadpoles. Photos: Margarita Lampo

> Two different batches of eggs were also recently laid by two other females on October 10th and December 10th at our unit in Caracas. 130 tadpoles from the first batch have been developing well. Embryos are developing from the second batch.

> If we can maintain high survival rates (>85%) over the next few stages, we hope to reach our goal of breeding 250 postmetamorphs from 6 founder individuals before June 2024. Given the success of this program during the first 18 months, we anticipate an earlier start of the first release trials into the wild, possibly during early 2025!



Argentina *ex situ* conservation programs: AArk visit report

Luis Carrillo | Director of Training, Amphibian Ark Federico Kacoliris | Argentina Coordinator, Amphibian Ark

Over the last 5 years, Amphibian Ark has supported 6 *ex situ* conservation programs in Argentina. We took the opportunity to visit most of them recently. The species involved in these programs are either Critically Endangered, Endangered, or Vulnerable on the IUCN Red List. Most of the programs are already on their way to being well-established and one of them with advance threat mitigation and in their first reintroduction trials.

Programs at the Ecoparque Buenos Aires and Bioparque Temaikèn have multidisciplinary staff, including biologists, nutritionists, technicians, and veterinarians. These institutions also breed their own food, which guarantees quality and availability. During the visit, we reviewed many aspects of their *ex situ* management practices, including UV light, nutrition, and biosecurity; we provided advice when necessary.

A couple of AArk supported programs in Argentina are still in their 'head-start' phase, meaning that they raise wild eggs in captivity to maximize their chances of metamorphosing and then release young frogs back into the wild. A major issue for amphibians in Argentina is the desiccation of ponds where frogs breed, so 'headstarting' can make a big difference for a population. The next step for these 'head-start' programs is to build capacity for them to breed frogs in captivity as well.

We were also fortunate to visit the habitat of two of the species, which helped us understand the conservation threats and how the program managers are tackling them.

It is worth mentioning that zoos are not the only institutions involved in amphibian conservation in Argentina—universities, natural history museums, and NGOs are also dedicated. To help the different facilities to achieve their goals, AArk plans to follow up with all programs and potentially hire a new in-country coordinator who can lend expertise to *ex situ* endeavors in Argentina.

Frogs in AArk *ex situ* conservation programs in Argentina, from top to bottom: 1) *Melanophryniscus nigricans*. Each individual has a unique spotting pattern on its belly, making it easier to identify individuals.

- 2) *Melanophryniscus estebani* at the Universidad de San Luis.
- <u>3) Atelognath</u>us patagonicus at Bioparque Temaikèn.
- 4) Gasthroteca gracilis at Reserva Horcomolle, Tucumán.

Photos: Luis Carrillo





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Amphibian focus in the "Vietnamazing" EAZA Conservation Campaign, 2024-2025

Thomas Ziegler | Cologne Zoo, Germany

Arne Schulze | Zoological Society for the Conservation of Species and Populations (ZGAP), Germany **Minh D. Le** | University of Science (HUS) & Central Institute for Natural Resources and Environmental Studies (CRES), Vietnam National University, Hanoi (VNU), Vietnam

Truong Q. Nguyen | Institute of Ecology and Biological Resources (IEBR), Vietnam Academy of Sciences and Technology, Vietnam

Over the last 20 years, the European Association of Zoos and Aquaria (EAZA) has set standards in modern species conservation all around the world through fundraising and environmental education. More than 140 species conservation projects have been funded and networks have been established with other conservation partners, galvanizing official conservation measures to be taken. Hundreds of millions of zoo visitors were also informed about these campaigns and the general importance of biodiversity conservation.

One of EAZA's focus areas is Southeast Asia. Beyond general campaigns for the region, EAZA has worked to combat the Asian Songbird Crisis and to protect threatened turtles given their popularity in the trade for traditional medicine.



EAZA's upcoming campaign focuses on the unique habitats and threatened biodiversity of Vietnam. The initial idea

came from Radoslaw Ratajczak, co-director of the Endangered Primate Rescue Center (EPRC) in Cuc Phuong National Park in Vietnam. Afterwards, a core team was assembled, consisting of zoos in Germany (Leipzig, Cologne, Dortmund Zoo), France (Mulhouse, Beauval Zoo), and the Netherlands (Royal Burgers' Zoo) as well as the Zoological Society for the Conservation of Species and Populations (ZGAP). Our team prioritizes the integration of the "One Plan Approach to Conservation" developed by the IUCN Conservation Planning Specialist Group (CPSG). The One Plan Approach aims to protect a species by involving all those responsible and relevant and drawing on a wide range of expertise. The best way to do this is to work on a united front for Vietnam within EAZA and Europe, and of course with conservationists and experts from Vietnam.

The new campaign was launched this September at the annual EAZA meeting in Helsinki, Finland in an hour-long plenary session to almost 900 participants from 327 institutions and 70 countries. Prof. Dr. Truong Quang Nguyen from Vietnam gave a presentation, highlighting the tremendous wealth of Vietnam's biodiversity, but also the multi-layered threats, explaining why such a campaign is so important for the country. We also presented the flagship species and priority projects of the campaign, as well as how to become involved, following the motto: "Be part of it!" EAZA members, as well as other interested conservation partners, can sign up and prepare for the 2024 campaign launch at their own institutions.

The aim of the "Vietnamazing" campaign is to build bridges between EAZA institutions, zoo visitors, and Vietnamese and international conservation partners and beyond to link conservation planning processes, in situ and ex situ conservation with habitat restoration efforts, scientific research, conservation education, fundraising, and public awareness, especially for threatened species. The campaign goals are therefore:

Launch of the "Vietnamazing" campaign at the EAZA annual conference in Helsinki, Finland. Photo: J. Pfleiderer



- (1) Highlight the uniqueness of Vietnam as a biodiversity hotspot
- (2) Promote and implement the One Plan Approach
- (3) Build bridges between EAZA and Vietnamese and international conservation and research partners
- (4) Fulfill the objectives of pre-selected flagship projects
- (5) Provide financial and technical support to advance conservation efforts for highly threatened species and their habitats
- (6) Strengthen ex situ conservation efforts for highly threatened species

The "Vietnamazing" campaign has chosen flagship species for various taxa: gibbons for mammals; the Vietnam pheasant for birds; the Vietnamese pond turtle (which is considered functionally extinct in the wild) and the Vietnamese crocodile lizard for reptiles; the tiger hillstream loach for fish; the Vietnamese giant magnolia snail and the Nuichua stick insect for invertebrates.

Of course, we will also be focusing on amphibians we present each flagship "Vietnamazing"

amphibian species on the following pages.

The general status of Vietnamese amphibians

As of 2022, Vietnam has ~275 described amphibian species; 95 of those (35%) are endemic, and more than half are known from only one location in Vietnam (Krzikowski et al. 2022). Fifty of the 275 amphibian species known from Vietnam (18%) are classified by the IUCN as threatened with extinction. Among them, 27 are endemic. Alarmingly, 13 endemic species, including two threatened species, occur exclusively in unprotected areas. No data are available for twothirds of Vietnam's endemic amphibians because their status on the IUCN Red List is either missing or outdated. In terms of amphibians, the "Vietnamazing" campaign will initially focus on mossy frogs (genus Theloderma) and the Vietnamese crocodile newt (Tylototriton vietnamensis).



Mossy frogs are flagship amphibians for the "Vietnamazing" campaign. This species is Khoi's mossy frog (*Theloderma khoii*). Photo: T.T. Nguyen

Flagship Species: Mossy frogs

The mossy frogs (genus *Theloderma*) are rarely encountered due to their cryptic way of life. The name comes from the fact that some species' camouflage imitates plant material (moss or bark) or even bird droppings! In many species the skin is warty; in others it is rather smooth. They are medium-sized to small frogs distributed from northeast India and southern China through southeast Asia to the Greater Sunda Islands, with the greatest species richness in the Indochinese region.

There are currently 28 described species in the genus *Theloderma*, many of which have only been described based on a single frog or a few specimens, so there is still much to be explored. Vietnam harbors more species of mossy frogs than any other country. To date, 17 species have been described from Vietnam, with more discoveries expected. According to the IUCN Red List, 24 *Theloderma* species have a declining population status, with five of them - all found in Vietnam - listed as threatened: three as Endangered (*T. nebulosum*, *T. palliatum* and *T. ryabovi*), and two as Vulnerable (*T. auratum*, *T. petilum*). To protect these species, research needs to be done in the field; then further conservation measures can then be planned, whether through the creation of official protection statutes, an expansion or establishment of protected areas, and/or parallel *ex situ* conservation by local stations to ensure the long-term survival of these species.

This species, the Dotted bubble-nest frog (*Theloderma albopunctatum*) imitates bird poop as a form of camouflage! Photo: T. Ziegler



In particular, to expand conservation efforts for Vietnamese mossy frogs, the EAZA Vietnam Campaign will work with its partners at the IEBR and together with Prof. Dr. Tao T. Nguyen, mossy frog specialist from Hanoi's Institute for Genome Research, to promote the following:

- (1) Monitoring (research on distribution, population size, and threats to primarily micro-endemic species
- (2) Carrying out integrative taxonomic research to determine the extent of species richness, especially in under-researched regions of Vietnam
- (3) Promoting the inclusion of micro-endemic species that are listed in Vietnam's Red Data book but are not yet protected
- (4) Laying the foundation for *in situ* conservation efforts for species not yet found in protected areas
- (5) Filling ex situ species conservation gaps in Vietnam

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The Vietnamese crocodile newt (*Tylototriton vietnamensis*) is one of the flagship amphibian species in the "Vietnamazing" campaign. Photo: T. Ziegler

Flagship Species: Vietnamese crocodile newt

The systematics of crocodile newts (genus *Tylototriton*) has been turned upside down in recent years. Species that were previously thought to be widespread have turned out to be several cryptic species (species that look physically similar but are genetically different species), all of which are threatened by extinction. With almost 40 species found in the mountain forests of the entire Asian monsoon climate zone, it is now the most species-rich genus within the family Salamandridae—16 species have been described in the last 5 years alone. Currently, 7 species are known from Vietnam, and all have been discovered in the last two decades.

The Vietnamese crocodile newt (*Tylototriton vietnamensis*) was described in 2005. Previously, it was thought to be the same species as the Black crocodile newt (*T. asperrimus*), whose occurrence is now restricted to southeastern China. These newts are usually found on land except during the rainy season, when they reside in temporary pools for mating.

Unfortunately, there are only small, isolated remnant forest stands left, which are increasingly giving way to agricultural

use. Coal mining is also a threat, as well as collection for traditional medicine and for the national and international pet trade. Because of this, the entire genus *Tylototriton* was recently listed in Appendix II of the Convention on International Trade in Endangered Species (CITES). *T. vietnamensis* is listed as Endangered in Vietnam's Red Data Book. The species is now no longer listed as Endangered in the IUCN Red List, but only as Vulnerable because IEBR and its Melinh Station for Biodiversity in Vietnam as well as Cologne Zoo in Germany have taken extensive measures to protect this species, including conservation breeding programs, population and threat analyses, and raising public awareness. Some newts have already been repatriated from Cologne Zoo to Vietnam, where they have been subsequently successfully bred. This is an example of the "Reverse the Red" campaign, which aims to reverse the threat status of species. Nevertheless, there is still a lot to be done for the conservation of this crocodile newt, especially in the wild.

To expand conservation efforts, the EAZA Vietnam Campaign, particularly with its partners from IEBR, Tay Yen Tu and Yen Tu Nature Reserves, CRES, and the Institute for Genome Research, Hanoi, will promote the following:

- (1) Population monitoring (assessment of population status and threats)
- (2) Genetic analyses of new crocodile newt populations
- (3) Expand conservation breeding in Vietnam and Europe
- (4) Improve conservation measures, such as increased ranger patrols
- (5) Restock or repatriate *ex situ* animals to recover wild populations
- (6) Raise conservation awareness for tourists and other stakeholders

For more information

Webpage: https://vietnamazing.eu/

Plenary session recording: <u>https://youtu.be/yXBlicjBCHE?-</u> feature=shared

Krzikowski, M., T.Q. Nguyen, C.T. Pham, D. Rödder, A. Rauhaus, M.D. Le & T. Ziegler (2022): Assessment of the threat status of the amphibians in Vietnam – Implementation of the One Plan Approach. – Nature Conservation 49: 77–116. Appealing for others to join the "Vietnamazing" campaign through the slogan "Be a Part of It!"— first presented at the 2023 EAZA conference. Photo: J. Pfleiderer



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Amphibian Ark Donors, January-December 2023

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