ASG

FROGLOG

Newsletter of the IUCN/SSC Amphibian Specialist Group

New Amphibian Reserve launched in Colombia

Colombia has more threatened amphibians than any other country, largely restricted to highly fragmented subtropical and montane forest which are unprotected and at threat of agricultural expansion. Within Colombia the hotspot of threatened amphibians is the Central Cordillera which also has the greatest concentration of coffee production in South

America and almost denuded of natural forests.

After extensive searches of the Central Cordillera for amphibians, herpetologist and Fundación ProAves President, Alonso Quevedo, with ecologist Oscar Gallego discovered

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WHAT'S INSIDE

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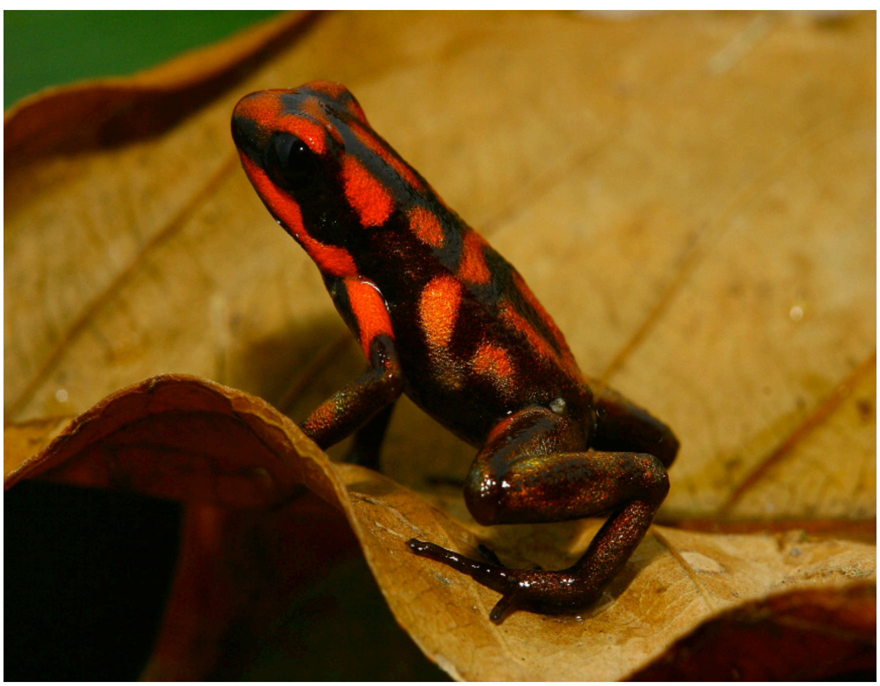
one of the largest surviving forest fragments, a mere 200 acres of forest on its eastern flank. Not only did Alonso discover that the 200 acres contained many threatened amphibians, but that it held many previously undescribed species including two species of poison dart frogs, recently named as the Swainson's Poison Frog (*Ranitomeya doriswainsonae*) and Little Golden Poison Frog (*Ranitomeya tolimense*).

Ranitomeya tolimerase - *or Ranita dorada © Alonso Quevedo*

In early December the newly named "Ranita Dorado Amphibian Reserve" was launched

Sadly this last 200 acres was in the process of being cleared for avocado and coffee plantations that would almost certainly seal the fate of countless amphibians and other unique biodiversity.



Ranitomeya doriswainsonae *© Alonso Quevedo*

"In an urgent bid to save this unique island of amphibian diversity" said Alonso Quevedo, "I negotiated with different land owners of the 200 acre forest to stop clearing forest and sell the land to the national conservation NGO, Fundación ProAves. The owners agreed, so I immediately approached Conservation International and IUCN Netherlands for emergency support."

"Alonso's proposal to protect a key subtropical forest

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and establish the Amphibian Reserve was ground-breaking" commented Dr Don Church, Amphibian expert at Conservation International and Amphibian Specialist Group of IUCN, "We had to support it!"

This exciting new initiative for amphibian conservation is born from a partnership of IUCN Amphibian Specialist Group, IUCN Netherlands, Dendrobatidae Nederland, Conservation International-Colombia and Fundación ProAves.

In early December, the newly named "Ranita Dorada Amphibian Reserve", named after the Little Golden Poison Frog, was launched.

This action comes at a crucial moment when conservation measures are urgently needed for this highly sensitive group. Amphibian's dependence on clean freshwater and sensitivity to deforestation and climate change gives added urgency that we take greater care of them as our own health and survival depends on the same resources. of the country; this increasing popularity is stimulating all types of human development, which results in severe habitat change and loss.

AROUND THE WORLD

Good News from an Amazon Forest Fragment Herpetofauna

Gregory O. Vigle, Milton G. Orozco, and Willan G. Poveda

From the Estacion Biologica Jatun Sacha (EBJS) in the lowland rainforest of Amazonian Ecuador, we are pleased to offer a hopeful report on the survival of an extraordinarily species-rich amphibian (and reptile) community inhabiting this forest fragment reserve located in the lower Andean foothills (see Vigle, 2008).

> Species Richness is among the highest ever reported from any single Neotropical locality

Although investigations at this site began in 1986, prior to widespread interest in reports of amphibian declines, we were fortunate to receive a DAPTF seed grant in 2003 to support continued monitoring efforts, which facilitated the training and employment of local naturalists and enabled the accumulation of additional sampling effort

Figure 1. **Phyllomedusa vaillanti ©** ***W.G. Poveda***

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through 2005.

With at least 86 amphibian species (and 87 reptiles) recorded from this relatively small site (and additional species expected), despite the fragmented surroundings of the EBJS, species richness for both groups is among the highest ever reported from any single Neotropical locality (comprising the first long-term study on a forest fragment herpetofauna within the upper Amazon basin).

In addition to presenting a current species list, this study also comments on results from the EBJS within the context of broader questions concerning reserve size, the identification of priority sites for conservation and monitoring, and comparisons with previous studies on forest fragments from the central Amazon region. The acquisition of consistent data on species persistence in an economical monitoring program is emphasized as a method employed to assess long-term conservation efficacy.

Figure 2. **Engystomocs petersi ©** ***M.G. Orozco***

While long-term monitoring efforts are labor-intensive, these may also offer opportunities for establishing equally long-term relationships among people and organizations, which foster the maintenance of forests and the human resources and knowledge needed to ensure continued conservation, education, and economic sustainability. Ongoing assessment in the field is a necessary prerequisite for understanding conservation success or failure; predictions concerning what might constitute success or failure may best be postulated relative to baselines of data gathered over time. Questions concerning decline versus persistence reflect two sides of the same epistemological coin; decline must be understood within the context of known patterns of persistence and fluctuation, and for most of the many species in the mega-diverse Neotropics, there exists little time-series data tracking populations or communities.

Although Vigle (2008) presents data primarily on species persistence, with species-level abundance data to be evaluated in a forthcoming paper, below we offer a casual preview of species-level abundance results concerning two noteworthy anurans, which serves to highlight the importance of long-term monitoring.

Phyllomedusa vaillanti (Hylidae; Fig. 1), and *Engystomops petersi* (Leiuperidae; Fig. 2) are both small frogs, each first recorded in the initial sampling effort undertaken at the EBJS from 1986 to 1988 (see Vigle, 2008). Within this initial period, including a total of 536

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effort-hours of sampling, both species were characterized as rare, each represented by only three and two individual records, respectively. A second phase of sampling began ten years later, in 1998, and continued through the end of 2005 (including a total of 581 sampling effort-hours).

For *P. vaillanti*, from mid-1998 to mid-2001, no additional records were obtained; although this result was not unexpected given the rarity of P. vaillanti in sampling from 1986-88, by mid-2001 a sufficient quantity of sampling effort had been accumulated to suggest that perhaps this formerly rare species had disappeared entirely from the study area. However, in June of 2001, *P. vaillanti* reappeared dramatically in numbers far exceeding its apparent abundance from 1986 to 1988; by the end of 2005, a total of 57 individuals had been recorded. On some evenings, more individuals were encountered in only two or three hours of sampling effort than had been recorded in the entire 1986-88 period.

Engystomops petersi likewise exhibited a similar dramatic increase in individual records after an even longer period of apparent absence. With only two individuals obtained between 1986 and 1988, from mid-1998 until early 2003 there were no additional records, suggesting that E. petersi also no longer survived within the study area. In February of 2003, one additional record was obtained, followed by 41 subsequent records in sampling conducted between June of 2003 and June of 2004. Unlike P. vaillanti, however, E. petersi just as abruptly seemed to again vanish after June of 2004, and no additional records were obtained in sampling efforts through the end of 2005.

For both species, these results were obtained from precisely the same small network of forest trails over the entire span of sampling. Although many amphibian species monitored at the EBJS exhibited more consistent patterns of apparent abundance, these examples provide evidence suggesting that some amphibian species at the reserve may exhibit extreme population fluctuations. In such cases, completely conflicting estimates of population size and persistence might be inferred based solely upon data from shorter-term periods, as compared to estimates of population fluctuations revealed only through continued long-term monitoring efforts.

We are most grateful to the DAPTF/ASG (with special thanks to Tim Halliday) for supporting our work at the EBJS, and hope that future monitoring will continue to confirm the survival of this species-rich community, and further contribute to a better understanding of the ecology and conservation of the amphibians and reptiles of Amazonia.

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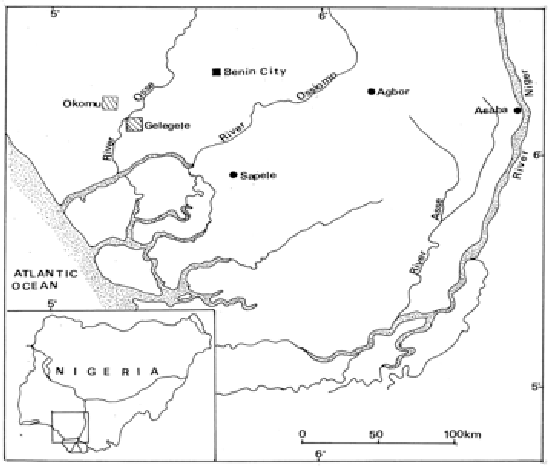
Amphibian Chytridiomycosis: First Report in Nigeria from the Skin Slough of *Chiromantis rufescens*

Abigail A. Imasuen, Chè Weldon, Martins S.O. Aisien and Louis H. Dupreez

The fungus *Batrachochytrium dendrobatidis*, the aetiological agent of amphibian chytridiomycosis, has been implicated in the declines and extinctions of many frog populations around the globe (Daszak, et al., 1999, Berger et al., 1999, Puschendorf et al., 2006). The skin in amphibians is directly involved in many important physiological processes, including water absorption, osmoregulation and to different degrees, respiration (Marco et al, 2008). The nature of their skin and their biphasic mode of life has made amphibians excellent environmental indicators (Blaustain and Wake, 1995). They act as prey and predators in ecological food web, therefore declines or extinctions alter the ecological balance of the environment (Green, 2005). Hence chytridiomycosis is an environmental problem that requires attention.



Map showing location of Okomu National Park, Edo State, Nigeria

Chytridiomycosis has been observed in frogs in the wild: free ranging frogs and those in protected environments (Drost and Feller 1996 and Diaz et al.; 2007) as well as those in captivity (Berger et al.; 2005). Clinical signs of chytridiomycosis vary between species and include lethargy, reddening of ventral skin, convulsions with extension of limbs, accummulation of sloughed skin over the skin and occasional ulcers. Lesions may occur which include irregular multifocal epidermal hyperplasia and disorder of the epidermal cell layer (Berger et al.; 1998, Pessier et al.; 1999 and Berger et al.; 2005).

Until now, information on the status of amphibians with respect to chytrid infection has been non-existent in Nigeria

In Africa, *Batrachochytrium dendrobatidis* has been isolated in South Africa from *Xenopus laevis* (Weldon, 2004) and other frog species (Hopkins and Channing 2003). It has been suggested that *X.*

Chiromantis rufescens *female*

Chiromantis rufescens *applectant pair*

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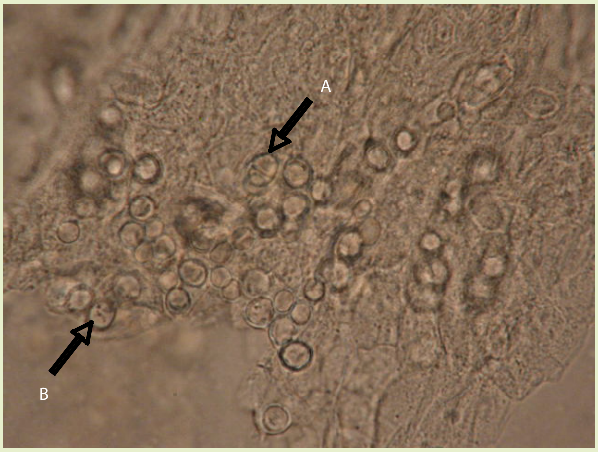
laevis was the carrier of the pathogen through which other amphibian were infected globally via the *X. laevis* trade (Weldon et al, 2004). Report also has it that amphibian chytrid infection has been detected among frogs in east Africa (Goldberg et al, 2007).

Until now, information on the status of amphibians with respect to chytrid infection has been non-existent in Nigeria. It was the absence of information on this all-important subject that led to the investigation of amphibians in the Okomu National Park, Nigeria for chytridiomycosis. Okomu National Park (6° 18'N, 5°15'E) situated in the lowland rainforest belt of southwestern Nigeria, is a protected sanctuary. Investigations for chytrid infection were carried out between April 2007 and July 2008. Samples of amphibians were collected and different methods for chytrid detection, which included wet mount examination of skin slough (Weldon, 2004), histological examination (Berger et al, 2000) and PCR molecular analysis (Boyle et al., 2004), were applied.

This report is on the wet mount examination of skin slough recovered from Chiromantis rufescens. On examining the skin slough under the microscope (Nikon Alpho-Photo-2 Microscope with attached Coolpix digital camera, 3.34 mega pixels), sporangia of *Batrachochytrium dendrobatidis* were observed as shown below. Results based on the other two methods are being analyzed and these too are giving indications of chytridiomycosis in other amphibian species investigated in the Okomu National Park.



Skin slough from **Chiromatis rufescens** ***infected with*** **Batrachochytrium dendrobatidis**

A = Sporangium with a septum
B = Sporangium containing zoospores

Acknowledgements:

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POLICY PIECE

The Rio Convention, CITES, European legislation and invasive amphibians: are we doomed to lag behind forever?

Joachim Mergeay

The international trade in amphibians and reptiles is a prolific business, be it legal or illegal. Many exotic species end up in terraria or aquaria. Generally, the legal framework is focused on protecting endangered species from being traded, mostly tropical or subtropical species. The so-called Rio convention (The 1992 United Nations Convention on Biological Diversity, Rio De Janeiro, Brazil) is the most important of these international agreements.

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Turkish marsh frog, **Pelophylax cf bedriagae ©** ***Robert Jooris***

In Europe, the treatise of the Rio convention and the earlier CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington DC, USA, 1973) is implemented into Regulation of the European Commission EC338-97. This regulation not only considers the need for the protection of endangered species in their native range, but also acknowledges the danger of certain exotic invasive species on local biota. So in addition to all CITES-listed species, appendix B of EC338-97 includes additional species of which transport into the European Union is prohibited or highly regulated because they represent a threat to local biodiversity. The only invasive amphibian listed there is the American bullfrog, *Lithobates catesbeianus* (formerly known as *Rana catesbeiana*).

Only the adpotion of a white list in European legislation will truly allow the prevention of future biological invasions

But how efficient is this legislation against invasive species, and in extension, the use of black lists with dangerous species? The concept of a black list implies that any exotic species is considered harmless unless proven otherwise. In other words, potentially harmful species are allowed to become invasive before action is taken. Additionally, no European legislation bans the trade per sé within the European Union in species like the Bullfrog; only the

Edible frog, **Pelophylax kl. esculentus ©** ***Robert Jooris***

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importation of them from outside the EU is banned.

In a paper recently published in Molecular Ecology (Holsbeek et al. 2008) the pitfalls of this approach are exemplified in the double invasion of two closely related water frog species in Belgium. The first of these species is the European marsh frog, *Pelophylax ridibundus* (syn. *Rana ridibunda*). Until the 1970ies this species was restricted in Western Europe to regions west and north of the Rhine river, but numerous introductions outside its native range since then have allowed this species to spread throughout Belgium, France and Switzerland. In this introduced range it is a fierce competitor with its much smaller sibling species the pool frog (*P. lessonae*) and with the Edible frog, *P. kl. esculentus*. The Edible frog is a rather peculiar hybrid "species": it originated through hybridization between Marsh frogs and Pool frogs during the last ice age. When it crosses with other edible frogs or with pool frogs, the offspring will consist again of edible frogs. Also crosses between Marsh frogs and Pool frogs will result in Edible frogs. However, when Edible frogs cross back with Marsh frogs, the offspring solely consists of genetically reconstituted Marsh frogs. This is the result of the complex reproductive behaviour of Edible frogs (Uzzel and Berger 1975). With regards to conservation issues, this means that populations of Pool frogs and Edible frogs can be easily wiped out by Marsh frogs through hybridization in a time span of two and one generations, respectively.

The invasion of Marsh frogs outside their native range therefore poses a serious threat to both other water frog species. In the study by Holsbeek et al. (2008) more than half of the populations were already invaded by non-native frogs. However, they did not only find Marsh frogs, but also commonly found a species otherwise restricted to the Middle East and Black Sea region, *Pelophylax cf. bedriagae* ("Turkish marsh frog"). This new species is almost indistinguishable from the regular Marsh frog and required genetic tools to confirm its identity. The study also demonstrated that both invasive species readily hybridize in their new range, which is generally a dangerous cocktail for the evolution of invasiveness (Ellstrand and Schierenbeck 2000).

Marsh frog,* Pelophylax ridibundus *© Hugo Willockx

The use of genetic markers also allowed to trace back the two invasive species to trade in water frogs from Turkey to Europe. A large part of this trade is intend-

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Pool frog, **Pelophylax lessonae** ***© Hugo Willockx***

ed for frog legs (for culinary purposes), but also for the pet trade. Many pond owners simply buy water frogs and introduce them into their garden pond. This is the stage at which the European and Belgian legislations fail dramatically: because all indigenous amphibians are protected in Belgium, retailers are importing exotic species that are neither protected (or of which importation is prohibited) through EC338/97 (and CITES) and are neither protected in their country of origin. This is the case for the Turkish marsh frog in Turkey, for example. Only intentional release in the wild of non-indigenous species is forbidden in Belgium, but this only shifts the responsibility towards pond owners (in the case of water frogs), whereas intentional release is almost impossible to prove.

Currently the Bull frog is the only invasive amphibian species that is included in Appendix B of EC338/97 (and later amendments). It may take some more years before the Turkish marsh frog is included, by which time it may have become even more invasive. And other species will follow in its footsteps, as measures for the prevention of invasions of exotic species on the European territory are entirely lacking. Prevention, however, is always the most cost-effective and environmentally most efficient strategy, but this consequently requires the use of a "white list": species that have been demonstrated to pose little or no threat for native biota. This principle is applied by Australian legislation, for example (Natural Resource Management Standing Committee & Vertebrate Pests Committee 2004). This is in concordance with the precautionary principle of the Rio convention: "where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat". Only the adoption of a white list in European legislation will truly allow the prevention of future biological invasions. Without it, we are doomed to be continually be overtaken by new invasion events.

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SEED GRANTS

DAPTF Seed Grants

Tim Halliday

Recipients of DAPTF Seed Grants are generally expected to publish the results of their projects in refereed journals, or as articles in Froglog. The following paper reports work supported by a DAPTF Seed Grant awarded to Megan Gahl and Aram Calhoun (2004):

Gahl, M. K. & Calhoun, A. J. K. (2008) Landscape setting and risk of Ranavirus mortality events. Biol. Conservation: 141; 2679-2689.
(megan_gahl@umit.maine.edu)

Instructions to Authors

FROGLOG publishes a range of articles on any research, discoveries or conservation news relating to the amphibian decline phenomenon. 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 should be in English, normally no more than 1000 words and follow the style of FROGLOG Vol 83 (as should references). You may also submit images, maps, figures or tables. We encourage the submission of photographs to accompany text. Short news items and press releases are also acceptable. Please submit potential contributions to Robin Moore at the address in the box to the right.

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