frog leg

Newsletter of the Declining Amphibian Populations Task Force - South Asia
Vol. IV, No. 1, February 2000

Are remnant rainforest fragments important for the conservation of Amphibians in the Western Ghats?

Karthikeyan Vasudevan
Wildlife Institute of India, P.O. Box 18, Dehradun, 248001, India

The rainforests of the Western Ghats have endured severe human pressures for several decades. As a result, the once contiguous rainforests have been decimated into several small remnant fragments. I documented the factors that influence amphibian species richness in the rainforests and the effects of rainforest fragmentation on them. After gaining an understanding of the pattern in amphibian species diversity and the factors that control them in their contiguous rainforest habitat in Kalakad-Mundanthurai Tiger Reserve (KMTR), the study on the effects of forest fragmentation in the Anamalais was initiated.

I used adaptive cluster sampling to sample forest-floor amphibians in KMTR and the Anamalais. This technique provided new descriptors of amphibian aggregations in the forest floor such as cluster size and mean number of species per quadrat (MSPQ). Three sites in KMTR and 14 fragments (5000 ha to 0.5 ha) in the Anamalais were the study areas. Comparison were made between unfragmented rainforest amphibian communities and those in fragmented forests, and among different size class of fragments.

Historically, rainforest fragmentation in the Anamalais took place in a manner that area of the fragment and the extent of disturbance in the fragment is linearly and negatively related. The MSPQ in the rainforest fragments was lower than those observed in comparable sites in the KMTR ($P<0.001$). Analysis through re-sampling of data after controlling for the drainage and altitude effects revealed that the distribution of MSPQ values was different from the expected distribution. This study provides evidence in favour of a single large reserve over several small ones. This finding has obvious conservation benefits when a reserve is being conceptualized for conservation of amphibian diversity in the Western Ghats.

Several island habitats and fragments are documented to have 'nested fauna'. It means that the at least one fragment in the landscape has the maximum number of species or nearly complete representation of species in the landscape. The other islands have a smaller subset of the fauna represented in decreasing numbers resulting in a nested pattern. Total nestedness is absent in reality and the lack of nestedness would mean that the occurrence of species in islands was not predictable and hence could have resulted due to chance.

The possibility that species richness in fragments of the Anamalais could be 'nested' was explored using the program NESTED. The amphibian fauna in the rainforest fragments of the Anamalais show a nested pattern ($T=14.81°$) suggesting ordered extinction of species in the fragments. The species that occur on the temperature line are at the threshold of extinction. The members of the genera *Micrixalus*, *Indirana* and *Nyctibatrachus* are likely to go extinct from the rainforest fragments of the Anamalais (Indira Gandhi Wildlife Sanctuary), if the size of the fragment decrease or disturbance through extraction of fuel wood continues. The probability that the NESTED program will generate a matrix to equal or lower temperature than that observed in the Anamalais rainforest amphibian fauna was $p << 0.001$. The deviation of species and sites from the nested pattern are explained through their typical idiosyncratic species and site temperatures, which are indicative of the intrinsic nature of species or the site. This idiosyncratic nature of species and sites can be largely attributed to the 'drainage' and 'altitude' effects documented by me in KMTR.

Among several parameters that influence amphibian species richness in rainforest fragments, human disturbance through extraction of fuel wood seems to have the most adverse effects. However, the richness of the amphibian fauna that undisturbed fragments continue to hold is of promising conservation value. Hence, the task of assigning conservation values based on amphibian species richness to the remnant rainforests fragments of the Western Ghats should be taken up as a priority.

Frog Leg is the network newsletter of DAPTF-SA, one of the objectives of which is to help amphibian researchers in South Asia to understand the work being conducted on amphibians in the region. This newsletter is useful only if the members of the network take an active role in contributing information of their current work and abstracts of their completed work for others to know. Such communication is of absolute importance if we are to work as a team in conserving amphibians in the region. This is a plea to all of you to contribute articles, notes and summaries to Frog Leg, the next issue of which will be published in August 2000.

Special thanks to the following organisations for the technical and monetary support provided to run the Declining Amphibian Populations Task Force-South Asia network and in the publication of this Newsletter.

Some amphibians described since the 1997 CAMP for Indian amphibians

Here are some amphibians described since the Conservation Assessment and Management Plan workshop for Indian amphibians was conducted in April 1997. The list of Indian amphibians used in that assessment included 205 taxa. Since then quite a few new species have been described, excerpts of some of which are printed here. This is just a service to help non-subscribers of herpetology journals. This is not meant to rob the subscribers away from herpetology journals. The information printed here is just enough to give some information of the new species, not the complete information. Readers are advised to contact the journal for more details, off-prints or subscription details.

Limnonectes orissaensis Dutta, 1997

Abstract
A new species of ranid, *Limnonectes orissaensis* (Anura: Ranidae) of the *L. limnocharis* complex, is described from Orissa State, eastern India. The new species is the largest among members of the complex in India (except *L. nilagirica*) and differs from the latter in having relatively shorter hind limbs, rounded digit tips and relatively larger metatarsal tubercles. A discriminant function analysis of eight morphological characters of *L. orissaensis* and *L. limnocharis* from India and the Malay Peninsula indicates distinct differences.

Diagnosis
Limnonectes orissaensis is a medium-sized ranid (males 36.2-47.2 mm; females 34.2-53.8 mm SVL) with interrupted longitudinal folds on dorsum, smooth venter, wider inner matatarsal tubercle, and a relatively more pointed snout than closely related species, *L. limnocharis* from Vietnam, Taiwan, China and Japan. There is no size difference between *L. orissaensis* and *L. limnocharis* from the Malay Peninsula, but a wider and longer inner metarsal tubercle (maximum length: 3.0 mm), greater number of ridges on dorsum, shorter hind limbs (maximum foot length: 24.3 mm), more rounded finger and toe tips and greater degree of webbing (fourth toe webbing extends less than half way between distal and penultimate subarticular tubercles) distinguishes *L. orissaensis* from *L. limnocharis* of the Malay Peninsula. *L. orissaensis* is easily distinguishable from the sympatric populations of *L. limnocharis* by its larger size. All species within the *L. limnocharis* complex in India and Sri Lanka are smaller in size than *L. orissaensis*, except *L. nilagirica* and *L. keralensis*. *L. niligirica*, however, has a relatively longer hind leg with pointed finger and toe tips, smaller inner metatarsal tubercle, and wider pigmented bars on lower jaw than *L. orissaensis*. *L. keralensis* is distinguishable by more extensive webbing (fourth toe webbing up to distal subarticular tubercle and others up to toe tips). All Nepalese endemics within the complex (*L. teraiensis*, *L. nepalensis* and *L. pierrei*) differ from *L. orissaensis* in having a relatively more tuberculate dorsum, semi-pointed finger and toe tips and reduced webbing (less than two-third).

Natural history notes
The new species has been collected from Jaleswar (Balasore District), Barpali (Sambalpur District) and Bhubaneswar (Khurda District). Most specimens were collected during the monsoons, June to July. They were close to human habitations, on grassy lands near water pools, and near paddy fields. When disturbed, they jumped into water, but immediately returned to the edges. *Limnonectes orissaensis* can be distinguished from *L. limnocharis* call uninterruptedly for hours, producing calls typical of crickets (*Gryllid* sp.). However, calls of *L. orissaensis* males are not cricket-like and the call frequency is lower than in *L. limnocharis*. *L. orissaensis* is active at night and hides in grass, below rocks, or in small holes near water during the day. Eggs are laid in open temporary rain water pools; the larvae are free-swimming and are morphologically similar to *L. limnocharis* tadpoles except for their larger size.

For complete information refer to:
Sushil K. Dutta (1997). A new species of *Limnonectes* (Anura: Ranidae) from Orissa, India. *Hamadryad*, 22:1(1-8).

Nyctibatrachus vasanthi Ravichandran, 1997

Abstract
A new species of *Nyctibatrachus* is described from the Kalakkad Tiger Reserve, Tamil Nadu, southern India. The new species is diagnosed by the following characters: canthus rostralis and tympanum indistinct; interorbital space wider than the upper eyelid; tongue short, lacking a papilla; vomerine teeth present; skin smooth; fingers free; toes webbed to the base of disks; and digital disks present. The new species is compared with known congeneric species, including species formerly assigned to the genus *Nannobatrachus*.

Diagnosis
A medium-sized species of *Nyctibatrachus*, differing from congeneric species in showing the following characters: canthus rostralis and tympanum indistinct; interorbital space lacking a papilla; vomerine teeth present; skin smooth; fingers free; toes webbed to the base of disks; and digital disks present.

Natural history notes
The holotype and one paratype of *Nyctibatrachus vasanthi* were collected on the banks of the Solaipalam River (Kakachi), which connects Manjolai Estate with Malumukku, while the second paratype was taken from near Sengaltheri Forest Rest House, on the edges of Kuvapatti Odai, a small hill stream. They were found below rocks in the edges of water, to which they leapt into, when the rocks were overturned. One of the paratypes contains ova, suggesting the release of eggs during the northeast monsoons (November - December).

For complete information refer to:
M. S. Ravichandran (1997). A New Frog of the genus *Nyctibatrachus* (Anura: Ranidae) from Southern India. *Hamadryad*, 22:1(9-12).

Philautus sanctisilvaticus Das & Chanda, 1997

Abstract
A new species of *Philautus* is described from Amarkantak, Madhya Pradesh, central India and compared with congeners from peninsular India and Sri Lanka. *Philautus sanctisilvaticus* sp. nov. is diagnosable from Indian and Sri Lankan species in possessing the following characteristics: head wider than long; tympanum small, concealed; webbing on toe IV up to basal subarticular tubercle on the inner side and to the distal subarticular tubercle on the outer side; dorsum brownish-grey, with a dark forehead, the sides of the body with brown and cream reticulations; SVL of holotype, a mature male, 20.8 mm; two paratopotypes, both adult females, 19.3 and 23.8 mm.

Diagnosis
Philautus sanctisilvaticus is diagnosable from known congeners in possessing the following characteristics: head wider than long; tympanum small, concealed ; webbing on toe IV up to basal subarticular tubercle on the inner side and to the distal

subarticular tubercle on the outer side; dorsum brownish-grey, with a dark forehead, the sides of the body with brown and cream reticulations; SVL of holotype, a mature male, 20.8 mm; two paratopotypes, both adult females, 19.3 and 23.8 mm.

Natural history notes

The type locality lies in the Maikala (M'kul or Mekala) Range, and is the source of both the rivers Narmada and Sone (Mani, 1974). Amarkantak, a major pilgrimage site in central India, particularly for performing the Sradh (Hindu funeral) ceremony (Dey, 1927).

For complete information refer to:
Indraneil Das and Shyamal K. Chanda (1997). *Philautus sanctisilvaticus* (Anura: Rhacophoridae), A new frog from the sacred groves of Amarkantak, Central India. *Hamadryad*, 22:1(21-27).

Polypedates pseudocruciger Das & Ravichandran, 1998

Abstract

A new species of *Polypedates* is described from southern Tamil Nadu State, south-western India. The new species, *P. pseudocruciger* is closely related to *P. cruciger* Blyth, 1852, from the mid hills and low country of Sri Lanka, from which it can be differentiated in showing a obtuse cutaneous spur on heel (vs absent); skin of forehead free (vs co-ossified to the fronto-parietal and squamosal bones); toe I webbing between distal and distal, subarticular tubercles; and tympanum diameter over 80 (vs less than 65) per cent diameter of orbit. Because of the attempt in the literature to synonymise *Polypedates* under *Rhacophorus*, the new species has been compared with members of both these genera from south-western India and Sri Lanka.

Diagnosis

A medium-sized species of *Polypedates*, differentiable from congeneric species, in addition to nominal species of the genus *Rhacophorus* from south-western India and Sri Lanka in possessing the following suite of characters: male SVL 48.0-55.0 mm; an obtuse cutaneous spur on heel; skin of forehead free; tympanum diameter over 80 per cent diameter of orbit; finger II greater than finger I; fingers with basal webbing; nuptial pad on dorsal surface of finger I; absence of a dermal fold along forearm; lack of a median lingual papilla; and dorsum with a dark hour-glass-shaped marking.

The new species differs from *Polypedates cruciger* Blyth, 1852, in having an obtuse cutaneous spur on heel (absent in cruciger); skin of forehead free (vs co-ossified to fronto-parietal and squamosal bones); toe I webbing between distal and penultimate (vs to distal) subarticular tubercles; and tympanum diameter over 80 (vs less than 65) per cent diameter of orbit.

Natural history notes

The species has also been observed at Charmadi Ghat and Baindur, Karnataka State, south-western India, at an altitude of 50-250 m above msl (Daniels, 1992b; 1997; Daniels and Ravichandran, 1995), and more recently, at Kalpetta, Wyanad, Kerala, south-western India, where several males were heard calling both during the day and at night, on 13 June, 1997 (Daniels, pers. comm., 1997). At Charmadi Ghat, the frog was observed crossing a road on a rainy night, while the paratype from Coondapur was observed asleep on a tree trunk during the day (Daniels, pers. comm., 1997). The species has also been sighted at Top Slip, Anaimalai Hills, Tamil Nadu State, south-western India, at an altitude of over 1,000 m above msl (Daniels, pers. comm., 1997). Earlier, Daniels (1992a) gave the altitudinal range of the species as 0-600 m above msl.

For complete information refer to:
Indraneil Das and M.S. Ravichandran (1998). A new species of *Polypedates* (Anura: Rhacophoridae) from the Western Ghats, India, allied to the Sri Lankan *P. cruciger* Blyth, 1852. *Hamadryad*, 22:2(88-94).

Rana charlesdarwini Das, 1998

Abstract

A new species of ranid, tentatively assigned to the genus *Rana* (sensu Boulenger, 1920) is described from Mount Harriet National Park, South Andaman Island, India. The new species, *R. charlesdarwini*, is diagnosed by the following suite of characters: tympanum large, exposed; lingual papilla absent; digit tips swollen but not dilated, lacking circummarginal grooves; ova pigmented, relatively numerous; the single adult male known smaller than two adult females and shows a median vocal sac and smooth nuptial pads on upper surface of first finger. Its phytotelmonous larvae from water-filled holes of trees have robust, dark-pigmented jaw sheaths that are situated terminally.

The new species appears allied to Indo-Chinese and Indo-Malayan ranids assigned to the genus *Ingerana* Dubois, 1987, although it shows numerous, relatively small, pigmented ova, and in lacking disks and digits and circummarginal grooves, as well as median lingual papilla, cannot be placed in either of the two subgenera, *Ingerana* or *Liurana* Dubois, 1987. Generic placement of the Andamanese species is tentative, pending collection of further examples of its poorly known presumed relatives from south-east Asia, as well as data on their life history. The lowered sea levels during the post-Pleistocene are hypothesized to have facilitated the immigration of species from Indo-China, across the Rakhine (Arakan) Yoma corridor.

Diagnosis

A member of *Rana* (sensu Boulenger, 1920, separable from members of other ranid generea from south-east Asia (see 'Affinities and Discussion') in showing the following characteristics: tympanum large, exposed; lingual papilla absent; digit tips swollen but not dilated, lacking circummarginal grooves; ova pigmented, relatively numerous; the single adult male known smaller than two adult females and shows a median vocal sac and smooth nuptial pads on upper surface of first finger. Its phytotelmonous larvae have robust, dark-pigmented serrated jaws situated terminally, and inhabits tree holes.

Natural history notes

The following amphibians were also recorded from the summit of Mt. Harriet: *Bufo melanostictus*, *Rana limnocharis* and *Kaloula baleata*. In addition, *R. andamanensis* was recorded from close to sea level to up to ca. 150 m above msl, just outside the boundaries of the National Park.

For complete information refer to:
Indraneil Das (1998). A remarkable new species of Ranid (Anura: Ranidae), with phytotelmonous larvae, from Mount Harriet, Andaman Island. *Hamadryad*, 23:1(41-49).

HAMADRYAD is a biannual herpetological journal published by the Centre for Herpetology, Madras Crocodile Bank Trust, Post Bag 4, Mammallapuram, Tamil Nadu 603104, India. The annual subscription to this journal is just Indian Rupees 150.00 for individuals and Indian Rupees 250.00 for institutions of the SAARC countries (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka). The journal is published in June and December.

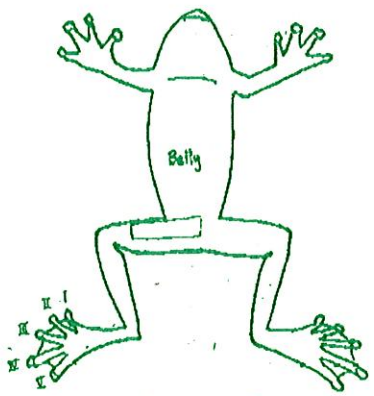
Survey of archived amphibians for chytrid fungi

Chytrid fungi are killing amphibians in the wild (Berger *et al.*, 1998). If the microorganisms is a primary parasite, we hypothesise that it has entered populations at particular points in time possibly just prior to the decline of the population. The alternative hypothesis is that the fungus was present in the population previously and other factors have allowed it to manifest as a pathogenic agent. By identifying when the pathogen first occurs in a population and the realationship to deaths of frogs, we hope to be able to:

1. Generate data to support either hypothesis
2. Determine the areas and frog populations where the fungus currently occurs
3. Determine the prevalence of the amphibian chytrid in "normal" frogs.

We are interested in examining any wild amphibians that have been collected and preserved. The chytrids are prevalent on ventral surfaces of the frog and on the feet, especially the webbing. They can be detected in specimens fixed in 10% formalin or 70% alcohol. If you submit fixed skin samples, we prepare histological slides stained with haematoxylin and eosin, and examine the superficial epidermis for fungi.

Protocol for collecting skin samples
(The following protocol was developed by Lee Berger and David Earl Green).



Skin sampling site for anurans

1. Cut a piece of skin as in the diagram.
2. For anurans or salamanders, also send a whole hind foot, or just a toe cut off at the base (ie. toe III or V for anurans, toe IV or V for salamanders). Alternatively, remove skin from the ventral surface of the foot.
3. Place skin samples in labelled container with formalin or alcohol.
4. Record the information requested below (if known) for every sample submitted.

Record sheet for specimens
Name and address of sender:
Phones: Fax: Email:
Animal ID no:
Species:
Sex: Date collected:
Location collected:
Type of environment:
Weight: Snout-Vent length:
Method of euthanasia
Healthy or sick?
If sick, describe any signs of disease:

Address to send samples. In the case of government hassles to send out samples, contact the following people for procedures and techniques. You may be able to test for the fungus yourselves. Also refer to Berger L., R. Speare and A. Kent (2000). Diagnosis of chytridiomycosis in amphibians by histologic examination. *Zoos' Print J.*15:1(184-190).

Rick Speare
School of Public Health and Tropical Medicine, James Cook University, Townsville 4811, AUSTRALIA
Phone: 07-47225777
Fax: 07-47225788
Email: richard.speare@jcu.edu.au

David Earl Green
National Institutes of Health
Bldg 28A, Room 115, MSC 5230
28 Liberty Drive, Bethesda MD 20892-5230, USA
Phone: 1-301-496-4465
Fax: 1-301-402-1068
Email: greend@exchange.nih.gov

---

http://www.jcu.edu.au/school/phtm/PHTM/frogs/pmskin.htm

Editor's note: Amphibian declines due to the chytrid fungus is well established. The occurence of this fungus in South Asia is still unknown. As a precaution, it is important for all of us studying amphibians in the wild to keep a look out for this disease, and report it to avert a rapid decline in our amphibian populations. If your government is sensitive to sending out tissue samples to foreign countries, do not dismiss this test for that reason. Consult the authors who are more than willing to help you with the techniques by e-mail.

ONGOING PROJECT

Taxonomy and ecobiology of amphibian fauna of Sonitpur District, Assam

Mohini Mohan Borah
Lecturer, Dept. of Zoology, Chaiduar College, Gohpur, Sonitpur, Assam 784168, India

Objectives
1. Assess the occurrence and ecological status of amphibian fauna of Sonitpur District.
2. Study patterns of distribution and habitat ecology.
3. Demarcate the areas of rare and endangered species for *in situ* conservation.
4. Study ecological parameters and biotic factors.

The project is supposed to help in bringing out first hand information on various aspects of amphibian fauna of the district. Emphasis is on public awareness and training of under-graduate science students of local colleges on the useful role of amphibians in the ecosystem. The proposed study area falls in northeastern Himalaya, which is recognised internationally as one of the 24 hot spots and the district represents a mosaic of wide variety of wet land ecosystems. The study when completed will be a significant contribution towards understanding the status of amphibians as per the objectives of the Declining Amphibian Populations Task Force.

frog leg
February 2000 Vol. 4, No. 1

Editor: Sanjay Molur
Edtorial Advisor: Sally Walker
Co-chairs: Sushil Dutta & Sanjay Molur

frog leg is Newsletter of the Declining Amphibian Populations Task Force - South Asia, the regonal network of the Declining Amphibian Populations Task Force, SSC, IUCN.

frog leg is published by Zoo Outreach Organisation and Conservation Breeding Specialist Group India as a section of ZOOS' PRINT as a service to the amphibian conservation community as well as conservation actioners and enthusiasts of South Asia.

For communication:
DAPTF-SA
Zoo Outreach Organisation
PB 1683, 79 Bharathi Colony
Peelamedu, Coimbatore, T.N. 641004
India.