

# FROGLOG

Newsletter of the Declining Amphibian  
Populations Task Force

August 2004, Number 64.



Morphological Abnormalities in Frogs of West Java, Indonesia

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In recent decades, amphibian deformities have generated public interest as high incidences have been found in several locations, notably in North America (Helgen et al., 1998; Ouellet, 2000). The only report on the incidence of amphibian deformities in Indonesia concerns tadpoles of *Rana chalconota* from a pond near rice fields in Sukabumi, West Java (Leong, 2001). During 2001 to 2003 we conducted ecological surveys on 26 occasions in 11 rice fields and on 28 occasions in 6 stream habitats in the Bogor, Sukabumi, Karawang and Subang districts of West Java province. We summarize the types and rates of morphological abnormalities we found in adult frogs found during this study. We also present preliminary data taken from frogs harvested by commercial frog hunters in Caringin (Bogor district) during 2001 and 2002, and data from specimens in the collection of the Museum of Zoology, Bogor (MZB).

West Java (~46,300 km<sup>2</sup>) is the second largest province in Java and is one of its wettest regions. All sampling was done at night, using visual encounter surveys (Heyer et al., 1994). Nomenclature follows Iskandar (1998). Our categories of morphological abnormalities are based on those of Tyler (1999),

Meteyer et al. (2000) and Ouellet (2000).

We examined a total of 4,331 frogs of 23 species and found 20 types of deformities in 9 species of frogs. We divided deformities into two general types: developmental abnormalities and trauma (injuries). We distinguished trauma abnormalities based on the appearance of old scars or, if they involved digits, the occurrence of digital re-growth. Developmental abnormalities occurred in limbs (amelia, micromelia, brachymelia, hemimelia, ectromelia, taumelia, cutaneous fusions), digits (ectrodactyly, brachydactyly, syndactyly, polydactyly, clinodactyly), the back-bone (scoliosis), the eyes (anophthalmia) and the skin (a lump-like tumour). Trauma included digit amputation, limb amputation, limb fractured, lip wounds and skin wounds. It was sometimes difficult to differentiate between developmental abnormalities and trauma, i.e. distinguishing brachydactyly and ectrodactyly from digit amputation.

#### The rice field habitat

In our rice field samples we examined 3,229 individuals of 13 species, and found 117 frogs exhibiting abnormalities. The overall frequency of abnormalities is therefore low (3.62%). We found abnormalities in four species, *Fejervarya limnocharis* (108 of 2,695, 3.64%), *F. cancrivora* (17 of 323, 5.26%), *Occidozyga lima* (1 of 117, 0.85%), and *Limnonectes kuhlii* (1 of 1). The most abundant species, *F. limnocharis*, exhibited abnormalities at all sites, at site-specific frequencies ranging from 1.71 to 11.11%, and the second most abundant species, *F. cancrivora*, was found with abnormalities on 11 occasions, at rates ranging from 3.08 - 7.14 %. The other two frogs exhibited

very low number of abnormalities. We only found one *L. kuhlii*, which may have strayed from a nearby stream.

A third of abnormalities were due to trauma; these included digit amputations (16% of all abnormalities), limb amputations (2%), fractured limbs (7%) and skin wounds (4%). The most common developmental abnormalities were digital (43%) and, of these, brachydactyly (16.3%), syndactyly (14.6%) and ectrodactyly (11.4%) were the three most common.

The oldest specimen of *F. limnocharis* stored in the MZB that exhibited abnormalities was a juvenile frog captured on 16 November 1921 from Bogor without one leg (amelia) (ID057.10). The oldest specimen of *F. cancrivora* stored in MZB that exhibited abnormalities was a female frog from Bogor captured on 26 July 1954 which had ectrodactyly and a bifid phalanx (ID341.5). Examination of individuals of these species captured by frog hunters revealed low numbers of abnormalities of several types including syndactyly, brachydactyly, ectrodactyly and amelia.

#### Stream habitats

We examined 1,102 frogs of 17 species in stream habitats. Fifty-three individuals showed signs of abnormalities. Overall frequencies of abnormalities in total sites are therefore moderate (4.81%). Abnormalities occurred in seven species: *Limnonectes kuhlii* (22 of 262, 8.40%), *Bufo asper* (13 of 162, 8.02%), *Rana chalconota* (6 of 269, 2.23%), *R. hosii* (1 of 235, 0.43%), *Bufo melanostictus* (1 of 18, ca. 5%), *Rhacophorus javanus* (1 of 18, ca. 5%), and *Fejervarya limnocharis* (1 of 10, ca. 10%). Almost half (45%) of all abnormalities were due to trauma, including digit amputation (22%), limb

amputation (2.4 %), fractured limbs (2.4 %), lip wounds (7.3%) and skin wounds (9.8%). The most common developmental abnormalities were digital (39.1%). The most common types of digital abnormalities were ectrodactyly (12.2%), brachydactyly (9.8%), and syndactyly (4.9%). The high prevalence of abnormalities in *B. asper* was due largely to individuals from a stream in Caringin, Bogor (6 of 25 individuals, 24%); most of the abnormalities in these animals were caused by trauma to the digits and lips. *L. kuhlii* in Cilember (Bogor) also showed a high prevalence of abnormalities (18 of 220, 8.18%), most of which were ectrodactyly or digital amputations.

Our results indicate that most of the frequencies of abnormalities are relatively low and probably within the normal range (Tyler, 1999 and Ouellet, 2000) in West Java, although in some cases there were elevated percentages of abnormalities (>5%). Our data were, however, collected almost exclusively on late juvenile and adult frogs. Our results might have differed if we had sampled tadpoles or immediately post-metamorphic frogs, reducing or eliminating the probable effects of differential survival.

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#### Acknowledgments

Field surveys were made possible by funding from Wildlife Conservation Society, James Cook University, Bogor Agricultural University and Indonesian Reptile Amphibian Trader Association for MDK. We thank MZB for giving us access to the specimens, especially to ibu Mumpuni. We thank all the volunteers for their help especially Ita Novita Sari for doing the work in MZB.

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### PRESS RELEASE: Concerns Remain About UV-B Damage To Amphibians



The exposure of amphibians to damaging levels of ultraviolet-B radiation in sunlight is likely a significant part of global amphibian declines, researchers say, despite some recent suggestions to the contrary and a scientific controversy about what role UV-B actually plays in this crisis.

Scientists from the United States, Canada and Spain have outlined their understanding of UV-B's biological effects on amphibians in an article in *Ecology* [(2004) *Ecology* **85**: 1747-1763], a professional journal.

In it, they respond to some recent studies that have called into question whether UV-B radiation is causing severe health problems or mortality in amphibians.

"At this point, we believe the broad body of research conclusively demonstrates that UV-B radiation can cause damage to many species of amphibians at almost every stage of their life cycle, from egg to adult," said Andrew Blaustein, a professor of zoology at Oregon State University and the lead author on the *Ecology* commentary. "It appears the damage may be even worse than we originally thought a few years ago, and it's clear

that rising levels of UV-B radiation, which could be caused by erosion of Earth's protective ozone layer, can play at least a part in the amphibian declines we're seeing around the world."

Most scientists now believe, Blaustein said, that a wide range of causes explain the totality of amphibian declines, and those causes probably include habitat destruction, disease, parasites, introduced exotic species, environmental contaminants and other aspects of global climate change. In some cases complex chains of interlaced ecological effects can lead to amphibian disease, deformity or death.

But UV-B radiation is still high on the list of concerns, the researchers say.

"At first our field studies showed only the damage that increased levels of UV-B radiation could do to amphibian embryos, where they caused mortality in some species and not in others," Blaustein said. "But with more research we've seen how UV-B radiation can affect growth and development in larvae, cause changes in behavior, some deformities, and make the amphibian more vulnerable to disease and death. And in adults, it appears that UV-B radiation can cause retinal damage and blindness."

The evidence gathered from numerous scientists around the world is both alarming and compelling, Blaustein said. Every single amphibian species exposed to natural levels of UV-B radiation has now been found to have some type of health problem, either immediately or later in life.

"Given the numerous other organisms and biological systems that other scientists have already demonstrated to be impacted by UV, it makes sense that some amphibians too would be sensitive to UV radiation," said Lee Kats, a professor of biology at Pepperdine University and another author of the *Ecology* study.

Some recent studies that have questioned these effects did not have an adequate base of field experiments, made too many assumptions about how UV-B radiation in the life cycle of one species would relate to other species, and fail to understand the natural behavior of amphibians and their evolution, the researchers said in their *Ecology* article.

"For instance, some researchers have now theorized that amphibians could avoid the effects of UV-B radiation simply by avoiding sunlight or laying their eggs in deeper

water," Blaustein said. "But that ignores millions of years of evolution, in which amphibians have developed certain types of behavior for specific reasons. Some species lay their eggs in warm, shallow waters because they are seeking sun and heat, and they need to hatch and grow quickly before the water evaporates or freezes."

"Those types of behavior do not change overnight just because the Earth's atmosphere may have changed," he said. "It's not that simple. Moreover, as ponds dry and water levels decrease, amphibians cannot just get out of the sunlight, and they are bombarded by intense UV radiation."

Amphibian declines are an issue that first came to light about 15 years ago and have raised warning flags among many ecologists, who believe they may be a harbinger of ecological changes that are first affecting some of Earth's most sensitive animals and may later cause more widespread damage to other species.

Aside from amphibian deaths, population declines and localized extinctions, another issue that has raised concern is amphibian deformities. A near epidemic of deformed legs, eye damage and other ailments has been found in more than 60 species of frogs, toads and salamanders in 46 states and across four continents.

At one site near Corvallis, Oregon, 75-80 percent of the frogs are deformed, mostly linked to a parasite and other ecological changes. And egg mortality in embryos of the western toad and some other species in parts of the Oregon Cascade Range have approached 100 percent in some recent years.

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New Laboratory  
of Natural  
Sounds in Cuba

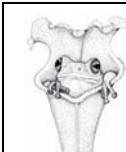
#### From Ansel Fong Grillo

On February 26 2004, the Laboratory of Natural Sounds "Juan C. Gundlach" was inaugurated in the Centro Oriental de Ecosistemas y Biodiversidad (BIOECO) in the city of Santiago de Cuba. This laboratory is the result of the collaboration between several national and international organizations such as the McArthur Foundation, The Field Museum of

Chicago, Maculay Laboratory of Natural Sounds of the Cornell University, BIOECO, and the BirdLife Important Bird Areas program in Cuba sponsored by the British Bird Watching Fair and the National Center of Protected Areas of Cuba (CNAP).

The laboratory already has many digitalized amphibian and bird vocalizations which are being automated and arranged in a database, although it also has insect, mammal and environmental sounds. Its mission is to create a library of natural sounds representative of Cuban biodiversity, as well as for research and environmental education purposes. This is also a new tool to study Cuban amphibians and especially to surveying and monitoring amphibian populations.

Gregory F. Budney, curator of sounds from the Maculay Laboratory of Natural Sounds of the Cornell University; Debra Moskovitz, ornithologist from the Field Museum of Chicago; Reynaldo Estrada, director of the National Center of Protected Areas (CNAP); Miguel Angel Abad Salazar, director of BIOECO and Nicasio Viña Dávila, delegate of the Ministry of Science, Technology and Environment in the Santiago de Cuba province were in the opening ceremony.



Un Nuevo  
Laboratorio de  
Sonidos Naturales  
en Cuba

#### De Ansel Fong Grillo

El 26 de febrero del 2004 se inauguró en el Centro Oriental de Ecosistemas y Biodiversidad (BIOECO) en la ciudad de Santiago de Cuba, el Laboratorio de Sonidos Naturales "Juan C. Gundlach". Este laboratorio es fruto de la colaboración de varias instituciones nacionales e internacionales como la McArthur Foundation, el Field Museum de Chicago, el Laboratorio Maculay de Sonidos Naturales de la Universidad de Cornell, BIOECO y el Programa de Áreas de Importancia para las Aves de la BirdLife en Cuba patrocinado por la British Bird Watching Fair y el Centro Nacional de Áreas Protegidas de Cuba (CNAP).

El laboratorio ya cuenta con una fonoteca de vocalizaciones digitalizadas de anfibios y aves cubanas en proceso de automatización en base de datos, aunque también posee grabaciones de insectos, mamíferos y sonido ambiente. Su misión es crear un banco de sonidos representativo de la

biodiversidad cubana que permita su utilización en la investigación y la educación ambiental.

Esta es también una nueva herramienta para el estudio de los anfibios cubanos y en especial para el muestreo y monitoreo de las poblaciones de ranas y sapos de la isla.

En la ceremonia de inauguración estuvieron presentes Gregory F. Budney, curador de sonidos del Laboratorio Maculay de Sonidos Naturales de la Universidad de Cornell; Debra Moskovitz, ornitóloga del Field Museum de Chicago; Reynaldo Estrada, director del CNAP; Miguel Abad Salazar, director de BIOECO y Nicasio Viña Dávila, delegado del Ministerio de Ciencia, Tecnología y Medio Ambiente de la provincia Santiago de Cuba.



Reports on  
DAPTF Seed  
Grants

#### From 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*. They are also required to send us reports, so that their results can be made available to DAPTF members. Below is a list of reports that we have received recently. Anyone wanting a copy of a report should contact the author in the first instance; we can supply copies if you cannot reach the author.

Cynthia Loftin & Michael S. Bank (2003) Effects of local and landscape heterogeneity on mercury loadings in palustrine amphibians from Acadia National Park, Maine.

[michael\\_bank@umit.maine.edu](mailto:michael_bank@umit.maine.edu)

Scott Michael (2001) Acoustic monitoring of declining anuran populations in Puerto Rico and Jamaica.

[smichael@tulane.edu](mailto:smichael@tulane.edu)

Trent Penman (2002) Applied conservation biology of a threatened forest-dependent frog, *Heleioporus australicus*.

[trent.penman@studentmail.newcastle.edu.au](mailto:trent.penman@studentmail.newcastle.edu.au)

Govindasami Ramaswamy (2002) Survey of Amphibian Diversity at the Indira Gandhi National Park (Western Ghats).

[prof\\_gr@hotmail.com](mailto:prof_gr@hotmail.com)

Tej Kumar Shrestha (1997) Conservation Status of Cascade Frogs in the Himalayan Foothills of

Nepal.

[drtks@ccsl.com.np](mailto:drtks@ccsl.com.np)

Greg Vigle (2003) Monitoring amphibians at a diverse Amazonian rainforest in Ecuador: employing indigenous personnel and digital cameras to obtain time-series data on diversity and abundance.  
[librarius@librarius.org](mailto:librarius@librarius.org)

**Special Grant from the DAPTF:**

Andrew Turner & Atherton de Villiers (2003) Western Cape Nature Conservation Board Long Term Frog Monitoring Annual Report.

[aaturner@cncjnk.wcape.gov.za](mailto:aaturner@cncjnk.wcape.gov.za)



Announcements  
and Meetings

**DONATIONS** We gratefully acknowledge receipt of these donations, received prior to June 30, 2004: US EPA, Danna Schock, International Amphibian Day, Arizona Game & Fish Herpetology Program.

**New Free Poster: Salamanders of Arkansas** The Arkansas Game & Fish Commission has published a new wildlife poster illustrating in colour the salamanders of their state. The poster is the product and design of state herpetologist Kelly J. Irwin with artwork by Bruce Cook. It supplements the information appearing in the recently (2004) published "Amphibians and Reptiles of Arkansas" by Stanley E. Trauth, Henry W. Robison, and Michael V. Plummer. The excellent photography is by Suzanne L. Collins (Lawrence, Kansas) and Stanley E. Trauth (State University, Arkansas).

To request a copy, call: 1-800-364-4263

**Green Frog Data Needed:** Walter Meshaka, state herpetologist of Pennsylvania, is currently studying geographic variation in life history characteristics of a widespread anuran, the green frog (*Rana clamitans*). If you live within the geographic range of this frog or come into contact with this species, please e-mail ([wmeshaka@state.pa.us](mailto:wmeshaka@state.pa.us)) or write to him (State Museum of Pennsylvania, Zoology/Botany, 300 North Street, Harrisburg, Pennsylvania 17120-0024) with what you know to be the calling season of this frog in your area. If, for specific areas, you can tell him if males have a yellow throat, so much the better! Please also note if you are willing for him to reference your information as a personal communication.

**Conference-Workshop: Captivity, Reintroduction and Disease Control Technologies for Amphibians.** Will be held 11th -14th December 2004 at the Amphibian Research Centre in Melbourne, Australia. The purpose of the meeting will be to discuss current tools for conservation and to develop a set of guidelines for use in reintroduction and conservation programs. Papers and posters are called for in the areas of: captive breeding and captive assistance programs, cryopreservation and other reconstitution technology, reintroduction, quarantine and disease management for captive and field populations. More information and

registration forms can be found at [www.frogs.org.au](http://www.frogs.org.au) The meeting is supported by the Australian Government and attendance is free of charge.

**The 9th Annual Meeting of the Canadian Amphibian and Reptile Conservation Network /Réseau Canadien de Conservation des Amphibiens et des Reptiles** will be held at Coast Terrace Inn, Edmonton South, September 24 - 27, 2004. All of the relevant information is on our website at [www.carcnet.ca](http://www.carcnet.ca) or you can contact Kris Kendall at:  
[kris.kendell@gov.ab.ca](mailto:kris.kendell@gov.ab.ca)

The deadline for early registration and the abstract deadline is 30 July 2004.

**12th Annual Association of Reptile & Amphibian Veterinarians (ARAV) Conference** April 2005, Tucson, Arizona. Scientific sessions include: general herpetological veterinary topics, diagnostics and therapeutics, anaesthesia and surgery etc. etc. plus field trips! For updated conference and registration information please view the ARAV website at [www.arav.org](http://www.arav.org)

Please submit titles for abstracts or papers by September 1, 2004 to:

[herpdoc@aol.com](mailto:herpdoc@aol.com)

**WCH5:** For advance details of next years' Fifth World Congress of Herpetology in Stellenbosch, South Africa, check out this web page:  
<http://www.wits.ac.za/haa/5wch.htm>  
DAPTF plans to have a high-profile presence at this meeting.



**RANA and US National Science Foundation Grants DEB-0130273 and INT-0322375 helped support the publication of this issue.**

**FROGLOG** is the bi-monthly newsletter of the Declining Amphibian Populations Task Force. Articles on any subject relevant to the understanding of amphibian declines should be sent to:

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WEBFROG

**DAPTF Website Updated:** Check out the latest updates to the DAPTF website at: [www.open.ac.uk/daptf](http://www.open.ac.uk/daptf) *Froglog* is now also available to download on-line in PDF format at: [www.open.ac.uk/daptf/froglog/](http://www.open.ac.uk/daptf/froglog/)

If you prefer to view your copy of this newsletter on-line (and therefore reduce paper usage and postage costs), please inform John Wilkinson at the e-mail address below.

**NEW! Donate to DAPTF's Work On-Line!** Later in the year, all postal recipients of *Froglog* will receive (as usual) a request for donations from our Chair. Now, however, anyone anywhere in the world with www access and a credit card can make a secure donation to DAPTF's work with PayPal at:

[www.open.ac.uk/daptf/about/about8.htm](http://www.open.ac.uk/daptf/about/about8.htm)

**The Colorado** Division of Wildlife has launched their web-based herpetofaunal atlas at: [wildlife.state.co.us/species\\_cons/herpetofaunalatlas.asp](http://wildlife.state.co.us/species_cons/herpetofaunalatlas.asp)

The latest version of the "Names of the Reptiles and Amphibians of North America" has been posted at: <http://ebeltz.net/herps/etyhome.html>

For fascinating video/audio sequences of calling frogs (and interviews with Carl Gerhardt about frog mate choice) visit: [www.midwestfrogs.com/](http://www.midwestfrogs.com/)

**Funding for FROGLOG is underwritten by the Detroit Zoological Institute, P.O. Box 39, Royal Oak, MI 48068-0039, USA**  
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