



In search of *Atelopus exiguus*

Robin Moore

As we scour the crystal clear water for signs of life, a persistent wind drives the thin damp air through my thin layers of clothing. In a patch of forest high in the Andes of southern Ecuador, we are on a mission to find the Critically Endangered *Atelopus exiguus*. These small frogs used to be so abundant that a ranger who walks the trails every day would watch his step to avoid them; he hasn't seen one in 12 years. It is hard to feel optimistic that we will find any.



Atelopus exiguus © Luis Coloma

I am accompanying Luis Coloma, Santiago Ron and Italo Tapia from the Pontificia Universidad Católica del Ecuador and local biologist Ernesto Arvelález on this expedition. With one individual in captivity, they are determined to collect more of this species to establish a captive breeding program with the eventual goal of reintroduction.

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IN SEARCH OF ATELOPUS EXIGUUS

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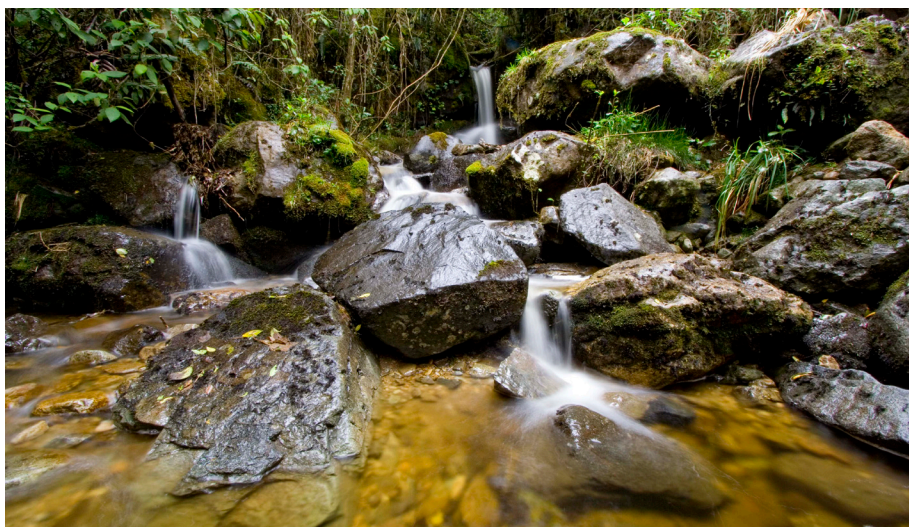
A stream of white water cascading over rocks interspersed with quiet pools of clear water provides perfect habitat for *Atelopus*. But several hours spent scouring the stream and surrounding habitats

for frogs prove futile. A stream that once bubbled with life now lies empty, void of all visible life apart from the occasional introduced trout darting for cover. Witnessing the apparent extinction of a species felt sobering.

As we made our way back to camp - the light dimming as quickly as our spirits, the team flipped over some rocks in a last ditch effort. And then a cry of delight; under the first rock lay a small olive green frog.

Continued searches over the coming days found a total of two *Atelopus exiguus*. Both are housed now at the Católica University in an impressive, climate-controlled captive facility.

As the decline and extinction of amphibians continues its relentless march around the globe, the occasional good news story reminds us that there is hope. Finding *Atelopus exiguus* left me optimistic that this empty stream can one day be alive with frogs again.



Atelopus exiguus stream habitat © Robin Moore

NEWS FROM THE ASG

Announcing Seed Grants

The IUCN/SSC Amphibian Specialist Group (ASG) is pleased to announce a new round of Seed Grants. These are intended as one-time awards of between \$500 and \$2000 for the support or initiation of research that furthers the ASG's mission to conserve biological diversity by stimulating, developing, and executing practical programs to study, save, restore, and manage amphibians and their habitats around the world.

There are three categories in this year's round thanks to generous support from Andy Sabin, the US Department of the Interior's Amphibian Research and Monitoring

Initiative (ARMI), and the North of England Zoological Society-Chester Zoo in the UK.

ARMI AWARDS

The criterion for these awards is that the proposed work should be done on species or issues of concern in the USA. ARMI is particularly interested in funding research on potential stressors of amphibian populations. For more information about ARMI, go to:

<http://armi.usgs.gov/>

CHESTER ZOO AWARDS

Grants are available to support specific amphibian conservation action for new or existing initiatives. This action may involve captive breeding, local community initiatives, habitat protection or

population monitoring. Priority will be given to countries outside of Europe and the USA.

UNRESTRICTED AWARDS

The ASG welcomes applications that address any aspect of amphibian declines, but favours joint applications that involve a partnership between herpetologists in developed and developing countries. We are also prioritising projects that:

- investigate synergistic effects between two or more factors that have been identified as actual or potential causes of amphibian population declines and which,
- implement amphibian conservation on the ground.

ANNOUNCING SEED GRANTS

Continued from previous page

Applicants should indicate which of the above categories they have in mind, but we will consider applications in the ARMI and Chester Zoo categories also in the Unrestricted category. Please send proposals to:

Jeanne McKay
The Durrell Institute for Conservation and Ecology (DICE)
The University of Kent,
Marlowe Building,
Canterbury, Kent
CT2 7NR
UK
Or: J.E.Mckay@kent.ac.uk

All information acquired with the

support of the ASG remains the intellectual property of the grant recipient, but must be freely available to the ASG for use in furthering its mission. Successful applicants are generally expected to publish the results of their projects in refereed journals, or as articles in the ASG newsletter, Froglog. In addition, Seed Grant recipients will be required to provide a brief mid-term and final report of their project so their findings can be made available to Seed Grant donors and ASG members. A reporting structure will be provided with award letters.

Please contact Jeanne McKay at the above email address if clarification or advice is required.

The closing date for applications

is Friday, November 23, 2007. Guidelines

Proposals of no more than 4 pages should contain: (1) Name, affiliation and contact information of proposer(s), (2) Project title, (3) Description of the intended work, including localities and species involved, (4) Start date and schedule of the project, (5) Explanation of how the project will further the ASG's mission, (6) Budget breakdown, including details of additional funding obtained or sought from elsewhere (note that we do not provide funds to support salaries), (7) References, if appropriate, and (8) Any other pertinent information.

Amphibian Alarm

The EAZA Year of the Frog Campaign 2007/8 was officially launched by Quentin Bloxam of Durrell Wildlife Conservation Trust on 12 September 2007, during the European Association of Zoos and Aquaria (EAZA) Annual Conference in Warsaw, Poland. Don Church of Conservation International presented the keynote presentation detailing the international conservation community's response to the amphibian extinction crisis to date and an overview of the Amphibian Conservation Action Plan (ACAP).

The EAZA Year of the Frog Campaign supports the global initiative '2008 - Year of the Frog' (www.amphibianark.org/yearofthefrog.htm) organised by the Amphibian Ark initiative which is coordi-

nated by the Conservation Breeding Specialist Group, Amphibian Specialist Group and the World Association of Zoos and Aquaria (WAZA).

This world-wide campaign focuses on raising awareness on the amphibian crisis and on raising funds to support the Amphibian Ark (AArk) activities.

Besides supporting the global campaign, further goals have been added to support European ex situ amphibian conservation efforts and to fit the framework of previous EAZA Conservation Campaigns:

- Generate public awareness and understanding on the amphibian extinction crisis.
- Raise funds for implementing the ex situ aspects of the Amphibian Conservation Action Plan



Dendrobates azureus © Robin Moore

(ACAP).

- Encourage further EAZA member participation in amphibian ex situ conservation.
- Raise awareness and funds to support and supplement the activities of the EAZA AArk.
- Further position IUCN and the zoo community as leaders in global conservation.

The EAZA Year of the Frog campaign has set a fundraising target of €750,000.

New ASG Chairs

A special welcome to our new ASG Working Group Chairs and co-Chairs for the following areas:

Ross Alford – Australia

Marinus Hoogmoed & Selvino Neckel – Brazilian Amazon and the Guianan Shield

Richard Podloucky – Europe

Martinez Solano – North Africa

Sanjay Molur & Karthikeyan Vasudevan – South Asia (minus Sri

Lanka)

Cesar Molina – Venezuela

We would also like to welcome the following Deputy Chair for Mainland SE Asia:

Yodchaiy Chuaynkern – Thailand

Reports and publications from previous DAPTF Seed Grants

Recipients of Seed Grants from the former DAPTF are generally expected to publish the results of their projects in refereed journals, or as articles in Froglog. They are also required to send reports, so that their results can be made available to a wider audience. Below is a list of reports that the ASG has received recently. Anyone wanting a copy of a report should contact the

author in the first instance; if you cannot reach the author, contact Tim Halliday: t.r.halliday@open.ac.uk.

Adriana Herrera-Montes. (2006) The relation between habitat structure and herpetofaunal community structure during forest succession. (ahemontes@yahoo.com)

Jill Hunt & Donald W. Sparling. (2006) The effects of endosulfan

on native Californian amphibians. (anmllvr@siu.edu)

Kevin G. Smith, Ché Weldon & Louis H. du Preez. Year 2006 Report for: *Batrachochytrium dendrobatidis* as a threat to amphibians of the Drakensberg Mountains of southern Africa: causes and consequences of a mortality event. (Grant from DAPTF Rapid Response Fund, 2006.) (kgs@biology2.wustl.edu).

USEFUL LINKS

Conservation Evidence

The website: www.ConservationEvidence.com aims to improve practical conservation management by collating and sharing knowledge as to which interventions work and which do not. Now in its fourth year, the website constitutes a considerable species and habitat management database currently comprising over 800 studies representing more than 60 countries from around the world. Over 30 governmental and non-governmental conservation organisations, as well as many individuals, have contributed so far. The website is divided into two main sections:

‘Conservation Evidence’ an online, peer-reviewed journal - this contains original, previously un-

published observations. Each paper is a case study documenting the effectiveness of a conservation management intervention. Contributors range from researchers to site managers, reserves wardens and amateur naturalists.

‘Summaries’ of previously published papers, reports and articles that document the effectiveness of conservation interventions. It is recognised that the scientific community is often poor at disseminating information to those practitioners that might make use of it at ground level. These summaries therefore help bridge this gap by making readily and freely available, information otherwise only published in the scientific literature with limited accessibility for those outside academic institutions.

All are welcome to browse and to freely make use of the information held within the website in order to benefit conservation.

At present there are only a few herpetofauna-related case studies. You can help fill this gap by submitting case studies on e.g. captive-breeding interventions, outcomes of translocations, the effect of introduced fish removal on amphibian populations, the usage of amphibian underpasses and artificial refugia etc. to the website.

The papers need not be long and can report simple management interventions.

For more information please view www.ConservationEvidence.com or feel free to contact the website editor, Dave Showler: d.showler@uea.ac.uk.

A rapid biodiversity assessment in eastern Cambodia

Phil Bowles

The Global Amphibian Assessment lists 44 species of amphibians from Cambodia, a country whose herpetofauna is very poorly known (Ohler et al, 2002). A recent survey of the nation's east represents the first herpetofaunal study conducted in this region, and adds eleven species not recorded in the GAA list (Stuart et al, 2006). *Caluella guttulata* (Microhylidae) was recently reported from the country for the first time (Stuart & Emmett, 2006), bringing the national total to 56 recognised species. The above three studies, all of which have taken place since 2000, represent the first reports from Cambodia for 38 of these species, five of which (13.2% of new records) are described as being new to science (Ohler et al, 2002; Stuart et al, 2006)."

In light of the potential for new



Chirixalus nongkhorensis © Phil Bowles



Polypedates leucomystax © Phil Bowles

discoveries in eastern Cambodia, cataloguing the species diversity in previously unstudied or understudied regions will be critical to effective conservation efforts. It is therefore important to assess their suitability as habitat for different taxa in order to set conservation priorities.

This survey consisted of rapid assessments using visual encounter surveys of the amphibian, reptile and arthropod fauna of Kirirom and Kep National Parks. These are upland reserves in south-eastern Cambodia, each centred on a single hill. Both are home to local human populations living within the park boundaries. During the survey period, selective timber extraction was

observed regularly, and openly, at both sites, although Cambodian law prohibits logging within reserves. Numerous established logging trails lead up the hillside at Kep. Kirirom also showed evidence of recent, extensive burning, which is likewise an illegal practice.

Nocturnal and diurnal surveys were conducted at Kirirom, Kampong Speu Province, from 1-3 September 2006. There was no evidence of recent rainfall. Suitable amphibian habitat in the survey area was restricted to a small rivulet running through evergreen forest and a lake surrounded by grassland (the latter only surveyed during the day due to its distance from the main field site).

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Fejervarya cancrivora © Phil Bowles

Amphibian abundance and calling activity were low. Two species were encountered, *Polypedates leucomystax* (Rhacophoridae) and *Limnonectes kohchangae* (Dicroglossidae). This latter species has a restricted range in Cambodia and Thailand, which is thought to be centred on the Cardamom Mountains (Stuart & Emmett, 2006).

Kep National Park, Kampot Province, has never been the subject of a biodiversity survey. Hillside vegetation alternates between evergreen forest with moderate logging disturbance, and open grassland. The park and the surrounding region were both surveyed. The habitats represented included rice paddies, agricultural and village ponds and a dense stand of mangroves.

In all, ten species of anurans were located. No amphibians

were detected in the vicinity of logging trails, even during and following heavy rainfall. In disturbed areas, *P. leucomystax*, *Microhyla heymonsi* and *Fejervarya limnocharis*

were both heard and observed. Breeding activity for *P. leucomystax* was confirmed by the presence of tadpoles within a dam pond. Calling activity was noted for *Microhyla heymonsi* and a species of *Occidozyga*.

Surveys in anthropogenic habitats outside the park revealed the additional presence of *Chirixalus nongkhorensis*, *Microhyla ornata*, *M. pulchra*, *Kaloula pulchra*, *Occidozyga martensii* and *Bufo melanostictus*. This represents only the second record of *C. nongkhorensis* (Rhacophoridae) from Cambodia (Stuart et al, 2006).

Diurnal surveys of the mangroves recorded *Fejervarya cancrivora* (Dicroglossidae). At Kep, this species appears to be confined to mangrove habitat. *F. cancrivora* has never before been reported in a survey of eastern Cambodia.



Microhyla heymonsi © Phil Bowles

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Only regionally common species were identified in the course of this study. The exception is *Limnonectes kohchangae*, a species with a restricted range which is however regarded as locally abundant throughout its area of occurrence (van Dijk & Swan, 2004). Moreover, this study was conducted in the context of a broader taxonomic survey in areas that have received little research attention. As such, sites were not selected specifically for the presence of suitable amphibian breeding habitat, and consequently the results may be biased in favour of generalist species able to exploit sub-optimal environments.

Nevertheless, the status of amphibians in Cambodia is very poorly-known, and baseline data on the area of occurrence of all species, including ones presently regarded as abundant and widespread, is vital in evaluating conservation priorities. Although Kep National Park protects a small area of evergreen forest in a landscape largely denuded of tree cover, the area appears unpromising as a refuge for uncommon amphibians due to the limited availability of natural breeding sites. Most species encountered in this region were found outside the park boundaries. No amphibian species was found exclusively within Kep National Park.

A total of nine amphibian species have been recorded from the Phnom Suroch region, which includes Kirirom (Stuart & Emmett, 2006).

Neither of the species identified from Kirirom in this survey adds to this total. Nevertheless, the park remains largely unsurveyed, and offers several potential sites with suitable breeding habitat. The two studies carried out in this park to date cover a total period of seven days spread between different times of year (Stuart & Emmett, 2006; this report). A more intensive, longer-term monitoring program might be warranted for this site.

Acknowledgments: I extend particular thanks to David Emmett of Conservation International for assistance with site selection and in confirming the identification of several species. I thank Bryan Stuart of the Chicago Field Museum for further assistance in species identification.

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Ohler, A., Swan, S. R. and Dal-

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Stuart, B. L. and Emmett, D. A. (2006) A collection of amphibians and reptiles from the Cardamom Mountains, southwestern Cambodia. *Fieldiana, Zool. N. S.* 109: 11

Stuart, B. L., Sok, K. and Neang, T. (2006) A collection of amphibians and reptiles from hilly eastern Cambodia. *The Raffles Bulletin of Zoology* 54: 129-155

van Dijk, P.P. & Swan, S. (2004) *Limnonectes kohchangae*. In: IUCN 2006. 2006 IUCN Red List of Threatened Species. <www.iucnredlist.org>. Downloaded on 09 June 2007.

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Fejervarya limnocharis © Phil Bowles

A report from Tobago

A study has just been completed on the status and potential conservation of a highly endangered frog: "*Mannonphryne olmonae*: an ecological assessment

in Tobago, Republic of Trinidad and Tobago", by Jahson B. Alemu I, Michelle N. E. Cazabon, Lena Dempewolf, Ryan P. Manette, Kerrie T. Naranjit & Alicia

Schmidt-Roach.

Please contact: Jahson Alemu at: jahsonb@gmail.com

Organophosphate pesticides - a major threat to anuran populations in an agroecosystem of Western Ghats, India

Vasudev, S. V. Krishnamurthy and H. P. Gurushankara

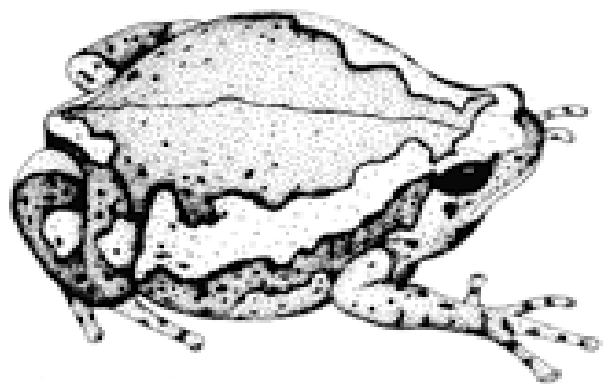
Pesticide application in agroecosystems of central Western Ghats comprises aerial spraying of rice paddies, with a subsequent mixing of pesticide and surface water. Most commonly used organophosphate pesticides are methyl parathion, (O, O - dimethyl O-4 - nitrophenyl phosphorothioate) and malathion (diethyl [(dimethoxy phosphino thioyl] butanedioate). Together they account for 65% of all organophosphate pesticide applications in the field (Anonymous, 2002). The environmental concentrations of these pesticides in sediment and water in agroecosystems are reported to vary from 0.262 to 129 µg kg⁻¹ and 0.699 to 298 µg L⁻¹ respectively (Rao & Pillala, 2001). However, the impacts of pesticides on anuran amphibians, which are common inhabitants of these agroecosystem, are less studied. We have studied the effects of pesticides on the morphology, behaviour and growth of tadpoles under sublethal concentrations.

In laboratory experiments, adults and tadpoles of *Fejervarya limnocharis* (Indian cricket frog) were exposed to malathion and methyl parathion using two different experimental designs. In

the first design, the pesticides were mixed with habitat water in eight concentration gradients (2 to 16 ppm of malathion and methyl parathion), while in the other, 10 gradients (5 to 50 ppm of malathion and methyl parathion) pesticides were sprayed to surface water. These two designs mimic the process of pesticide application in the field. The mortality of the individuals in each treatment gradient was recorded at 24 hour intervals for a duration of 96 hrs. The results revealed the differences in these two applications. Compared to mixing method, both pesticides require higher concentration to produce LC50 under spray design of experiment. The LC50 values for tadpoles and adults in two designs of experiments decreased from 24 hrs to 96 hrs. For both pesticides, the tadpoles are highly sensitive compared to their adults. In both types of experimental design, the LC50 values of tadpoles for methyl parathion was 40-52% less and for malathion 37 to

43% less than their adults. Thus the present experiment revealed that methyl parathion is more effective on tadpoles and adults of cricket frog.

Metamorphosis and other related metamorphic changes under the influence of these sublethal concentrations of two pesticides were studied in detail using mesocosms which mimicked field conditions and an experimental set-up in the laboratory. In general, both showed that pesticides negatively influenced survival time, viability, growth and metamorphosis of tadpoles. However, on comparing the results of the laboratory experiment with that of the field mesocosms, it revealed that all tested variables were further decreased under laboratory conditions.



Kaloula pulchra by Tim Halliday

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On exposure of the tadpoles to the two pesticides, both in mesocosms and in the laboratory, behavioural abnormalities viz., kinking, slashing of tail, spasms, loss of balance, convulsion and morphological abnormalities viz., bent tail, bulged trunk, swollen head and edema were significantly increased with the increase in concentration. Methyl parathion induced more abnormalities compared to malathion. These

abnormalities could influence the physiological and morphological fitness of tadpoles and cause depletion of local populations.

F. limnocharis is a common inhabitant of all agroecosystems of central Western Ghats. In addition, many anuran amphibians breed in the shallow waters of paddy fields and other agricultural areas. Pesticide applications in these agroecosystems coincide with the breeding periods of frogs in these waters. The species concerned are therefore un-

der severe threat from pesticide use in the Western Ghats.

Acknowledgements

This investigation was carried out with a research grant (No: F. 3-65/2001 (SR-II) from the University Grants Commission, New Delhi.

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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 Jeanne McKay at the address below. Accepted submissions will be printed in order of receipt.

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: Jeanne McKay, Editor, The Durrell Institute for Conservation and Ecology (DICE), The University of Kent, Marlowe Building, Canterbury, Kent, CT2 7NR, United Kingdom
E-mail: J.E.McKay@kent.ac.uk



Dendrobates tinctorius © Robin Moore