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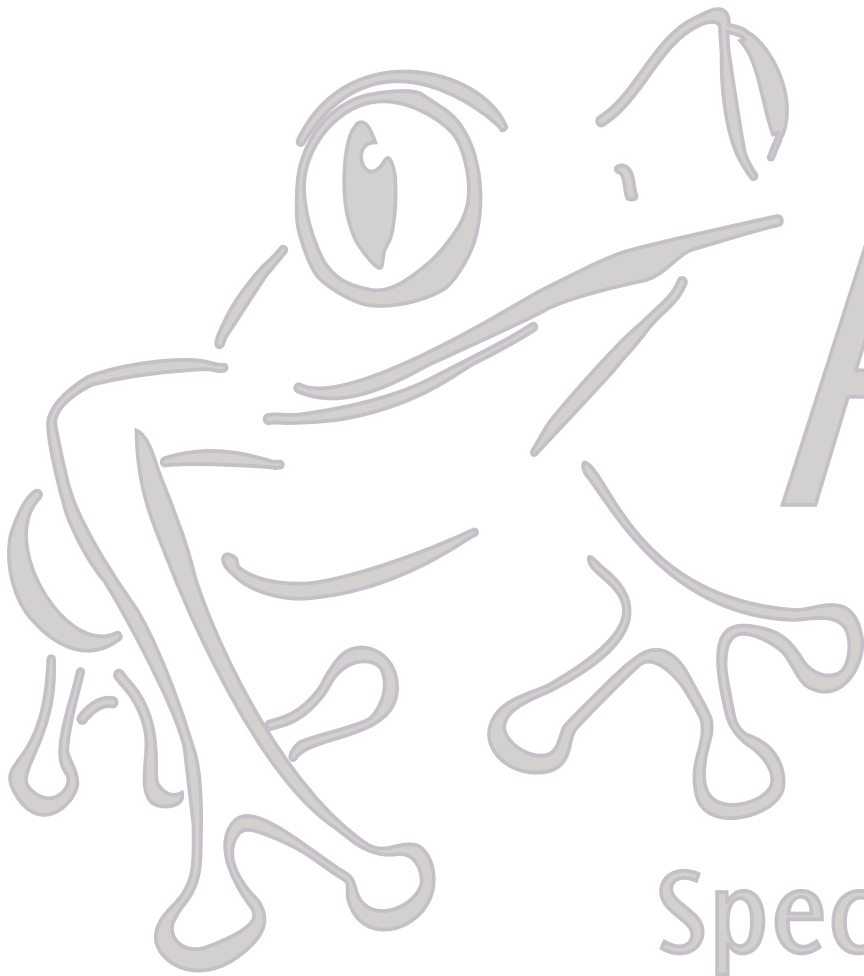


“Lost” Frogs

The global search comes to an end. Where next?



Red List
Updating South Africa's Red Lists.



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Welcome to the new-look FrogLog. It has been a busy few months for the ASG! We have redesigned the look and feel of FrogLog along with our other media tools to better serve the needs of the ASG community. We hope that FrogLog will become a regular addition to your reading and a platform for sharing research, conservation stories, events, and opportunities. We invite submissions of everything from letters and research papers to workshop announcements or simply stories from the field. It is your platform and we look forward to working with you to make it as relevant and informative as possible.

Soon we will also launch an updated ASG Web site at www.amphibians.org. The site will be more dynamic and include resources such as a forum to stimulate discussion on issues related to amphibian research and conservation. Please take a moment and join our Facebook and Twitter communities and use these social networks, along with the Web site and mailing list, to engage with the wider ASG community.

To support these new resources the ASG has hired a new coordinator, and it is with pleasure that we welcome James Lewis on board. James is bringing with him several years of program coordinator experience having spent the last five years working in Central America, most recently with the Wildlife Conservation Society in Belize. Prior to moving to the Americas James worked as an Ecological Consultant in Europe and has spent time working in sub-Saharan Africa. James will play a key role in assisting with the day to day running of the ASG. His major focus will be developing the ASG Web site and communication strategies to meet the needs of our members and the greater herpetological community. Please feel free to contact James with any requests and suggestions at jplewis@amphibians.org. We look forward to working with you to build a community of committed individuals with a shared concern and appreciation for all amphibians.

ASG and Editorial Committee

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The Sierra Caral of Guatemala: a refuge for endemic amphibians

By Carlos Vásquez-Almazán,
Theodore J. Papenfuss, Robin Moore, Hussain Aga Khan, and Don Church



Duellmanohyla soralia. Credit Hussain Aga Khan

The Sierra Caral are an extension of the Sierra Merendón, the mountain range along the border of Honduras and Guatemala. The original forest consisted of both lowland tropical forest below 1000 meters and cloud forest above 1000 meters. The highest elevation in the Sierra Caral is about 1300 meters. The Guatemalan side of these mountains is a source of water to communities in the Motagua Valley, one of the focal points of the “Debt-for-Nature Swap”, a conservation program that is supported by the governments of Guatemala and the United States and two non-governmental agencies, Conservation International and The Nature Conservancy.

Unfortunately, the geographic position of the Sierra Caral, which is adjacent to the Motagua Valley where a main highway connects Guatemala City with the major sea port, Puerto Barrios, allows easy access to these mountains and most of the original forest has been destroyed.

In the early 1990s, scientists from the University of Texas at Arlington conducted amphibian and reptile surveys

in an area that still contained forest. They discovered several endemic species including the IUCN Critically Endangered salamanders *Nototriton brodei* and *Cryptotriton wakei*. Presently nine Endangered and Critically Endangered amphibians are known to occur in the Sierra Caral. Endemic plants, insects, and reptiles are present, including the beautiful blue Merendon palm-pitviper (*Bothriechis thalassinus*).



Deforestation in the Sierra Caral of Guatemala, near the border with Honduras. Credit Robin Moore

During the last three years we have visited the remaining forest several times to conduct amphibian and reptile surveys. We are working with the Guatemalan NGO, FUNDAECO (Fundación para el Ecodesarrollo y la Conservación), which is the lead

agency that will coordinate the purchase of habitat to preserve this site as part of Guatemala’s Protected Area network. Due to loan foreclosures ownership of three large tract of forest was transferred to Banco Industrial, one of the largest banks in Guatemala. In 2010 one of the large tracts was sold to a private individual, however two of the tracts are still for sale. We visited the Sierra Caral in October, 2010 to make sure that the habitat was intact and suitable for acquisition as a protected area.

Banco Industrial has agreed to sell the property at a below market price and already over \$500,000 of the \$1,000,000 need to purchase the property has been pledged.

Acknowledgements

Funding for fieldwork was provided by the Critical Ecosystems Partnership Fund (CEPF), Conservation International, Global Wildlife Conservation, the Mohamed bin Zayed Species Conservation Fund, the Museum of Vertebrate Zoology, and the National Science Foundation (Biotic inventory and evolution of the terrestrial vertebrate fauna of nuclear Central America, grant BSI-1026393). Hussain Aga Khan, who visited the Sierra Caral with us in 2009, provided the photograph of *Duellmanohyla soralia*.

Updating the IUCN Red List status of South African amphibians

By John Measey

Five years after the publication of the South African Frog Atlas (Minter et al, 2004) which coincided with the end of the Global Amphibian Assessment (Stuart et al, 2004), it was time to re-assess South Africa's 118 species of anuran amphibians. The very solid foundation laid by the former Red List was essential to produce the update, and with it an opportunity to look back over the last five years of amphibian research and decide what we need to know for before the next assessment is due. What has emerged is not only an updated Red List, but also a policy document that will guide researchers, policy makers and conservationists to prioritise research on threatened amphibians for the next five years. The South African National Biodiversity Institute (SANBI) is proud to announce the publication of this book which is available for free download from the SANBI website (details below).

Assessments of all species took place from September 2009 and were finalised in a workshop at SANBI on 2 December 2009, when the South African Frog Re-assessment Group (SA-FRoG) was formed. Prior to the workshop, taxonomic leaders were charged with investigating all South Africa's amphibian taxa to assess all data gathered since the 2004 assessments. Only those considered to be threatened (CR, EN or VU), Data Deficient (DD) or species which had previously been listed as threatened were discussed at the workshop, all others having already been considered by leaders as continuing to be of Least Concern (LC).

For all 35 species reassessed during the workshop, sufficient data were available to make global assessments. Only 13 were deemed to hold the same status as in the 2004 assessment. All 7 species classified



Thanks to everyone who attended the workshop (3-4 December 2009) to prioritise research on South Africa's amphibians.

as Data Deficient (DD) in 2004 had sufficient data obtained to make full assessments. Of the threatened species, 8 were downlisted (2 CR to EN, 1 EN to VU, 2 VU to LC and 3 VU to NT) while 3 were uplisted (2 EN to CR and 1 VU to EN). Full details of all threatened amphibian species in South Africa (assessed by SA-FRoG & IUCN SSC Amphibian Specialist Group) are detailed in an appendix of the book

the Red Listing, attended by a forum of the region's amphibian scientists. The aim was prioritise research by producing a list of clear actions and responsible agencies together with a time frame for the research required. Four sessions discussed priorities for threatened species in the following areas, which are also the chapter titles in the resulting book:

- Understanding and Documenting Species Diversity
- Conservation and Ecological Studies
- Assessing Status and Trends
- Education, Awareness and Capacity Building

Despite a history including some of the world's best herpetologists, South Africa still has new frogs to describe, and these require a combined approach including molecular studies in conjunction with morphological and call analysis.

Priorities include undescribed species of *Anhydrophryne*, *Capensibufo*, *Microbatrachella*, *Poyntonophrynus* and *Xenopus*. Timely descriptions are important as each new species is



Arthroleptella rugosa is the only new frog described in South Africa since 2004 and joins the Red List in 2010 as Critically Endangered. Credit: Andrew Turner

(Measey, 2011) as well as on the IUCN Red List website (www.iucnredlist.org).

A second two day workshop followed

likely to have an increased threat status, also requiring reassessments of other species within the genus.

Priorities for conservation and monitoring include the (now) Critically Endangered *Vandijkophrynus amatolicus*, last seen in September 1998 and the subject of a co-ordinated effort to find them again (see CI's The Search for Lost Frogs). In general, most species continue to be assessed on their distribution data (Extent of Occurrence and Area of Occupancy) and a priority to collect population data and set up long-term monitoring programmes for several threatened species was identified.

The list of priorities for conservation research is particularly long and this caused a lot of concern as there is not sufficient capacity or locally available funding to conduct the work that is required. Including museums, universities, research institutes and provincial nature conservation organisations, South Africa has a total of 14 amphibian researchers, most of whom also work on reptiles and other small vertebrates. This capacity needs to grow in order to meet the increasing threats to the country's frogs.

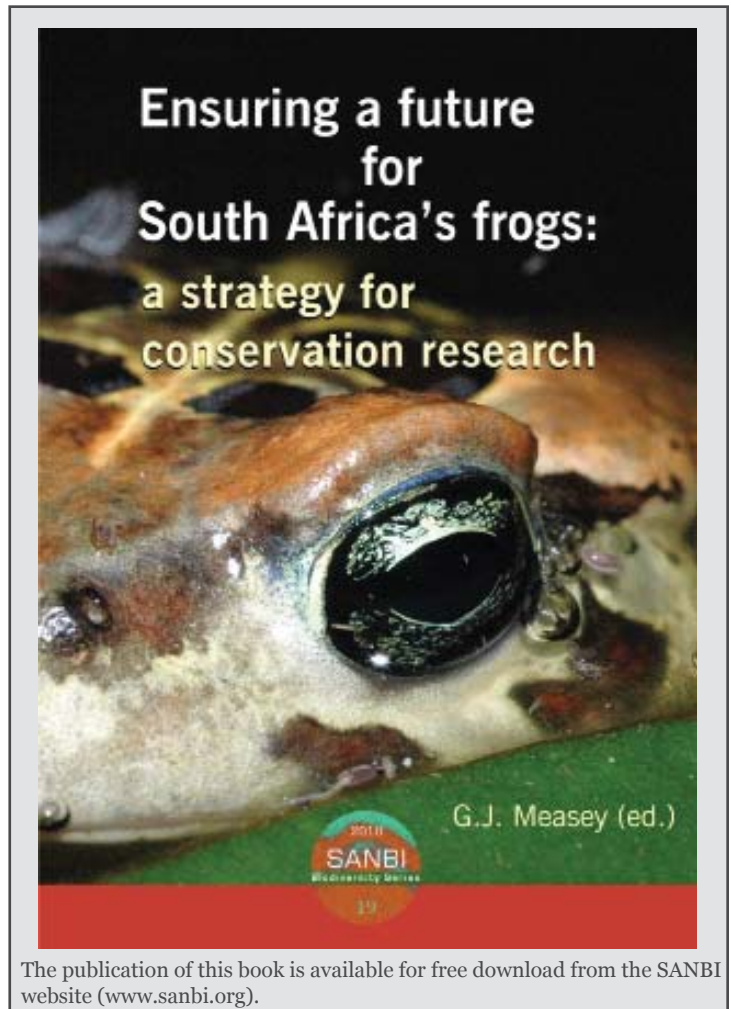
The reassessment and research strategy represents an important step for the conservation of amphibians in South Africa, and a model approach for other areas of the globe. The fulfilment of the targets presented is ambitious given the small capacity and lack of local funds, but would represent a significant step to redress the loss of the region's amazing amphibian biodiversity.

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SA-FRoG

SA-FRoG is made up of Marius Burger, Alan Channing, Michael Cunningham, Sarah Davies, James Harvey, John Measey, Les Minter, Louis du Preez, Jeanne Tarrant, Krystal Tolley, Andrew Turner and Atherton de Villiers. Assessments were facilitated by Ariadne Angulo and the Amphibian RLA. I would particularly like to thank the SANBI publications department for their work on the book, and Tilla Raimondo from SANBI's Threatened Species Programme who obtained funding for the workshops and resulting publication from NORAD.

Amphibians on the IUCN Red List: Developments and changes since the Global Amphibian Assessment

By Ariadne Angulo

The Global Amphibian Assessment (GAA) was a landmark initiative spearheaded by the International Union for Conservation of Nature (IUCN), Conservation International and NatureServe, producing comprehensive conservation assessments for all amphibian species known at the time. The GAA helped catalyze global amphibian conservation initiatives and the formation of the IUCN SSC (Species Survival Commission) Amphibian Specialist Group (ASG). Results from the GAA now reside in the IUCN Red List of Threatened Species (<http://www.iucnredlist.org/initiatives/amphibians>). Updates to Amphibians on the IUCN Red List are now coordinated through the IUCN SSC Amphibian Red List Authority (Amphibian RLA),

a group of people tasked by the Chair of the IUCN SSC with overseeing the process of updating, maintaining and curating amphibian assessments in the IUCN Red List. The Amphibian RLA has developed a wiki site that contains a series of resources and information pertaining to amphibian assessments (<http://amphibianrla.pbworks.com/w/page/29057098/Home-page>). While this website was originally intended for the RLA itself, it contains useful assessment-related information for the broader herpetological and conservation communities. Please visit our wiki site and for further information on amphibian assessments please contact the Amphibian RLA Focal Point, Ariadne Angulo at ariadne.angulo@iucn.org.

The forced closure of conservation work on Seychelles Sooglossidae

By Justin Gerlach

Since 1997 the Nature Protection Trust of Seychelles (NPTS) has been based on Silhouette island, one of the richest islands for biodiversity in Seychelles. This has been the base for conservation projects for species such as giant tortoises, terrapins and the critically endangered Seychelles sheath-tailed bat. In addition NPTS has been carrying out monitoring and research on the island's ecosystems for the past 14 years. This has included monitoring populations of sooglossid frogs which have only just been identified as being in decline.

Investment in research, monitoring and conservation of sooglossids on Silhouette islands has come from voluntary work and a significant grant from the Mohamed bin Zayed Species Conservation Fund (MBZ) (Table 1), over the past 14 years \$14,020 has been invested by MBZ and \$9,789 by NPTS, principally in terms of voluntary provision of time and labour. This investment enabled NPTS to elucidate the ecological requirements of the sooglossids and the impacts of invasive species and climate change on the populations. In addition monitoring systems were established for frog populations, vegetation, invertebrates and climate. By 2010 these were providing important data for conservation of the frogs. Establishing assurance colonies had met with only partial success by the end of 2010; protocols for keeping three species had been established but breeding had not been achieved. Plans for 2011 included continuing monitoring, expanding habitat restoration and continued work on determining the

necessary conditions for breeding. When the government of Seychelles declared Silhouette island a National Park in August 2010 this was expected to lead to greater security

for the frog populations, through legal protection of their habitat, and to facilitate conservation work. However this is now in question.

In December 2010 the Seychelles

government company that manages the island (Islands Development Company) gave NPTS notice of eviction

by the end of the year. Efforts to persuade IDC to reverse its decision failed beyond postponing the eviction to the end of March. Unfortunately attempts to persuade the Seychelles Ministry of Environment to intervene effectively were unsuccessful due to conflicts of interest within the ministry. This is a particular problem in conservation in small countries where the same individuals are in positions

of influence in multiple organisations. When conflicts arise it may thus be impossible to achieve independent arbitration.

This development means that from the end of March there will be no active conservation on the island. For the amphibians this means that at this point 14 years of monitoring data will come to an end. Most worrying of all is that there will be no conservation oversight of the Silhouette National Park in the foreseeable future. Despite its protected status it will remain a "paper park" and the suspicion that NPTS is being removed from the island to allow unregulated development is a very real concern.

| | Expenditure | Income | Source |
|--------------------|-----------------|-----------------|---|
| Research | \$486 | 0 | Time and equipment from NPTS |
| Monitoring | \$8,703 | \$8,120 | MBZ grant for equipment, time provided by NPTS |
| Habitat management | \$8,140 | \$4,900 | MBZ grant and time and equipment provided by NPTS |
| Assurance colonies | \$6,480 | \$1,000 | MBZ grant for equipment, time provided by NPTS |
| Total | \$23,809 | \$14,020 | MBZ grant, \$9,789 NPTS |

Table 1. Expenditure on research and conservation on Sooglossidae in 1997-2010

“For the amphibians this means that at this point 14 years of monitoring data will come to an end.”

Alien amphibians challenge Darwin's naturalization hypothesis

By R. Tingley, B. L. Phillips and R. Shine

Invasive species are a major threat to global biodiversity. Understanding why some introduced species go on to become successful invaders, whereas others fail, is thus critical to halting biodiversity declines. In *The origin of species*, Charles Darwin suggested that introduced species would be less likely to invade locations that hosted congeneric natives because they would have to compete with relatives for resources, and would be more likely to be attacked (Darwin, 1859). This theory has come to be known as 'Darwin's naturalization hypothesis', and has received some support from studies of plant

invasions. However, in a recent paper published in *The American Naturalist*, Reid Tingley, Ben Phillips, and Rick Shine from the University of Sydney, Australia, demonstrate that Darwin may have been incorrect when it comes to amphibians. The authors found that introduced amphibians are more (not less) likely to invade locations that host species from the same genera (Tingley et al., 2011).

Tingley and colleagues investigated whether the presence-absence and species richness of congeners at introduction locations influenced amphibian invasion success across the globe. Contrary to Darwin's naturalization hypothesis, the likelihood of successful establishment was higher when congeneric species were present, and increased with increasing congener species richness. Importantly, these correlations were robust to taxonomic and geographic biases, as well as potentially confounding covariates.

Why do amphibians thrive when introduced to locations that host closely related species? The most likely explanation is that the presence and richness of congeneric species serve as indicators of the abiotic suitability of introduction locations. Thus,

Cane toads (*Rhinella marina*) are one of the world's most notorious amphibian invaders. Credit: Ben Phillips.



preadaptation to novel environmental challenges at introduction locations plays a critical role in enabling introduced amphibians to flourish outside of their native geographic ranges. These findings represent the first example in which the 'preadaptation hypothesis' is supported in organisms other than plants, and may help conservation authorities to predict risk levels associated with the importation of specific alien species.

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Is there a decline of amphibian richness in Bellanwila_Attidiya Sanctuary?

D. M. S. Suranjan Karunarathna and A. A. Thasun Amarasinghe

Sri Lanka is not isolated from the current global period of mass extinctions (Achard et al., 2002; Jenkins, 2003). Already 21 endemic amphibian species have gone extinct (Stuart et al., 2004; Manamendra-Arachchi and Pethiyagoda 2005; Meegaskumbura et al., 2007). Sri Lanka has a variety of wetland ecosystems, the Bellanwila-Attidiya Sanctuary (BAS) (altitude: 5 m; 60 51' Northern latitudes and 790 53' Eastern longitudes) in Colombo district of Western Province (Figure 1), Sri Lanka is among the most important. It is listed in the directory of



Figure 1. Unplanned garbage dumping area in the BAS. Credit: D.M.S.S. Karunarathna

Asian wetlands by the IUCN in 1989. According to the latest survey, the vertebrates (Table 1) included 11 (7.2%) species of amphibians (Karunarathna et al., 2010). However they failed to record *Duttaphrynus atukoralei*, *Hylarana aurantiaca*,

Sphaerotheca rolandae, *Philautus leucorhinus* and *Philautus variabilis*, species that were previously recorded by Goonatilake et al. (2001) during a survey in 1995-1998. The latter 2 species are currently known as extinct.

According to Karunarathna et al. (2010) *Pseudophilautus* (earlier *Philautus*) *popularis* was the only shrub frog recorded in BAS (Figure 2). However we believe the previous authors, Goonatilake et al. (2001) may misidentified another two *Pseudophilautus* species now recognizing from another name or extinct before naming them. However, both figures (fig. 12 & 13)



Figure 2. *Pseudophilautus popularis* only known shrub frog in BAS. Credit: D.M.S.S. Karunarathna

in Goonatilake et al. (2010) seem to be *Pseudophilautus popularis*. Also, we do not believe *Duttaphrynus* (earlier *Bufo*) *atukoralei* was correctly recorded from BAS. Considering the distribution pattern of this species, the authors may have misidentified darker juveniles of *Duttaphrynus melanostictus* as *Duttaphrynus atukoralei*. For *Hylarana* (earlier *Rana*) *aurantiaca* also we assume they misidentified the darker form of *Hylarana gracilis*. The other remaining species *Sphaerotheca rolandae* and *Polypedates maculatus* are also doubtful and may have been misidentified: both figures (see fig. 14 & 15) in Goonatilake et al. (2010) seem to be the same species *Polypedates cruciger*.

Finally, after critically comparing the species list, it appears that the amphibian species richness was not declined during 10 years [in 1995-1998 according to Goonatilake et al. (2001) and

in 2005-2006 according to Karunarathna et al. (2010)] in BAS. Therefore it would be interesting to study how the amphibian community adapted to rapid changing environment in BAS during 1995-2005 by changing the species assemblage while maintaining overall species richness.

Acknowledgements

We would like to thank Lee Harding for reviewing the manuscript.

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| | Species Name | Common Name |
|-------------------------|-----------------------------------|-------------------------------|
| Family - Bufonidae | | |
| 1 | <i>Duttaphrynus melanostictus</i> | Common house toad |
| Family - Dicroglossidae | | |
| 2 | <i>Euphlyctis cyanophlyctis</i> | Skipper frog |
| 3 | <i>Euphlyctis hexadactylus</i> | Sixtoe green frog |
| 4 | <i>Fejervarya limnocharis</i> | Common paddy field frog |
| 5 | <i>Hoplobatrachus crassus</i> | Jerdon's bull frog |
| Family - Microhylidae | | |
| 6 | <i>Kaloula taprobanica</i> | Common bull frog |
| 7 | <i>Microhyla rubra</i> | Red narrow mouth frog |
| 8 | <i>Ramanella variegata</i> | White-bellied pugsnout frog |
| Family - Ranidae | | |
| 9 | <i>Hylarana gracilis</i> | Sri Lanka wood frog E |
| Family - Rhacophoridae | | |
| 10 | <i>Pseudophilautus popularis</i> | Common shrub frog E |
| 11 | <i>Polypedates cruciger</i> | Common hour-glass tree frog E |

Table 1. List of the Amphibian species recoded from Bellanwila-Attidiya sanctuary (BAS). (Abbreviation: E - Endemic species).

High prevalence of the amphibian chytrid pathogen in Gabon

By Rayna C. Bell, Adriana V. Gata Garcia, Bryan L. Stuart and Kelly R. Zamudio

In our recent study published in *EcoHealth* (Bell et al., in press) we present the first evidence of the amphibian chytrid pathogen in Gabon. Amphibian chytridiomycosis is an infectious disease caused by the fungus *Batrachochytrium dendrobatidis* (*Bd*) that is implicated in the worldwide decline and extinction of amphibians (Lips et al., 2006; Berger et al., 2005). Though Africa has been proposed as a potential source for the global expansion of *Bd*, the distribution of *Bd* across the continent remains largely unexplored.

Using quantitative PCR (qPCR), we screened for the presence of *Bd* in 166 adult anurans from two national parks in Gabon (Monts de Cristal and Ivindo). Our final sample included 20 genera and 42 species of frogs from seven families. *Bd* was detected in four of the seven families (Arthroleptidae, Hyperoliidae, Ranidae, and Rhacophoridae); however, our sampling of Bufonidae, Pipidae and Petropedetidae was limited (10 samples) thus we cannot reject the possibility that species in these families are also infected. Overall, *Bd* was detected in 20 of the 42 species and was present at all three sites surveyed (two in Monts de Cristal, and one in Ivindo) with high prevalence (19.6% - 36.0%). Both national parks were *Bd* positive at all elevations and across habitat types. Though future efforts over longer sampling periods may identify diseased individuals, our short-term surveys did not find evidence of chytridiomycosis or significant mortality in this area.

This study presents the first record of infection for 19 of the 20 species that were *Bd* positive. Mapping the contemporary and historic distribution of *Bd* in Africa will help clarify whether amphibian populations are naïve to the pathogen or if it is endemic, which will be essential for understanding the dynamics of chytridiomycosis. Future efforts in Gabon, and Africa more generally, should focus on variation among hosts in susceptibility, possible variation in the virulence of the pathogen, and the environmental determinants of disease dynamics.

Acknowledgements

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Breeding-site selection by red-belly toads, *Melanophryniscus stelzneri* (*Anura: Bufonidae*), in Sierras of Córdoba, Argentina

By Laura C. Pereyra, Julián N. Lescano and Gerardo C. Leynaud

Differences among wetlands can have important consequences on reproductive success of amphibians; therefore habitat selection is expected to be of particular importance for anurans inhabiting heterogeneous environments (Resetarits and Wilbur, 1989).

The red-belly toad (*Melanophryniscus stelzneri*) is a diurnal toad, endemic to the pampasic Sierras system of Córdoba and San Luis, two provinces in central Argentina. The species is commonly distributed in isolated populations. They are small, black toads, with bright yellow spots on arm, shoulders and sides, and ventrally black with bright red spots on belly (Ceí, 1980), displaying an aposematic design (Figure 1). Currently, red-belly toads are exposed to several threats,

such as dramatic habitat loss and harvest for international pet trade. In addition, cases of anurans infected with chytridiomycosis were recently recorded in the locality where these toads live (Ghirardi et al., 2009). All these threats can be synergistic; in combination, these factors may result in reduced viability of anuran populations (Semlitsch, 2000). Therefore further information about the species status and habitat choice is necessary to develop strategies aimed at habitat protection and species conservation (Ficetola et al., 2006).

The aim of our study was to investigate the relationship between reproductive activity of red-belly toads and features of water bodies used as breeding sites in Córdoba province, Argentina, to understand

the ecological factors that affect their occurrence.

Fieldwork was carried out from November 2007 to February 2008, in coincidence with the reproductive activity of the species, in the localities of Villa Flor Serrana and Mallín, Punilla department, Córdoba province, Argentina (S 31° 23' 10.8'' W 64° 36' 23.6'' and S 31° 19' 18.0'' W 64° 35' 04.6'', respectively). The landscape is characterized by streams and small ephemeral ponds. A characteristic ephemeral wetland common throughout this region is the locally called mallín (Figure 2). Due to its flooded and soft soil, the mallín presents small interconnected hollows that fill up with water. The effect of trampling by both livestock and other animals promotes the formation of these hollows.

Breeding activity of red-belly toads was established by the detection of amplexant pairs, calling males, tadpoles and/or egg masses. Non-breeding sites were haphazardly selected on the basis of geographical proximity to the breeding sites used by the red-belly toads.

We used an information-theoretic approach (Burnham and Anderson, 2002; Mazerolle, 2006) to evaluate the relative support for a priori formulated hypotheses in explaining habitat selection by red-belly toads. Eight habitat variables related to important water body features were recorded and were used to fit a habitat selection model with GLM.

Our results showed that red-belly toads exhibit non-random habitat use at the spatial scale examined, with a clear preference for ephemeral and shallow breeding sites, with abundant vegetation both within and surrounding the water body, and with absence of potential predators and other anuran species. Preference for ponds with abundant vegetation may merely represent a by-product of life-history needs by red-belly toads, due to their behaviour of fixing



Figure 1. Adult male of *Melanophryniscus stelzneri* Credit: M. S. Akmentins.

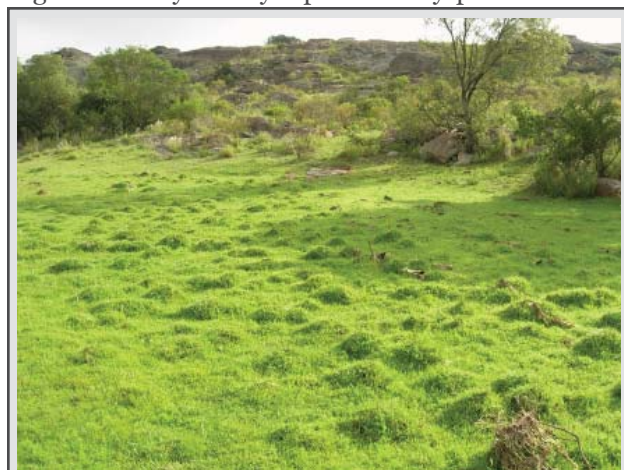


Figure 2. View of a mallín (characteristic ephemeral wetland of Sierras of Córdoba). Credit: Laura C. Pereyra

the eggs to submerged plants near shallow coasts (Bustos Singer and Gutierrez, 1997). Also, the amount of vegetation cover within the ponds may generate complex microhabitats within the water body that could provide shelter from potential predators (Egan and Paton, 2004) and food for larvae. Red-belly toads presented a positive association with mallines, and were never found in the streams. The common use of sites disturbed by livestock trampling, as mallines, and the avoidance of riverine systems has also been observed in a congeneric species (Goldberg et al., 2006). Considering the potential threats the species may be exposed to and taking into account its restricted distributional range, it is important to understand basic data of the species to monitor populations trends and develop appropriate conservation strategies. Further studies, such as those involving larval survival rates and body condition of metamorphic individuals, are needed to assess the differential fitness of red-belly toads in different breeding habitats.

On the other hand, although ephemeral ponds, like mallines, are highly vulnerable to human activities and threatened in many regions, their biodiversity value is frequently overlooked, contributing to their neglected and inadequate management (Beja and Alcazar, 2003). For certain species, these types of wetlands are critical habitats, and species strongly associated with these water bodies may not persist in landscapes in which the loss of these wetlands is significant (Babbitt, 2005).

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The Search For “Lost” Frogs

By Robin D. Moore

A glimmer of hope, but much cause for concern. Those are the reactions from teams of scientists from around the world that have returned from an unprecedented search for 100 species of “lost” amphibians – frogs, salamanders, and caecilians that have not been seen in a decade or longer, and may now be extinct.



Ecuador - Rio Pescado Stubfoot Toad (*Atelopus balios*)
Photograph by Eduardo Toral-Contreras

The Search for “Lost” Frogs, launched in August by the IUCN Amphibian Specialist Group (ASG) and Conservation International (CI), with support from Global Wildlife Conservation (GWC), sought to document the survival status and whereabouts of threatened species of amphibians which they had hoped were holding on in a few remote places.

However, five months of multiple, targeted expeditions have led to disappointing findings that conservationists say should sound an urgent wake-up call for countries, and prompt coordinated efforts to prevent further declines in the populations of these environmentally sensitive barometer-species. Only four of 100 missing amphibians that scientists set out to find were located. Eleven more rediscoveries were unexpected surprises.

The search – a first of its kind – took place between August and December 2010 in 21 countries, on five continents, and involved 126 researchers. It represented a pioneering effort to coordinate and track such a large number of “lost” amphibians. The goal was to establish whether populations have survived increasing pressures such as habitat loss, climate change, and disease, and to help scientists better understand what is behind the amphibian crisis.

nimbae) of Ivory Coast (last seen in 1967), the Omaniundu Reed Frog (*Hyperolius sankuruensis*) of Democratic Republic of Congo (last seen in 1979) and the Rio Pescado stubfoot toad of Ecuador (*Atelopus balios*).



Cave Splayfoot Salamander (*Chiropterotriton mosaueri*), Mexico. Credit Sean Rovito.

The team of scientists that rediscovered *A. balios*, led by the Ecuadorian herpetologist Santiago Ron, spoke with members of the local community, who gave convincing accounts of recent sightings of the species, it is often the case that local people know of the existence of species even if scientists do not. A single healthy adult toad was then found during a night search beside a river in an area dominated by farms and tropical rainforest. The striking, spotted toad was the only species identified in the campaign’s “top 10” list to be found. The Rio Pescado stubfoot toad is found only in Ecuador and is restricted to a very small area, four localities in the Pacific lowlands of southwestern Ecuador. The land where it was found is unprotected and the future of this species is uncertain. It is likely that this represents the last population of the species because it has not turned up in any other known localities.



Mount Nimba Reed Frog (*Hyperolius nimbae*), Ivory Coast, Africa. Credit Ngoran Germain Kouame.

Out of an initial list of 100 “lost” species, only four amphibians were rediscovered during the 2010 global search. The Cave Splayfoot Salamander (*Chiropterotriton mosaueri*) of Mexico (last seen in 1941), the Mount Nimba Reed Frog (*Hyperolius*

Stubfoot toads – or harlequin toads as they are sometimes referred – have been particularly hard hit by amphibian declines and extinctions, with only a handful of species clinging to survival. Researchers feared that the chytrid fungus had wiped out the Rio Pescado stubfoot toad, which was previously last seen in 1995, along with many other closely related species in Ecuador. Its rediscovery is significant and encouraging, said CI’s amphibian expert Dr. Robin

Moore, and should offer Ecuadorians a unique opportunity to protect this gorgeous and rare species.

Other rediscoveries were made in India, where scientists, who were inspired by CI's global search, launched their own campaign to focus on rediscovering local species. The effort resulted in five missing amphibians being rediscovered, so far, including one that was last seen in 1874 and another which was found by pure chance in a rubbish bin.

Dr. SD Biju, of the University of Delhi, organized the "Lost! Amphibians of India" to track approximately 50 missing species, and described his reaction to the incredible rediscoveries:

"I was so excited to see the Chalazodes Bubble Nest Frog in life after 136 years. I have never seen a frog with such brilliant colors in my 25 years of research! It has an unusual combination of fluorescent green dorsum, ash blue thighs and patchy yellow eyes. I feel assured that these rediscoveries will infuse more enthusiasm in our pursuit of the remaining 45 'lost' amphibians. Our hunt has just begun and it is a good start."

In Haiti, searches in the country's diminishing forest regions of the southeast and southwest yielded six surprising rediscoveries of species (previously reported by CI) that were not on scientists' initial list of 100, but that had not been seen in two decades – including the Ventriloquial Frog and Mozart's Frog. In Colombia, no species were rediscovered, but three potentially brand new species to science were



Omaniundu Reed Frog (*Hyperolius sankuruensis*), Democratic Republic of Congo. Credit Jos Kielgast.

rate and amphibians are really at the forefront of this extinction wave. We need to turn these discoveries and rediscoveries into an opportunity to stem the crisis by focusing on protecting one of the most vulnerable groups of animals and their critical habitats."

To that point, Dr. Moore noted that his teams did not find the #1 species on their "top 10" list: the emblematic golden toad from Costa Rica, which some consider to be the poster child for the global amphibian extinction crisis. The last specimen, a solitary male, was seen in 1989.

Dr. Moore said: "I'm not completely surprised that it was not found, but I'm pretty disappointed. While it does not confirm that the species is extinct, with every unsuccessful search it does become more likely. It is very sad to lose unique species such as this, I feel like the world becomes a little bit less colorful with every one that is lost."

Amphibians provide many important services to humans such as controlling insects that spread disease and damage crops and helping



Chalazodes Bubble-nest Frog (*Raorchestes chalazodes*), India. Credit SD Biju



Dehradun Stream Frog (*Amolops chakrataensis*), India. Credit SD Biju.

to maintain healthy freshwater systems. The chemicals in amphibian skins have also been important in helping to create new drugs with the potential to save lives, including a painkiller 200 times more potent than morphine. Not to mention their incalculable role in human cultures, from classical literature to fairy tales, and the aesthetic worth of their bright colors and melodic calls.

Even though the “Search for the ‘Lost’ Frogs” campaign is coming to end, CI and ASG will continue their efforts to prevent further extinctions of amphibians and ensure that their habitats remain intact and continue to provide

benefits to people, thanks to the support from Andrew Sabin and the Sabin Family Foundation, George Meyer and Maria Semple, the John D. and Catherine T. MacArthur Foundation, Save our Species Fund, the U.S. Fish and Wildlife Service and Global Wildlife Conservation.

“Searching for lost species is among the most important conservation activities we can do as scientists. If we’re going to save them, we first have to find them,” said Dr. Don Church, Global Wildlife Conservation’s President.

Besides the campaign in India, searches for “lost” amphibians

will continue in Colombia and Dr. Moore will spearhead a project over the next three years to adopt amphibians as an indicator group to monitor climate change impacts on ecosystem health and incorporate findings into protected area management. The work – to be implemented with several local partners – will take place in Papua New Guinea, Solomon Islands, Haiti and Madagascar.

To find out more about the “Lost” Frogs Campaign please visit www.conservation.org/lostfrogs.

Recent diversification in old habitats: Molecules and morphology in the endangered frog, *Craugastor uno*

By Jeffrey Streicher, Jesse Meik, Eric Smith and Jonathan Campbell

Biologically, the montane cloud forests of southern Mexico are exceptionally diverse. But sadly, the remaining tracts of these sublime habitats are under intense pressure from urban encroachment (Ochoa-Ochoa et al. 2009). We recently published a study on an endangered frog endemic to fragments of these pine-oak cloud forests in the Sierra Madre del Sur (Streicher et al. 2011). *Craugastor uno* (Figures 1–3) is a direct-developing frog in the family Craugastoridae (Hedges et al. 2008), and is related to a group of nondescript frogs with extended finger pads that occur in parts of Mexico, Guatemala, and Honduras (the *C. bocourti* group). Within this group *C. uno* is one of the poorest known species with fewer than 10 specimens collected since its description in the early 1980s by Savage (1984). The meager representation of *C. uno* in natural history collections is likely related to a number of factors in addition to its apparently secretive lifestyle. For instance, poorly maintained roads, local bureaucracy, and activities associated with political insurgence in the past and the narcotics trade in recent times are major obstacles for biological expeditions to the Sierra Madre de Sur. Based on our collective efforts and a strong collaboration with colleagues at the Universidad Nacional Autónoma de México (UNAM), our field work has led to the collection of seven of the known *C. uno* specimens (including the holotype collected by J. Campbell in 1979). This unique access to *C. uno* specimens and the growing conservation concern for cloud forest habitats motivated our study. Our analysis of *C. uno* was also timely since some authors have suggested that this species may be extinct (Ochoa-Ochoa et al 2009).

Prior to our study, there was controversy in the literature regarding a *C. uno* specimen collected in Oaxaca in 1972 that was thought by some to be an undescribed species (see Santos-Barrera and Canseco-Márquez 2004; Smith and Chiszar 2000). This controversy was warranted since the Oaxacan specimen is morphologically distinct from the Guerreran holotype (e.g., differing skin texture, color pattern, toe pad widths etc.). These differences are important because they are often used to distinguish species (Canseco-Márquez and Smith 2004; Smith 2005; McCranie and Smith 2006).

To investigate how these different populations of *C. uno* are related, we used mitochondrial and



Figure 1. *Craugastor uno* from central Guerrero, Mexico. Credit: E. Smith



Figure 2. *Craugastor uno* from eastern Guerrero, Mexico. Credit E. Smith



Figure 3. *Craugastor uno* from Oaxaca, Mexico. Credit: E. Smith

nuclear DNA and examined the morphology of specimens. Several interesting patterns emerged. First, the levels of genetic divergence between the different *C. uno* populations were low, typically below 1%, which is lower than levels of variation observed within wide ranging temperate frog species like *Acris crepitans* (Gamble et al. 2008). Despite being closely related, none of the *C. uno* populations shared identical DNA sequences, which suggests that populations might not experience gene flow from neighboring mountains. Further support for potential isolation was found when we examined morphological variation in *C. uno*. Using simple ratios of measurements (e.g., tibia length, head length, etc.) to overall body size (snout–vent length), we found several ratios that had non-overlapping variation unique to each of the *C. uno* populations. Additionally, we found dorsal coloration and skin texture qualities that were exclusive to each population. Given these data, we recommended that for now *C. uno* be recognized as a single species that exists as a series of isolated populations (i.e., a species with distinct metapopulation structure).

In light of these results, we were left with several questions regarding the series of events that led to the recent diversification of *C. uno*. Conservative molecular clock estimates (e.g., Macey et al. 2001) tell us that the populations in our study should have diverged from one another after the onset of the Pleistocene (<1 million years ago). However, the geologic elements and associated dispersal

barriers in the region were well established by 5 million years ago (Campa and Coney 1983; Nieto-Samaniego et al. 2006). How then do we explain the observed patterns of low genetic diversity? A potential explanation may be

did during warming cycles (like the present). In this system, cool periods allow for dispersal events and gene flow between highland communities that are restricted to higher elevations (and therefore isolated from one another) during

warm periods (Savage 2002). This dynamic climate system may offer an explanation for how closely related *C. uno* populations would have become recently isolated on old mountains.

While we are left with many questions regarding *C. uno*, we feel that our pilot study highlights the importance of using integrative approaches to inform decisions on how we describe and protect biodiversity. Additional sampling, both geographic and genetic, would serve to test the population structure and taxonomic relationships we have hypothesized. Unfortunately, like many endangered habitats, the cloud forests of the Sierra Madre del Sur (Figures 4 and 5) may be further degraded before we are able to

achieve these goals.

Acknowledgments

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Figure 4. Cloud forest habitat in the Sierra Madre del Sur near the type locality of *Craugastor uno* in Guerrero, Mexico. Credit: J. Streicher

related to a historically fluctuating climate. While our understanding of paleoclimatology is constantly progressing, most researchers agree that within the major climate shifts of the last 5 million years there are many ‘second-order’ climate shifts that fluctuate on shorter time scales (usually around 20,000 years [Lisiecki and Raymo 2005]). During cooler cycles it is thought that highland ecosystems, like the pine-oak cloud forests of Mexico, existed at lower elevations and covered larger geographic areas than they

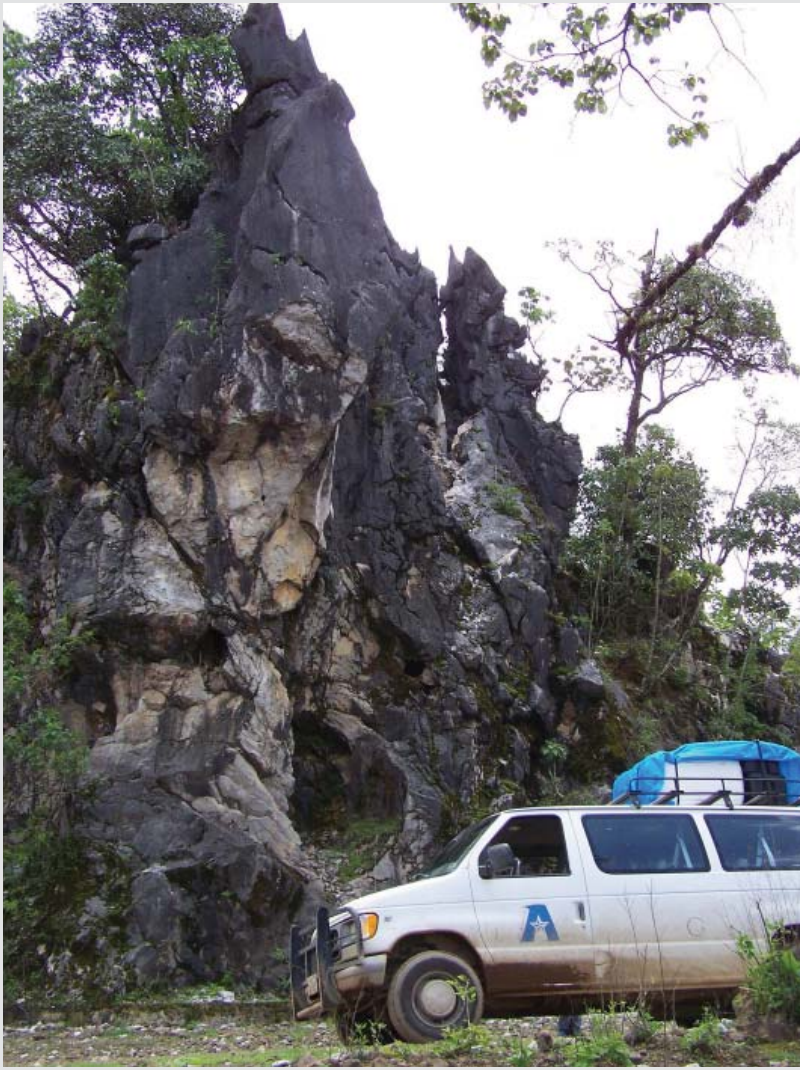


Figure 5. Example of a mountain road at about 2200 meters in the Sierra Madre del Sur of Guerrero, Mexico. Credit: J. Streicher

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Upcoming Meetings

Red List Assessment and Amphibian Ark Conservation Needs Assessment Workshop Santa Domingo, Dominican Republic, 22-26 March 2011.

Amphibian Conservation Needs Assessment Workshop Santa Domingo, Dominican Republic, 27-30 March 2011.

Second Mediterranean Congress of Herpetological Marrakech, Morocco, 23-27 May 2011. Details at: http://www.ucam.ac.ma/cmh2/En_General_Infos.html.

Joint Meeting of Ichthyologists and Herpetologists Minneapolis, USA, 6-11 July 2011. Details at <http://www.dce.k-state.edu/conf/jointmeeting/>.

SEH-Conservation Committee Herpetofauna monitoring course Luxembourg, 24-25 September 2011. Details at <http://www.seh-cc.org/blogs/blog2.php/2011/02/14/herpetofauna-monitoring-course-organized-by-the-seh-conservation-committee>.

16th European Congress of Herpetology and 47. Deutscher Herpetologentag (DGHT) Luxembourg and Trier, 25-29 September 2011. Details at <http://www.symposium.lu/herpetology/>.

IX Latin American Congress of Herpetology Curitiba, Brasil, 17-22 July 2011. <http://www.seh-cc.org/blogs/blog2.php/2010/11/11/ix-latinamerican-congress-of-herpetology>

Recent Publications

Bradford, D. F. et al. (2011) Pesticide distributions and population declines of California, USA, alpine frogs, *Rana muscosa* and *Rana sierrae*. *Envtl. Toxicol. & Chem.*: 30; 682-691. (david@epa.gov)

Bulen, B. J. & Distel, C. A. (2011) Carbaryl concentration gradients in realistic environments and their influence on our understanding of the tadpole food web. *Arch. Environ. Contam. Toxicol.*: 60; 343-350. (cadistel@schreiner.edu)

Catenazzi, A. et al. (in press) *Batrachochytrium dendrobatidis* and the collapse of anuran species richness and abundance in the Upper Manu National Park, southeastern Peru. *Conservation Biol.*: (acatenazzi@gmail.com)

Conlon, J. M. et al. (in press) Host defense peptides in skin secretions of the Oregon spotted frog *Rana pretiosa*: implications for species resistance to chytridiomycosis. *Dev. Comp. Immunol.*: (jmconlon@uaeu.ac.ae)

Distel, C. A. & Boone, M. D. (2011) Pesticide has asymmetric effects on two tadpoles across density gradient. *Envtl. Toxicol. & Chem.*: 30; 650-658. (cadistel@schreiner.edu)

Duffus, A. L. J. & Cunningham, A. A. (2010) Major disease threats to European amphibians. *Herpetol. J.*: 20; 117-127. (aduffus@gdn.edu)

Gunderson, M. P. et al. (2011) Effect of low dose exposure to the herbicide atrazine and its metabolite on cytochrome P450 aromatase and steroidogenic factor-1 mRNA levels in the brain of premetamorphic bullfrog tadpoles (*Rana catesbeiana*). *Aquatic Toxicol.*: 102; 31-38. (chelbing@uvic.ca)

Han, B. A. et al. (2011) Effects of an infectious fungus, *Batrachochytrium dendrobatidis*, on amphibian predator-prey interactions. *PLoS ONE*: 6; e16675. (han@uga.edu)

Márquez, M. et al. (in press) Immunological clearance of *Batrachochytrium dendrobatidis* infection at a pathogen-optimal temperature in the hylid frog *Hypsiboas crepitans*. *EcoHealth*: (mlampo@gmail.com)

Price, S. J. et al. (in press) Effects of urbanization on occupancy of stream salamanders. *Conservation Biol.*: ([\[wfu.edu\]\(http://wfu.edu\)\)](mailto:pricsj7@</p></div><div data-bbox=)

Rowe, C. L. et al. (2010) Differential patterns of accumulation and depuration of dietary selenium and vanadium during metamorphosis in the gray treefrog (*Hyla versicolor*). *Arch. Environ. Contam. Toxicol.*: 60; 336-342. (rowe@cbl.umces.edu)

Skelly, D. K. et al. (in press) Intersex frogs concentrated in suburban and urban landscapes. *EcoHealth*: (david.skelly@yale.edu)

Smith, G. R. et al. (2011) Differential effects of malathion and nitrate exposure on American toad and wood frog tadpoles. *Arch. Environ. Contam. Toxicol.*: 60; 327-335. (smithg@denison.edu)

Van Rooij, P. et al. (2010) Development of in vitro models for a better understanding of the early pathogenesis of *Batrachochytrium dendrobatidis* infections in amphibians. *Alternatives to Lab Animals*: 38; 519-528.

Recent publication information obtained from AmphibiaWeb: Information on amphibian biology and conservation. [web application]. 2011. Berkeley, California: AmphibiaWeb. Available: <http://amphibiaweb.org/>. (Accessed: Mar 18, 2011).

Internships and Employment

The following information can be found at <http://www.parcplace.org/jobs.html>. Herp jobs are posted as a service to the herpetological community. If you would like to list a job opening for your organization, please send the announcement to herpjob@parcplace.org.

Field Assistants (2-3) - behavior and ecology of the lizards. Great Abaco Island, Bahamas.

Summer Herpetological Internship Opportunity. Lower Michigan.

Postdoc position - Amphibian pathogens and their impact on

If you have any upcoming events or recent publications that you would like announced in FrogLog, please send details to James Lewis at jplewis@amphibians.org.

**biodiversity. Station d'Ecologie
Experimentale, Moulis, France.**

Field Assistant - Canopy research
on herpetofauna. Singapore and the
Philippines (Southeast Asia).

**Volunteer/Intern Herpetological
(Glass Lizard) Field Technician.
College of Charleston, Charleston,
SC.**

Summer student contract position in
GIS and wildlife monitoring. The USGS
Patuxent Wildlife Research Center, Laurel,
Maryland.

**Everglades Python Technician
- University of Florida Fort
Lauderdale Research and Education
Center Fort Lauderdale/Davie,
Florida.**

Biological Technician - Desert Tortoise
Radio Telemetry. near Barstow, California.

**Summer Intern - Archbold
Biological Station Herpetology
Program. Archbold Biological
Station, FL.**

Biological Science Technician - USGS -
Desert Tortoise Research
Henderson, NV.

**Summer Interns - Box Turtle
Research. Colorado Reptile Humane
Society, Longmont, CO.**

Postdoctoral Fellowships - International
Institute for Applied Systems Analysis.
Vienna, Austria.

**NRCS Review Biologist -
Massachusetts Department of Fish
and Game Westborough, MA.**

PhD Student Position - Hong Kong Newt
Ecology. University of Hong Kong, Hong
Kong.

**Paid Amphibian Technicians
- Alabama A&M University.
Mid-Cumberland Plateau in
Northeastern Alabama and
Southern Tennessee.**

Wildlife Research Specialist Position -
Lowland Leopard Frog Research. Phoenix,
Arizona.

**Field Technician - Bluntnose
Leopard Lizard Research San Luis
Obispo, California.**

Graduate RA Positions - Lizard Behavior
and Physiology Indiana State University.

**Paid Interns - Maryland Herp Atlas.
Jug Bay Wetlands Sanctuary, MD.**

Field Technician, Intern & Volunteer
Positions - Gopher Tortoise Research
Archbold Biological Station, FL.

**Student Research Opportunities
- Indiana-Purdue University Fort
Wayne Fort Wayne, IN.**

Timber Rattlesnake Field Technicians
- Purdue University. Yellowwood and
Morgan-Monroe State Forests, Indiana.

**Seasonal Position - Research on
Bog Turtles and Other Endangered
Species Smyrna, Delaware.**

Field Technicians - Amphibian Research
Sequoia and Kings Canyon National
Parks, CA.

**Field Biologist - SWCA
Environmental Consultants
Pasadena and Bakersfield, CA.**

Field Technicians (4) - Anuran Surveys in
Western Iowa. Onawa, Iowa.

**Master's Student Opportunities -
Garter Snake Ecology. University of
Texas at Tyler - Tyler, TX.**

Temporary Field Technician - Effects of
fire on Black Kingsnakes. Land-Between-
The-Lakes National Recreational Area,
Kentucky.

**Senior and Mid-Level Wildlife
Biologists - EPG, Inc. Salt Lake City,
UT.**

Graduate Research Studies in Sustaining
Hardwood Ecosystems, Purdue University
West Lafayette, Indiana.

**Biological Science Technicians.
Yosemite National Park, CA.**

Reptile and Amphibian Monitoring
Technicians (2). Cape Cod National

Seashore, MA.

**Field Technician(s) - Amphibian
Surveys in Northern California.
USGS, Biological Resources
Division, Point Reyes Field Station,
El Portal, CA.**

Master's Assistantship - Map Turtle
Ecology & Conservation. Towson
University - Towson, MD

**Student GIS Contractor - North
American Amphibian Monitoring
Program (NAAMP). USGS Patuxent
Wildlife Research Center - Laurel,
MD.**

Research Specialist - Amphibian Disease
Ecology. University of Tennessee -
Knoxville, TN.

**Assistant Professor - Wetland
Ecologist. Murray State University,
Kentucky.**

Field Technician - Florida Sand Skink
Ecology. Archbold Biological Station, Lake
Placid, Florida.

**Young Scientists Summer Program.
Vienna, Austria.**

Field Technicians, Telemetry Technicians,
and QAQC Coordinator - Desert Tortoise
Research. Institute for Wildlife Studies,
Mojave Desert and Las Vegas, Nevada.

**Wildlife Management Biologist -
North Carolina Wildlife Resources
Commission Western North
Carolina.**

Horned Lizard Technician Positions (2).
Southern Illinois University - Carbondale,
Illinois.

**Graduate Assistantships - Natural
Resources Genetics. Purdue
University - West Lafayette,
Indiana.**

Supervisor Position - Museum of Living
Art (Herpetarium), Fort Worth Zoo Fort
Worth, Texas.

**Visiting Assistant Professor Position
Purdue University - West Lafayette,
Indiana.**

If you have any internship or career opportunities that you would like announced in FrogLog,
please send details to James Lewis at jplewis@amphibians.org

Funding

Funds for habitat Protection

The ASG supports organizations working to protect critical amphibian habitat worldwide. This fund is specifically for direct conservation action, not research (although some funds can be earmarked for survey work if this is an integral component of the overall project). Criteria and examples of funded projects can be found at <http://www.amphibians.org/ASG/Funding.html>.

Rolex are looking to support individuals working on innovative environmental/species based projects through their Rolex Awards for Enterprise. Successful applicants will receive US\$100,000, a Rolex chronometer, and the benefits of international publicity as a Rolex Laureate or Associate Laureate. To date, Rolex have supported more than 30 projects focused on the environment and have identified more than 60 threatened species that these projects have impacted. Indeed a number of SSC members are already Rolex Laureates and/or Associate Laureates. To help promote the program to our network we have placed a clickable link on the species pages of the Red List website as well as a news story that can be accessed from the home page (See: <http://www.iucnredlist.org/news/rolex-awards-for-enterprise>).

IUCN NL Small grants for the Purchase of Nature
IUCN NL Small grants for the Purchase of Nature (SPN) enables local partners to take direct action and save nature. SPN provides funds for the purchase and protection of threatened wildlife habitats and vulnerable ecosystems. For more information visit http://www.iucn.nl/fondsen/purchase_of_nature/.

The conservation leadership Programs website provides a comprehensive overview of a large array of funding available <http://www.conservationleadershipprogramme.org/OtherFundingOptions.asp>

The following information is kindly provided by the Terra Viva Grants Directory, for more information please visit: <http://www.terravivagrants.org/>.

Cleveland Metroparks Zoo -- Scott Neotropical Fund 2011. The Scott Neotropical Fund makes grants for conservation of wildlife in the neotropics (Mexico, Caribbean, Central America, and South America). Grants support research, training, and technical assistance with the aim of benefiting local communities along with providing wildlife protection. The primary investigator must be resident in the neotropical region. Grants are US\$3 thousand to US\$5 thousand. The application deadline is 25 March 2011. <http://www.clemetzoo.com/conservation/grants/scott/>

Tourism Cares -- 2011 Worldwide Grants. Tourism Cares invites nonprofit charitable organizations in the USA and internationally to apply for its 2011 Worldwide Grants. The grants are to benefit tourism-related sites of exceptional cultural, historic, or natural significance around the world. Applications from (and working with) organizations in developing countries are welcome. In 2011, Tourism Cares will make 12 grants of US\$10 thousand each, in two stages. The first deadline is 01 March 2011, and the second deadline is 01 July 2011.

Crawford Fund -- Research in Agriculture, Fisheries, Forestry 2011. The Crawford Fund Fellowship supports a scientist in agriculture, fisheries, or forestry from Asia-Pacific countries for additional training in Australia. Applicants are scientists below the age of 35 who are citizens of, or who are working in, one of the following countries and territories: Bangladesh, Bhutan, Burma (Myanmar), Cambodia, East Timor, Fiji, Indonesia, Laos, Nepal, Niue, Papua New Guinea, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Kirabati, Vanuatu, and Vietnam. Nominations require the support of an Australian citizen. The closing date is 01 April 2011.

King Baudouin Foundation -- Elisabeth and Amélie Fund for

Water Management 2011. The Elisabeth and Amélie Fund makes grants in support of sustainable and equitable water management in countries of the Southern Hemisphere. Grants range from €5 thousand to €40 thousand. The call is open to Belgian organizations working with local partners. The deadline for applications is 04 April 2011.

Nicolas Hulot Foundation -- Grants for South Solidarity 2011. The Nicolas Hulot Foundation funds projects in "South Solidarity" that integrate environment with economic and social concerns in Southeast Asia, Sub-Saharan Africa, and Latin America and the Caribbean. Grants are up to €30 thousand for two years. Online registration (in French, English, Spanish, or Portuguese) is submitted by 15 April and 15 October each year.

American Society of Primatologists -- Small Research Grants 2011. The ASP makes one-year grants for research on either captive or wild primates. Preference is for training initiatives, start-up funds, supplementary funding for students, and innovations in animal care and research technology. Applicants can be of any nationality. Grants range from US\$500 to US\$1500. Applications are due 15 June 2011.

Council for the Development of Social Science Research in Africa (CODESRIA) -- Comparative Research Networks 2011. CODESRIA supports researchers in African universities and research centers through funding for Comparative Research Networks. The networks address priority research themes within CODESRIA's strategic plan, including: (i) Water and Water Resources in the Political Economy of Development and Citizenship; and (ii) Ecology, Climate, and Environmental Sustainability in Africa (among many other themes). Recent grants range from US\$10 thousand to US\$35 thousand per network. CODESRIA favors CRNs which are multidisciplinary, sensitive to gender issues, and inclusive of younger scholars. Proposals are accepted through 15 June 2011.

Lindbergh Foundation -- Applications 2011. The Charles A. and Anne Morrow Lindbergh

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Foundation makes grants in the amount of US\$10,580 for research and education in agriculture, conservation of natural resources, waste minimization, and other themes. Citizens of all countries are eligible to apply. Applications are due 09 June 2011.

National Birds of Prey Trust (UK) -- Grant Applications 2011. The National Birds of Prey Trust makes grants to conserve birds of prey in their range countries. Grants support conservation education and science. Each project is expected to help build capacity in bird conservation with local communities, NGOs, and governments. Small grants are under £5 thousand, and larger grants are available. Grants funded by the Trust may form part of larger projects. The annual submission deadline is June.

Nestlé Prize in Creating Shared Value -- Applications 2012. The Nestlé Prize in Creating Shared Value is awarded in alternate years to an individual, NGO, or small business for an outstanding innovation or project in the area of water, nutrition, or rural development. The Nestlé CSV Prize commits up to CHF 500 thousand to the Prize Laureate to assist in the development of the innovation and bring it to scale. The closing date for nominations is 30 June 2011.

Club 300 Foundation for Bird Protection—Grants 2011. The Foundation, based in Sweden, makes grants of up to US\$5 thousand for bird protection on a worldwide basis. Eligibility is open to everyone. The deadlines for applications are 01 January and 01 July of each year.

Conservation, Food, and Health Foundation – Grants 2011-2012. The CHF makes grants to nonprofit organizations in support of environmental conservation, sustainable agriculture, and community health in the developing world. Applicants are nonprofit organizations. Grants are under US\$25 thousand. Concept applications must be received by 01 January and 01 July.

Tourism Cares -- 2011 Worldwide Grants. Tourism Cares invites nonprofit

charitable organizations in the USA and internationally to apply for its 2011 Worldwide Grants. The grants are to benefit tourism-related sites of exceptional cultural, historic, or natural significance around the world. Applications from (and working with) organizations in developing countries are welcome. In 2011, Tourism Cares will make 12 grants of US\$10 thousand each, in two stages. The first deadline is 01 March 2011, and the second deadline is 01 July 2011.

Biodiversity Foundation -- Call for Proposals 2011. The Biodiversity Foundation (Spain) announces its 2011 call for proposals in biodiversity, climate change, and sustainable development. The Foundation supports conservation field projects, research, education and training, and public awareness in Spain and internationally. The funding for international cooperation (one component of the call) is open to Spanish organizations; nonprofit organizations in EU countries; nonprofit organizations in developing countries that have international support from Spain (e.g., through AECID); and international organizations. Most international projects to date are in Latin America, and to a lesser extent in Sub-Saharan Africa. However, there are no geographical restrictions. The closing date for applications is 31 August 2011.

Keep Intouch

If you would like to be added to the ASG mailing list, please send an email to froglog@amphibians.org with the subject heading “add me to mailing list”.

Also follow us on Facebook for regular updates on the herpetological community and the latest news from the ASG.

<http://www.facebook.com/AmphibiansDotOrg>

Instructions to Authors

Froglog publishes a range of articles on any research, discoveries or conservation news relating to amphibians. We encourage authors describing original research to first make submissions to a refereed journal and then, if appropriate, to publish a synopsis in Froglog. Submissions to FrogLog should be in English, in the region of 1000 words, unless previously discussed with the editorial team, and follow the format of FrogLog 83 and above.

All graphics supplied for publishing should be submitted as separate files, ideally in original jpg format or alternative commonly used graphical format. Please ensure that the highest quality image is sent to allow for optimal reproduction.

Tables and charts may be included at the end of a word document with clear indication as to the appropriate title/legend.

All titles and legends should be listed one after the other, as part of the text document, separate from the figure files. Please do not write a legend below each figure.

Submission must include all authors first and surname which will be printed at the beginning of the published document.

Each submission will be referenced as follows at the back of the edition:

Tingley, R., Phillips, B. L. & Shine, R. (2011) Alien amphibians challenge Darwin's naturalization hypothesis. *FrogLog* 95. Author Contact: reid.tingley@gmail.com.

If you require further information on author affiliations, provide directly under this reference.

Examples of submissions can be found in previous editions of FrogLog and include:

- News and Comments
- Correspondence
- Obituaries
- Opinion
- Futures
- News & Views
- Insights, Reviews and Perspectives
- Upcoming meetings
- Recent Publications
- Books Releases
- Careers

Submission should be sent to froglog@amphibians.org.

Please name all files as follows, first author surname_brief title description_content i.e. tingle_darwins naturalization_paper, tingle_darwins naturalization_figure 1.

Students

The ASG has a particular interest in highlighting the vast amount of work being undertaken by students around the world and we invite students to submit synopsis of their thesis where appropriate.

Contributing Authors

Vásquez-Almazán, C., Papenfuss, t. J., Moore, R. D., Aga Khan, H. & Church, D. (2011) The Sierra Caral of Guatemala: a refuge for endemic amphibians. *FrogLog 95*. Author Contact Robin Moore rdmoore@conservation.org.

Measey, J.¹ (2011) Updating the IUCN Red List status of South African Amphibians. *FrogLog 95*. Author Contact: john@measey.com

¹AmphibianRLA, Applied Biodiversity Research Division, South African National Biodiversity Institute, Claremont 7735, Cape Town, South Africa.

Angulo, A. (2011) Amphibians on the IUCN Red List: Developments and changes since the Global Amphibian Assessment. *FrogLog 95*. Author Contact: ariadne.angulo@iucn.org.

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Karunaratna, D. M. S. S. & Amarasinghe, A. A. T. (2011) Is there a decline of amphibian richness in Bellanwila-Attidiya Sanctuary? *FrogLog 95*.

Bell, R. C.¹, Gata Garcia, A. V.¹, Stuart, B. L.² & Zamudio, K. R.¹ (2011) High prevalence of the amphibian chytrid pathogen in Gabon. *FrogLog 95*. Author Contact: Rayna C. Bell rcb269@cornell.edu (phone) 415.847.4118 (fax) 607.255.8088

¹Department of Ecology and Evolutionary Biology, Cornell University, Ithaca, NY 14853, USA

²North Carolina Museum of Natural Sciences, Raleigh, NC 27601, USA.

Pereyra, L. C., Lescano, J. N. & Leynaud, G. C. (2011) Breeding-site selection by red-belly toads, *Melanophryniscus stelzneri* (Anura: *Bufonidae*), in Sierras of Córdoba, Argentina. *FrogLog 95*. Author Contact: Pereyra, L. C. laurech@gmail.com.

Moore, R. D. (2011) The Search For Lost Frogs. *FrogLog 95*. Author Contact rdmoore@conservation.org.

Streicher, J., Meik, J., Smith, E. & Campbell, J. (2011) Recent diversification in old habitats: Molecules and morphology in the endangered frog, *Craugastor uno*. *FrogLog 95*. Author Contact: streicher@uta.edu.