Scaphiophryne gottlebei by Franco Andreone ISSN 1026-0269

FROGLOG

Newsletter of the Declining Amphibian Populations Task Force

December 2005, Number 72

Greater Antilles Region Progress Report

By R. L. Joglar and P.A. Burrowes, Working Group Co-Chairs

The purpose of this communication is to provide an update of the current status of the amphibians in Puerto Rico since the publication of our last report in 2002, and to inform on valuable collaborations with the Dominican Republic and potentially with Cuba.

We have not found *Eleutherodactylus karschm*idti, *E. jasperi* or *E. eneidae* since 1976, 1981 and 1990 respectively, in spite of our continuous field expeditions. An interesting population effect is observable at our elfin forest site in the Caribbean National Forest (El Yunque) where *E. portoricensis* and *E. coqui* seem to be recovering from population declines observed in the early 1990's. However, populations of 3 other species (*E. whightmanae, E. richmondi* and *E. locustus*) have not recolonized areas at El Yunque where they were abundant in the past, and are still very scarce in that forest. Fortunately, there are still parts of the island where these species occur, and we are monitoring them carefully. For the past five years, we have been studying the potential causes of amphibian declines in Puerto Rico, and have proposed a synergistic interaction between climate change (increased dry periods) and disease (chytridimycosis) as an explanation for the patterns observed (Burrowes *et a*l., 2004). Our data suggest that at times of drought frogs may clump in humid patches of the forest where the fungus is more likely to occur. This could provoke a situation where frogs stressed from lack of water and clumping, become immunologically deprived in an area where the fungus is potentially abundant. As a consequence, infections by the chytrid may increase, generating an epidemic that results in amphibian declines. Recent work lead by a graduate student at our lab (Ana Longo) has tested part of this hypothesis. We set-up a controlled experiment with six terraria in which the number of refugia, food, light and temperature remained constant. Water was applied to the soil on only one half, and later to one fourth of the experimental terrariums, while controls received water throughout the entire surface. The use of retreat sites by high-mountain *Eleutherodactylus coqui* was monitored daily. Frog dispersion within the terraria changed significantly as a result of the water treatments (ANOVA $F_{1,35}$ = 13.6; P = 0.001). In the experimental terrariums, frogs moved from dry to humid sides within three days of drought. Thus, in spite of their territorial behaviour, frogs with limited water clumped in the humid retreat sites, while control frogs used refuges on both sides. The next step of this experiment is to inoculate frogs with equal numbers of chytrid zoospores to determine if those forced to clump by a limited water regime, are more susceptible to chytridiomycosis. We expect to proceed with these experiments soon, since collaboration with Joyce Longcore at University of Maine has yielded a culture of the Puerto Rican strain of chytrids.

Field work on amphibian monitoring and chytrid detection at various sites in the Island from east to west (El Yunque, Patillas, Toro Negro, and Maricao) suggest that chytrids are all over the highland forests of Puerto Rico. Efforts to detect chytrids among five amphibian species (117 individuals) at four localities in the lowlands have yielded negative results. Our monitoring program includes four different highland forests in Puerto Rico, where we estimate frog densities by species, and check for incidence of chytrids as related to dry versus the wet season, specific microhabitat, sex and ontogenetic stage of individuals sampled. An interesting pattern of cyclic decline, survival and recuperation of the heartiest species is becoming apparent. This has lead us to investigate whether a synergy between climate and disease is playing a role in the prevalence of the fungus in Puerto Rico, as has been described in Australia (Berger *et al*. 2004, Retallick *et al.* 2004). In order to answer this question we have broadened our geographical and taxonomic monitoring of amphibian populations and chytrid detection, and included fine-scale weather data collection at some localities. Finally, we expect to complete historic sampling at other localities to test disease dispersion hypotheses for the chytrid fungus in Puerto Rico. Results of our progress were presented in August, 2005 at the recent RANA meeting in México.

In the year 2004 we started collaborations with Marcelino Hernandez, from the Dominican Republic, that included a workshop on monitoring amphibians given by R. L. Joglar, followed by several days of field work in the Cordillera Central. This work resulted in baseline population data for the localities of Ebano Verde (1440 m) and Valle Nuevo (2500 m) and the first records of chytrids for the Dominican Republic in three species of anurans: *Eleutherodactylus pituinus, E. patriciae* and *Hyla vasta*.

Luis M. Diaz from Cuba, participated in this training activity and we hope to develop similar collaborations in the near future.

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Good news for three critically endangered and traded frogs from Madagascar

By Franco Andreone, V. Mercurio, F. Mattioli, and T. J. Razafindrabe

The ongoing project to study the critically endangered (CR) and endangered (EN) species of Madagascan frogs has revealed some novel and unexpected aspects of their distribution and life history (e.g., Andreone & Randrianirina, 2003; Andreone *et al*., 2005 *b*). The rationale behind our work is that a species cannot be adequately protected without analysing thoroughly its adult and larval biology, and without knowing the full extent of its distribution.

The results of the *Global Amphibians Assessment* (GAA) and the *Amphibian Conservation Action Plan* (ACAP), held recently in Washington DC, emphasise the importance of this issue (Andreone *et al*., 2005 *a*). For the 220 Malagasy amphibian species evaluated in the GAA, 9 are CR, 21 are EN, and 25 are Vulnerable. This gives a total of 55 threatened species (25% of the total). However, the real situation may well prove to be worse than this, because many of the 44 species listed as Data Deficient (DD) might eventually prove to be threatened. Furthermore, the results of our research concerning abundance have highlighted how deficient the true extent of our knowledge may be for the already categorised species.

Among the CR amphibians some attractive colourful species are (or have been) exploited by the pet trade, and are included in CITES Appendix II (Andreone *et al*., 2005 *a*). In some cases the number of specimens exported per year was high, causing alarm in the conservation world. The present study was therefore started within a project financed by *Conservation International* and by the *DAPTF Rapid Response Fund* to assess quickly the impact of trade on the status of these amphibians, especially when combined with habitat loss. Data compiled from the UNEP/WCMC CITES database (on 18/10/2005) reveals that the exportation of *Mantella expectata* reached a peak in 2002 (up to 1390 individuals), *M viridis* in 2003 (2040 animals), and *Scaphiophryne gottlebei* in 2003 (980 individuals).

Mantella expectata and *Scaphiophryne gottlebei* are unique amphibians, apparently endemic to the Isalo Massif of south-central Madagascar, records for Morondava and Mandena probably being erroneous. Despite the very high demand for specimens, virtually nothing was known about their biology and life history. Although *S. gottlebei* was exported in high numbers, due to its striking white, red, green and black back coloration, a search on the internet and of terrarium journals revealed no evidence of successful captive breeding. We must therefore conclude that all the exported individuals have been lost, and that captive breeding has not yet been achieved. The available data depicted a distribution limited to a single or a few localities, which obviously suggested a threatening situation. Our research confirmed that both these species are restricted to habitats inside and near the narrow and wet canyons typical of the area. In particular, *M. expectata* occurs in ephemeral and temporary pools in open, sun-exposed sites, while *S. gottlebei* is more restricted, occurring only inside the canyons and caves.

A few populations of *Mantella expectata* and *S. gottlebei* were first discovered around the Ilakaka or “Saphire”, a village which grew rapidly and chaotically after the discovery of sapphires in the area. In January-February 2004 we started our survey there in order to locate and visit the sites where the specimens were collected for the pet trade and for exportation. After visiting the previously known sites, we also surveyed the narrow canyons in the area with the result that many new populations were found around the Ilakaka and Ranohira villages, as well as inside the Isalo National Park. During November-December 2004 we continued our research to include the Isalo Massif and within the Isalo National Park, intensifying our efforts to visit many canyons and other potentially suitable sites.

One of the most interesting results, in the context of distribution and conservation, was the large number of sites where the presence of *Mantella expectata* was confirmed. Of a total 49 sites visited on the Isalo Massif, 39 (77%) contained *M. expectata*. Furthermore, four other sites contained *M. betsileo*, a newly discovered species for the area, and 17 sites (46%) by animals which show chromatic traits intermediate between *M. betsileo* and *M. expectata*. It is crucial that we determine if these are hybrids between the two parental species. To resolve this issue future molecular analysis is urgently needed to establish conservation priorities.

Other encouraging results include the apparent abundance of *M. expectata*. In the inspected sites abundance was generally high with many animals active and easy to see, especially during the infrequent rainfall periods. For example, at one site (Zahavola) a mark-recapture study revealed around 300 animals in a100m linear transect.

The situation was quite different for *S. gottlebei*, for which we were unable to find many populations. Of the 49 sites, this species was confirmed at only 19 (c. 40%). This was probably due to the fact that this microhylid species is mainly nocturnal, usually voiceless and with very secretive habits. We suspect that it is much more widespread than we observed, but is simply difficult to detect. Moreover, at most sites it was confirmed only on the basis of its tadpole, an indication of how difficult the adults are to find. The species is apparently restricted to the northern portion of the Isalo Massif, but this needs to be confirmed. Despite the fact that our study was carried out during two periods, covering almost all of the rainy period at Isalo (from November to January) we were able to witness breeding behaviour on only one occasion (Andreone *et al*., 2005 *c*). Consequently it was not possible to conduct a population study and we have gathered only limited data on population stability. With the exception of habitat preference, call and larval habits (Mercurio & Andreone, 2005) the life history of *S. gottlebei* remains enigmatic and further studies are required.

The overall situation of *M. viridis* from the extreme north of Madagascar appeared similar to that for *M. expectata,* taking into account that both belong to the *M. betsileo* group and that both live in arid or semi-arid environments. According to our observations at Antongombato and other sites, *M. viridis* shows considerable ecological plasticity, occurring both in ephemeral ponds and along streams as well as in drains in streets. Population stability was very variable from one site to another, with population density higher in mango plantations crossed by irrigation ditches. We roughly estimated the presence of at least 150 individuals along a 15 x 5 m transect. Our research also detected many new populations within previously-recorded regions, such as Antongombato and Montagne des Français, as well as Antsahampano, Andranotsymaty, Mahavavona and Andoajampona regions. A population discovered within the Montagne d'Ambre National Park (Andranobaribe) is the only one detected so far within a protected area. For *M. viridis* we also found individuals that showed intermediate coloration with *M. betsileo*: these may be hybrids. Of 42 sites visited, 32 (76%) contained *M. viridis;* 10 (31%) contain *M. betsileo* or intermediate morphs.

Our survey work has thus revealed that, although the three studied species still have quite a restricted area (Isalo Massif for *M. expectata* and *S. gottlebei*, and Antambombato, Montagne des Français, Montagne d'Ambre for *M. viridis*) local abundance is apparently very high. In view of the fact that these species have a short life span (1-2 years for all the three species according to preliminary skeletochronological data: Andreone *et al*., 2005 *b*), it appears that the total population number may be exceptionally high, and that collecting for the pet trade could be conducted in a sustainable way.

*Acknowledgements***:** This research was supported by funds from the Nando Peretti Foundation, Conservation International, the DAPTF, National Amphibian Conservation Center. Istituto Oikos facilitated our field activities. Companionship in the field was provided by G. Aprea, and J. E. Randrianirina. At Isalo we were kindly assisted by Jean Hervé Bakarizafy and local guides.

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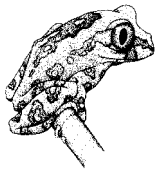

Frost induced mass mortality in a high altitude population of *Rana temporaria*

By: Dan Cogălniceanu and Tibor Hartel

The impact of global climate changes on amphibians is poorly understood and documented (Collins & Storfer, 2003). The most vulnerable to climate changes are populations close to the altitudinal and latitudinal limits of their range. *Rana temporaria* is widespread through most parts of Europe, reaching higher altitudes and latitudes than any other amphibian species. It winters both on land and in water and starts reproduction at low temperatures, shortly after ice-melt.

Retezat National Park, located in the western part of Romania, is the oldest national park, having been legally established in 1935. The park has an area of 38,047 ha of which 1,630 ha are strictly protected and covered by one of the largest single areas of pristine mixed forest in Europe. The universal value of the park was recognized by the UNESCO Man and Biosphere Program in 1979,

through its inclusion in the international network of biosphere reserves. In the lower part of the park there are deep narrow valleys, while the higher parts consist of glacial plateaus. Glacial and cryonival reliefs are extremely widespread, allowing lakes to form in the deeper parts of the moraines. A total of 58 permanent glacial lakes and an almost equal number of temporary lakes are recorded at altitudes between 1700-2300 m.

The Retezat Mountains have the highest humidity and runoff in the Romanian Carpathians with runoff values reaching 36.6 l/s·km^2 at altitudes higher than 2200 m. The climate is moderately cold and humid, with yearly average temperatures between 6^{0}C in the valleys and -2^{0}C in the alpine areas. Annual rainfall varies between 900-1300 mm, reaching higher values below the timberline.

The Iezilor Lake is situated in the strictly protected scientific reserve and human impact is insignificant. The lake is fish-free and it supports a large reproductive population of *Rana temporaria* and a small population of *Triturus alpestris*. It is situated at 2149 m a.s.l. (45.3613 N and 22.8451 E), has an area of 3630 m^2 and a perimeter of 390 m, a maximum depth of 1.1 m and a medium depth of 0.38. Water quality is very good, with dissolved oxygen during the ice-free period ranging between 8.2-9.6 mg/l, pH ranging between 6.3-6.9 and conductivity between 8-13 µS/cm 25^{0}C.

The surrounding terrestrial habitat consists mostly of alpine pasture, rocks and boulders and small areas covered by dwarf pine (*Pinus mugo*). The ice-free period of the lake lasts between June and October, but snow patches may persist during the summer in the surrounding terrestrial habitats. Two alpine lakes are located in the vicinity (within 1000 m radius) but are not used for reproduction by frogs. However, there are several small, temporary puddles which are sometimes used for reproduction.

Since 2000, the lake and its surroundings were visited regularly and the reproductive success of this species was observed each year, with a large number of juveniles metamorphosing. The 2004-2005 winter was longer than usual, with occasional frost and below-zero temperatures lasting in the area until June 2005. On June 19 2005, more than 50% of the lake was still covered by ice. At noon the water temperature was 2.4^{0}C, soil temperature 1.4^{0}C and air temperature 10.4^{0}C. Water parameters were normal except for pH, which was more acid than usual (5.34). In the deepest part of the lake a cluster of more than 70 dead *Rana temporaria* adults was observed. Several other dead animals were also observed in different deep parts of the lake. Upon collecting several dead animals it appeared they were in an advanced state of decomposition, and had apparently been dead for a long period. This indicates that the prolonged frost period has either caused the entire water body to freeze, trapping the animals in ice or the thick ice cover induced hypoxia. Air temperature was measured for a year, using a miniature thermistor with integrated data logger with a resolution of 0.1^{0}K (Vemco Minilog-T, Vemco Ltd., Halifax, Nova Scotia, Canada). The temperature showed that, after a short period of frost during 13-19 October 2004, air temperature was below zero for almost eight months during November 7th 2004 until June 2nd 2005. The period was about a month longer than during an average year. We suggest that the frogs died most probably at the beginning of winter.

While the long-term impact of this incident is hard to assess, an immediate result is that while in June 2004 more than 80 egg clutches were found, this year only 25 were counted. The long-term monitoring of this population will allow us to assess the potential negative impact of this event on the survival of this population.

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Froglog Shorts

DONATIONS: We gratefully acknowledge receipt of the following donations received prior to November 17th, 2005: Mark Klein and Mary Wagner, Thomas and Sue Pick Family Fund, Norm Damm, James S. Andrews, A. Stanley Rand, Dave and Marvalee Wake, Nadine D. Foley, Richard Zweifel, John Serrao, Gale and Richard Nord, Erik Kiviat, Heather Brooke Taylor, Frederick H. Pough, Richard R. Montanucci, Robert T. Brooks, Brian T. Miller, Charles Leavell, David Rich, Ray Pawley, Mark R. Jennings, Cynthia Carey, Chris Banks, Ronald E. Beiswenger, John Harshbarger, Willlard P. Hunnewell, Douglas A. Rossman, Charles C. Carpenter, Donald R. Farrar, Fred Kraus, Desert Fishes Council and Rana Konsult.

Project Kodok

We have received a report from Project Kodok, a research project aimed at investigating and monitoring anuran populations in Tanjung Puting National Park, Central Kalimantan, Indonesia, South East Asia. An electronic copy of the report can be obtained from the DAPTF office and information about the project can be found at *www.projectkodok.org .*

Welcome to two new DAPTF Working Group Chairs

We would like to welcome Professor Djoko Tjahjono Iskandar (Indonesia) and Abdulai Barrie (Sierra Leone).

RANA and the US National Science Foundation grant DEB-0130273 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:* Jeanne McKay, Editor, Department of Biological Sciences, The Open University, Walton Hall, Milton Keynes, MK7 6AA, U.K.**
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Funding for FROGLOG is underwritten by the Detroit Zoological Institute, P.O. Box 39, Royal Oak, MI 48068-0039, USA