ASG

FROGLOG

Newsletter of the IUCN/SSC Amphibian Specialist Group

In Search of the Limon harlequin frog

The stiffened corpse of a female lies sprawled in the shallow water as a male clings to her back in a desperate effort to mate. He is among the last of the surviving Limon harlequin frogs – or Atelopus sp. #13 – a brilliant bright yellow and black species that is known to breed in just one stream in southern Ecuador: but for how much longer? The scene is a poignant symbol of an all-too-familiar phenomenon.

Limon harlequin frog **© Robin Moore**

On the evening of June 4 I arrived in Quito to meet up with Luis Coloma and Santiago Ron from the Catolica University and Joel Sartore and Jennifer Holland from National Geographic. Armed with cameras, video and recorders, we planned our trip to Limon, a small town in the south of Ecuador, to document the species.

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WHAT'S INSIDE

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We set off early and drove all day along breathtaking and sometimes nerve-wracking roads from Quito to Limon until finally we neared the home of harlequin frog #13. As we turned the final corner to overlook the ravine, our hearts sank.

cal habitat for the frog. "We are too late" sighed a dejected Luis Coloma, eyes to the ground. He could not bear to watch as the habitat was destroyed in front of us.

Pessimistic of our chances of finding the frog, we waded solemnly upstream away from the falling rocks. Not only is the barrage of debris down the slopes an environmental hazard; it also presents a human hazard. David Salazar, who has been studying this population for the last 4 years was hit by a falling rock last week and is reluctant to work here any longer because it is no longer safe.

Suddenly, a jubilant cry

"We may be watching a species go extinct before our very eyes."

Bulldozers and workmen lined the road, shoveling rubble indiscriminately over the sides of the stream that provides the last criti-

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Limon harlequin frog **© Robin Moore**

from upstream raised our spirits like a generous shot of rum. We raced up to find a small male clinging to a leaf: a surge of excitement that the species is still alive.

On our way back down the stream, however, we found another male. Rather than provide reason for celebration, this one was trying to mate with a dead female. "We may be watching a species go extinct before our very eyes" exclaimed Joel Sartore. "I knew it was bad, but I had no idea it was this bad."

Jennifer find dead frogs **© Robin Moore**

Another symbol of the destruction: glass frog eggs were found hanging over dry ground, waiting to hatch.

It is not a fight between conservation and development. Questions need to be asked before the decision is made to consign a species to the annals. The road expansion we witnessed is destroying the resources that support local communities. Dynamited hillsides invite erosion and landslides, and tossing of rubble into rivers is turning their clear

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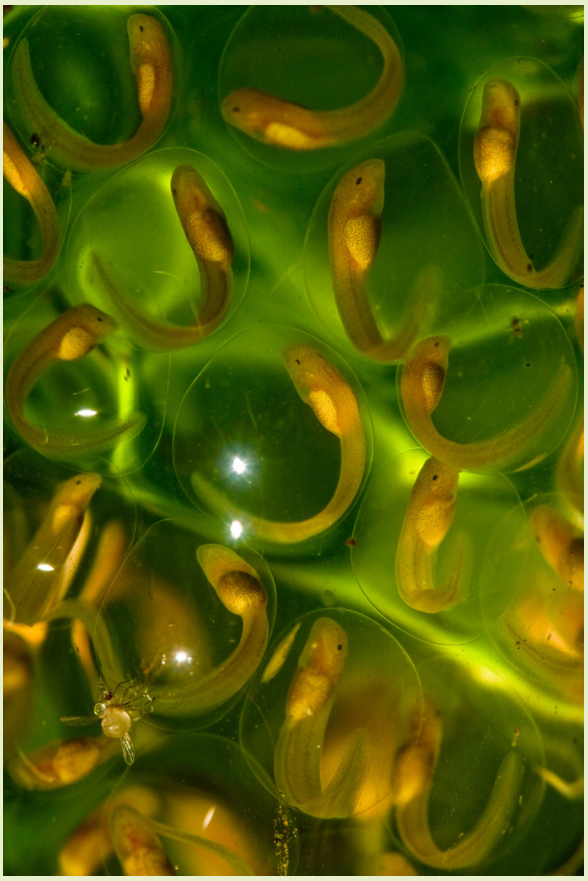

Glass frog eggs **© Robin Moore**

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waters brown and suffocating the life out of them - in the name of development.

It is not the improvement of this road that is the problem per se: it is the way in which it is being done. It is a rushed job, with no proper assessment of it's impacts and no measures to mitigate these impacts.

Just two weeks earlier the Minister of the Environment emphatically reiterated Ecuador's committment to reducing biodiversity loss by 20010. Here is the perfect place to start.

We are working with local partners from the Catolica University to try and protect some of the habitat upstream of the development. A captive breeding program for the species will hopefully provide individuals for reintroduction. In the meantime, we will shine the spotlight on the government and question their committment to protecting this and other valuable habitats in the hope that our voices will be heard.

Robin Moore: rdmoore@conservation.org

AROUND THE WORLD

Rapid survey on amphibian skin diseases in a mountain forest at the northern andes of Peru

Marco A. Enciso, Mirella Villena, Ana P. Mendoza, Germán Chávez

The skin of amphibians is highly permeable and directly involved in an important physiologic processes, including water absorption, osmoregulation, and, to different degrees, respiration. In the amphibian epidermis, the combination of a fragility, with minimal keratinization, and lack of potentially protective structures makes it very sensitive to environmental perturbations and cutaneous injury (Pessier, 2002).

Investigators have described many infectious and noninfectious diseases that occur among various species of captive and wild amphibians, and there is considerable overlap in diseases of captive versus free-ranging populations (Densmore & Green, 2007). Generally, the microorganisms involved in the infectious diseases are bacterias, fungus and viruses.

Bacterial infections are one of the first causes of morbidity and mortality in captive

Pristimantis corrugatus at the ACP Huiquilla, Amazonas, Peru

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and wild amphibians. These bacteria are a part of the normal flora of these species, and only cause disease when there is a breakdown in the natural defense mechanisms. Among bacterial diseases, the most overdiagnosed and misdiagnosed disease is red leg syndrome. The most frequently implicated etiological agent is *Aeromonas hydrophila*; however, many other gram-negative bacteria can be involved, like a Acinetobacter, Proteus, etc (Crawshaw, 1992; Mauel et al., 2002).

Skin swab for bacterial analysis in a Pristimantis individual

In the case of fungal infections, chytridiomycosis is a disease associated with, or directly attributed to, severe population declines, extirpation of populations and extinctions of many amphibian species around the world (Daszak et al., 1999). The chytrid fungus, *Batrachochytrium dendrobatidis*, causes a severe hyperkeratosis of the skin, affecting the cutaneous respiration and thermoregulation of amphibian host, causing death. In addition, secondary bacterial or other fungal infections can be present (Pessier, 2002; Paré, 2003). The agent is recognized as a global threat to a broad host range of wild amphibian populations (Berger et al., 1999).

Bacterial infections are one of the first causes of morbidity and mortality in captive and wild amphibians.

It is necessary to know to what extent these infectious agents occur in susceptible groups like amphibians, principally in free-ranging individuals. In Peru, we do not have reports of bacterial diseases in wild amphibian populations. In relation to the fungus, its has been identified in the southern region of the Andes (Seimon et al., 2005; Seimon et al, 2007), but amphibian populations in the northern Andes had not previously been evaluated.

The aim of this study was to investigate the presence of *B. dendrobatidis* and bacterial agents in the skin of free-ranging amphibians in the northern andes of Peru. The study was carried out in the mountain forest and puna region of the Área de Conservación Privada Huiquilla, Amazonas, located in 06°23' S, 77°29' W and 2800 m.a.s.l., northeast of Peru. The field work was car-

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ried out in October 2007 and February 2008. The samples were collected from amphibians of the genus Pristimantis (*P. corrugatus*, *P. schultei* and *P. melanogaster*) and Gastrotheca (*G. monticola*). Skin samples of distal phalanx (n=23) were obtained for histopathological analysis. This was performed in the Laboratory of Histopathology, Faculty of Veterinary Medicine (FVM), Universidad Nacional Mayor de San Marcos (UNMSM), Lima-Peru. Established protocols of haematolxilyn/eosin stain for chytrid identification were used (Berger et al., 2000). For the bacteriological analysis, skin swabs were taken (n=19). The analysis was carried on in the Laboratory of Microbiology, FVM, UNMSM, Lima-Peru. Established protocols for Aeromonas and enterobacteria isolation were used.

The most over- and misdiagnosed disease is red leg syndrome.

With respect to *B. dendrobatidis*, the results prove the absence of fungus in the samples of the species collected, indicating that frogs in this sample area are not developing the disease. However, the presence of the pathogen cannot be ruled out in this area, because while the individuals sampled may not have developed the clinic disease, they may still have been exposed to the pathogen. More studies at the molecular level are necessary with the use of PCR technique.

In the bacteriological analysis we found *Aeromonas caviae* in the 10.51% of the samples, and to a lesser extent we found other enterobacteria of the genus Enterobacter, Serratia and Hafnia. The results suggest the potential threat of infection and development of disease in these species with Aeromonas, because if it is true that the bacteria can be a normal skin inhabitant, any event that provokes stress in the amphibian (like a high temperatures, chytridiomycosis, etc) could trigger the disease.

This rapid survey gives us an overview about the health status of amphibian populations in the sampled area. More studies on chytrid fungus and other diseases are necessary in order to understand the degree of impact and diseases distribution in Peru.

Acknowledgements

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Corresponding author: MAE (marco.enciso@gmail.com)

African Amphibian Working Group 12-13 April 2008, Ilboro Safari Lodge, Arusha, Tanzania

Kim Howell and Flora Stephano

The 13th meeting of the AAWG was held from 12-13 April 2008 at Ilboro Safari Lodge, Arusha, Tanzania. The 28 registered participants came from Nigeria, Kenya, Uganda, Tanzania and South Africa as well as the UK, Europe and the USA.

The papers and posters presented are listed below, grouped according to topics, with the name of the presenter.

A unique aspect of this AAWG was that it was supported by the local private companies,

Nomad Safaris, Ngare Sero Lodge and WEGS consultants. Their generous support meant that participants did not have to incur registration costs. A night of frogging on the grounds of Ngare Sero Lodge was preceded by a meal, and they also funded a closing cocktail. Nomad Safaris provided transport as well as driver guides for the evening, and these guides participated actively in the night's frogging.

Dr. Michele Menegon led a discussion focussed on how Tanzania might take advantage of experience gained in southern Africa as regards Amphibian conservation, and it was noted that there was a need for Tanzania to establish an Amphibian Red Data book. In training sessions, Dr Menegon and Prof. Alan Channing

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provided "hands on" experience on photographing amphibians and David Moyer gave a demonstration on techniques used in recording amphibian vocalisations.

The next meeting of the AAWG will be hosted by Prof. Alan Channing in Stellenbosch, South Africa in 2010.

TOPIC	SPEAKER	TITLE
Species, Systematics, Distribution	Alan Channing	Just what is that species?
	Abigail Imasuen	Biodiversity of Amphibians in Okomu National Park, Nigeria
	Annika Hilliers	From leaf-litter frogs' phylogeography to West Africa's forest history
	John Visser	*Heleophryne* re-visited – How secondary sexual characters confuse the species specific.
	Michael Cunningham	The geography of speciation in Karoo Toads *(Vandijkophrynus spp.)*
	Kirsty Bell	*Breviceps macrops* distribution
	Andrew Turner	Post-Miocene evolution in the Cape Fold Mountains: A moss frog's perspective.
	Patrick Malonza	Vertebrate species richness in the Eastern Arc Mountains: revisited using amphibians as a model
	Rafeal de Sa	Preliminary analysis of the genetic diversity of *Hemisus marmoratus* (Anura, Hemisotidae).
	John Measey	Investigating ancient and modern population fragmentation in Amietophrynus pantherinus, the endangered Western Leopard Toad
	Michele Menegon	1997-2007, summary of the results of ten years of fieldwork on the Amphibians of the Eastern Arc Mountains
	Mathias Behangana	On vocalisations of some Ugandan anurans
Reproduction	C.L. Henderson	Reproductive potential in Southern African frogs
	Flora Stephano	Stages of Development of Clawed Frog, *Xenopus muelleri* from hatching to metamorphosis
Techniques etc	Kim Howell	The benefits of pitfall traps when sampling amphibians

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	Elizabeth Harper	A Field Guide to the Amphibians of the Eastern Arc Mountains and Coastal Forests of Tanzania and Kenya
Parasites & Disease	David Moyer	Chytridiomycosis in anurans in the Udzungwa Mountains, results of a survey
	Marika Gericke	The culturing and distribution of *Batrachochytrium dendrobatidis* in South Africa
	Leon Meyer	Seasonal variation and the influence of environmental gradients on *Batrachochytrium dendrobatidis* infections in South African frogs
	Martins Aisien	Observations on the reproductive biology of *Polystoma erahensis* parasitic in *Amietophrynus regularis* from Nigeria
	Louis Du Preez	Madagascan polystomes-the African connection
Feeding, Diet	Beryl Bwong	Diet composition of *Xenopus borealis* in natural and disturbed habitat in the Taita Hills
Conservation	Abeda Dawood	Genetic variability between populations of the critically endangered frog *Microbatrachella capensis* (Anura: Ranidae: Cacosterninae).
	Krystal Tolley	Deconstructing a controversial local range expansion: conservation biogeography of the painted reed frog (*Hyperolius marmoratus*) in South Africa
	Patricia McCauley	Amphibians and Ecotourism
Posters	Michael Cunningham	Systematic revision of Ghost Frogs *(Heleophryne)*
	A. Dawood	Antimicrobial activity of epithelia from selected frog species of the south Western Cape of South Africa
	Devolent Mtui	Observations on biology of the Torrent Frog *Arthroleptides. yakusini* in Kihansi gorge, Tanzania
	Devolent Mtui	Observations on the status of amphibians in Kihansi Gorge, Tanzania
	Job de Graaf	Frogs of Flood River, Dodoma, Tanzania

Report by co organisers Kim Howell (kmhowell@udsm.ac.tz) and Flora Stephano (fsnyaki@udsm.ac.tz) of the Dept. of Zoology & Wildlife Conservation, University of Dar es Salaam, Dar es Salaam, Tanzania.

DAPTF Seed Grants

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 papers report work supported by DAPTF Seed Grants awarded to Johanna Delgado-Acevedo (2002), Eli Greenbaum (2002) Tibor Hartel (2004), Nancy Karraker & James Gibbs (2002), Justin Garwood (2005) and Pamela Widder & Joseph Bidwell (2004):

Delgado-Acevedo, J. & Restrepo, C. (in press) The contribution of habitat loss to changes in body size, allometry, and bilateral asymmetry in two Eleutherodactylus frogs from Puerto Rico. Conservation Biol: (johannadelgado@yahoo.com)

Greenbaum, E., Kusamba, C., Aristote, M. M. & Reed, K. T. (2008) Amphibian chytrid fungus in Hyperolius (Anura: Hyperoliidae) from eastern Democratic Republic of Congo. Herpetol. Review: 39; 70-73. (eli.greenbaum@villanova.edu)

Hartel, T. (in press) Weather conditions, breeding date and population fluctuation in *Rana dalmatina* from central Romania. Herpetol. J: (asobeka@yahoo.com)

Karraker, N. E., Gibbs, J. P. & Vonesh, J. R. (2008) Impacts of road deicing salt on the demography of vernal pool-breeding amphibians. Ecol. Applications: 18; 724-734. (karraker@hkucc.hku.hk)

Pope, K. L., Garwood, J. M., Welsh, H. H. & Lawler, S. P. (in press) Evidence of indirect impacts of introduced trout on native amphibians via facilitation of a shared predator. Biol. Conservation: (kpope@fs.fed.us)

Widder, P. D. & Bidwell, J. R. (2008) Tadpole size, cholinesterase activity, and swim speed in four frog species after exposure to sub-lethal concentrations of chlorpyrifos. Aquatic Toxicology: 88; 9-18. (widder @vt.edu)

Cure for the chytrid?

Reid Harris and colleagues at James Madison University have identified bacteria that live naturally on amphibians and help them to survive fungal infection.

Testing the mountain yellow-legged frog (*Rana muscosa*), Harris and colleagues found that the presence of bacteria helped reduce weight loss and increase lifespan durng a fungal attack.

The amphibian chytrid has been implicated in population crashes and species extinctions around the world, yet a silver bullet to cure wild individuals has continued to elude scientists. This finding is significant and provides hope that we may have a method for combatting the fungus before many more species are lost to the disease.

Harris and colleagues plan to begin field trials within the next few years if positive results continue.

Seeking enthusiastic volunteer to identify calls of Costa Rican amphibians

We are looking for an enthusiastic, patient and knowledgeable volunteer with expertise on Costa Rican frog calls. We are testing a new state-of-the-art acoustic monitoring protocol for frogs and defining several protocol parameters such as number of samples per night, duration of each sample, etc. The person will have to listen to several hundreds of hours of recordings and be able to identify all the frog species calling. All recordings come from La Selva Biological station and adjacent mid elevation Braulio Carillo National Park, Costa Rica. The results from this effort will likely result in a paper in an international journal and coautorship will be offered. For more information please contact Jorge Ahumada, TEAM Network, Conservation International (j.ahumada@conservation.org).

Matching Funds for Site-level Conservation

The Amphibian Specialist Group is accepting proposals to achieve the protection of critical amphibian habitat anywhere in the world. Proposals from Africa and Asia are highly encouraged. The site must have demonstrable importance for amphibians and contain a population of at least one IUCN Threatened amphibian species. Sites containing species identified by the Alliance for Zero Extinction (AZE: www.zeroextinction.org) as occurring in just one site worldwide will be favored. We can match up to 50% of project costs: remaining funds must be secured by the applicant. Organizations and Institutions are eligible to apply for funding. Please submit a one-page summary of the site, the species, the opportunity and a detailed budget, up to a maximum request of USD $30,000 to Robin Moore at rdmoore@conservation.org. Larger requests may be considered for exceptional projects. Proposals will be reviewed on a rolling basis as they are received.

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.

FROGLOG is the bi-monthly newsletter of the Amphibian Specialist Group (ASG). Articles on any subject relevant to the understanding of amphibian conservation, research and / or assessments should be sent to: Robin Moore, Editor, Conservation International, 2011 Crystal Drive, Suite 500, arlington, VA 22202, USA.
E-mail: rdmoore@conservation.org