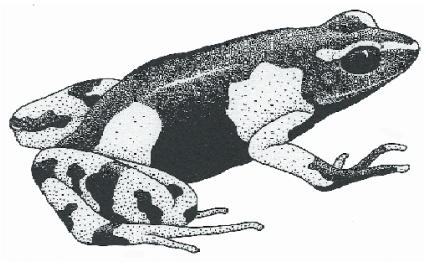
Mantella madagascariensis by Tim Halliday

ISSN 1026-0269



FROGLOG

Newsletter of the Declining Amphibian Populations Task Force

August 2002, Number 52.

Northern red-legged frogs and endocrine disrupting compounds (EDCs).

By James B. Bettaso, Hartwell H. Welsh, Jr. & Brent D. Palmer

Endocrine disrupting compounds (EDCs) have been defined as an exogenous substance or mixture that alters function(s) of the endocrine system and consequently causes adverse health effects in an intact organism, or its progeny, or (sub) populations (Damstra et al. 2002). Many human-made compounds have been implicated in disrupting endocrine function in wildlife worldwide, including agricultural and industrial chemicals. EDCs may affect amphibians at several life stages. Their complex life cycles involve aquatic and terrestrial phases, each of which may be exposed to EDCs via these different environments. Amphibians may also be exposed to increase levels of EDCs in their prey as these compounds pass up the food chain in the process of biomagnification. Amphibians as sentinel taxa for detecting EDCs are a logical approach to assessing ecosystem status with regards to these stressor compounds (Palmer et al. 1998).

The definition of a biomarker is a chemical, biochemical, physiological, or behavioral endpoint that can be used to assess exposure or effect by an environmental stressor (Kendall et al. 1998). The use of the biomarker vitellogenin (VTG) has been extensively employed in fisheries research on the effects of estrogen-mimicking compounds (Sumpter & Jobling 1995, Matthiessen 1998). Vitellogenin is a protein produced by female oviparous vertebrates under normal estrogen regulation and not normally produced by males or subadult animals. Polyclonal antibodies that recognize amphibian VTG have been developed (Palmer & Palmer 1995, Selcer et al. 2001) in the form of an enzyme-linked immunosorbent assay (ELISA) test. We used these bioassays to test for the production of VTG in wild populations of northern red-legged frogs (*Rana aurora aurora*) in coastal, northwestern California, USA, seeking evidence of exposure to estrogen-mimicking compounds.

In 1999 and 2000, wild populations of *R. a. aurora* were surveyed for endocrine disruption by plasma analysis for VTG. ELISA analysis in 1999 indicated 67% (4 of 6) of the populations tested contained male red-legged frogs producing VTG. In 2000, ELISA analysis showed that 56% (5 of 9) of the populations tested exhibited male and subadult red-legged frogs producing VTG. For the two years of this study, 9 of the 13 study sites tested (69%) had animals producing VTG. This is the first evidence that one or more exogenous sources of estrogen or estrogen mimics are present in the environment of the north coast of California.

The recent work on the pesticide atrazine inducing hermaphroditism in African clawed frogs in the laboratory argues for additional work in wild populations of amphibians (Hayes et al. 2002). Laboratory studies on African clawed frogs has shown that a variety of pesticides, industrial chemicals and pharmaceuticals can induce estrogenic effects (Palmer and Palmer 1995; Palmer et al. 1998; Selcer et al. 2001). With the production of VTG in males and subadults in wild populations of *R. a. aurora*, further research into possible estrogenic effects in these amphibians could prove fruitful.

This work is the first to our knowledge to document endocrine disruption in a wild population of amphibians. The potential for endocrine disrupting chemicals to produce both subtle (such as VTG induction) and pronounced (such as sex reversal) harmful effects may lead to amphibian population declines.

This research was funded in part by a DAPTF seed grant in 1998 for equipment necessary to collect plasma samples. This is the first report of results derived from that support. This is a part of JBB's research for a Master's of Science in Wildlife at Humboldt State University in collaboration with HHW at Redwoods Sciences Lab and BDP at the University of Kentucky.

Contact: James B. Bettaso[1,3], Hartwell H. Welsh, Jr.[1] & Brent D. Palmer[2] (1) Redwood Sciences Lab, Pacific Southwest Research Station, US Forest Service, 1700 Bayview Dr., Arcata, CA 95521, USA. (2) Department of Biology, University of Kentucky, Lexington, KY 40506, USA. (3) **jbettaso@fs.fed.us.**

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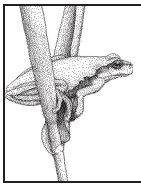

Monitoring of amphibians and reptiles along the Drava River

By Tibor Kovács

The directorate of Danube-Drava National Park in Hungary initiated a long-term monitoring programme on the Hungarian side of the Drava River. Besides the amphibians and reptiles, the programme involves some 25 animal and plant groups that supposedly indicate environmental changes. I was focusing on the breeding sites of the amphibians rather than finding them after the mating season. The ultimate reason for the programme is to reveal the biodiversity before a water power station is built on the Croatian stretch of the river. Similar works were carried out on the local herpetofauna in Szigetköz (Gubányi and Creemers 1994) and Kis-Balaton (Kovács 1996) in western Hungary.

Three areas were involved in the monitoring: Őrtilos (46°17.0´; 16°53.5´), Lankóc Wood (46°13.5´; 17°03.5´) and Vízvár (46°06.0´; 17°13.5´). The breeding sites included abandoned gravel pits, fishponds, oxbow lakes, backwaters and alder swamp forests. Altogether 18 water bodies were surveyed of which 6 were selected for regular monitoring. The survey methods partly complied with the National Biodiversity Monitoring System (Kiss 2001) but also considered the specific features of each locality.

During the last two years I have found 12 amphibian and 3 wetland reptile species in the surveyed lakes and ponds: The Danube crested newt (*Triturus dobrogicus*), smooth newt (*T. vulgaris*), fire-bellied toad (*Bombina bombina*), common toad (*Bufo bufo*), green toad (*B. viridis*), tree frog (*Hyla arborea*), spadefoot toad *(Pelobates fuscus*), moor frog (*Rana arvalis*), agile frog (*R. dalmatina*), edible frog (*R.* kl. *esculenta*), pool frog (*R. lessonae*), marsh frog (*R. ridibunda*) terrapin (*Emys orbicularis*), grass snake (*Natrix natrix*) and dice snake (*N. tessalata*).

Moor frogs and agile frogs appeared in the same ponds roughly at the same time and probably competed for the better breeding sites. Moor frogs formed compact choruses and built egg-mats unlike the agile frogs, which dispersed their eggs. When the water level was low the moor frog sites became insufficient for choruses and laying eggs. So, while 2000 was definitely a rich year in Lankóc Wood, the drier 2001 season resulted in poor recruitment of moor frogs.

Green toads were not found in the breeding ponds in 2000-01. This was surprising since considerable numbers were killed on the roads of the surrounding villages. It seems that they are unwilling to compete with other species for the best breeding sites, and instead seek ephemeral puddles.

Large newts were identified as Danube crested newts by using the Wolterstorff index (forelimb length/distance between legs). This species occupies the Carpathian Basin (Griffiths 1995) and not the related northern crested newt (*T. cristatus*) from which it was separated. Danube crested newts were always found together with smooth newts, whereas the latter species occupied some ponds where the first was not present. The relative density of smooth newts was always higher than that of Danube crested newts.

Marsh frogs (from the green frog complex) are a rare species in the region. Even in the larger fishponds or lakes I found pool frog/edible frog communities or pure edible frog populations indicating disturbed habitats.

One of the most crucial factors affecting the breeding sites and amphibian breeding success is the water level of the Drava river, which changes dramatically depending on the schedule of the Dubrava power station in Croatia. Fast daily changes of water level make several inlets of the river insufficient for breeding amphibians. Another important point is the annual variation in water regime. In 2000 the water level in the river Drava did not show striking variation so the most optimal aquatic plant community developed in those ponds located close to the river. Due to favourable breeding conditions, the number of mating amphibians reached the available maximum. 2001 started with very high water levels in the sample sites at Őrtilos and Vízvár, so the native shallow water vegetation could not develop properly. However, in Lankóc Wood, 5 km away from the river, the level of the river did not influence pond wildlife.

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Contact: Tibor Kovács, Behavioural Ecology Group, Dept. Syst. Zool. Ecol., Eötvös University, Budapest 1117, Pázmány P. s. 1/c., Hungary.

South Asian Amphibian Workshops: Executive Summary

A Conservation Assessment and Management Plan (C.A.M.P.) and a Global Amphibian Assessment (G.A.A.) for Amphibians of South Asia were held simultaneously from 1 – 5 July 2002 at the State Forest Service College, Government of India in Coimbatore, Tamil Nadu, India. Forty-seven participants from five countries of South Asia (India, Sri Lanka, Bhutan, Bangladesh, Nepal) as well as from Great Britain, USA and France attended the workshop. Participants consisted primarily of amphibian field biologists and taxonomists, who worked assiduously from morning well into all nights of the workshop to assess 310 species and 9 populations of amphibians of the South Asian region. Five working groups were formed: Sri Lanka (2 groups), northeastern part of South Asia, and Western Ghats (2 groups). A set of 5 criteria developed over several years by the Species Survival Commission, IUCN, were used to assess and then categorize the species. The five criteria are 1) population reduction, 2) restricted distribution and fluctuation, 3) restricted population and fluctuation, 4) very small or restricted population and 5) quantitative analysis. Species were categorized as given below. Although minor changes in these numbers may be made when some information has been checked, it will not alter the fact that most amphibian species in South Asia are in deep trouble.

Table: Draft Summary – Categories of Species Assessed in 2002 South Asian Amphibian CAMP

	Category	Meaning (abbreviated)	# Spp
EX	Extinct	(no reasonable doubt that the last individual has died)	18
CR	Critically Endangered	(facing an extremely high risk of extinction in the wild in immediate future)	32
EN	Endangered	(facing a very high risk of extinction in the wild in the near future)	58
VU	Vulnerable	(facing a high risk of extinction in the wild in the medium-term future)	44
NT	Near threatened	(close to qualifying for a category of threat)	14
LC	Least Concern	(does not quality for a category of threat; widespread and abundant)	82
DD	Data Deficient	(having insufficient information to make a risk assessment)	63
NE	Not Evaluated	(not yet been assessed against the criteria)	8
		TOTAL:	**319**

One of the groups of animals to be most affected by the Earth's crisis are amphibians. In South Asia itself, with 18 species having been assessed as Extinct and 134 as Threatened by the region's foremost amphibian biologists at the recent CAMP workshop, it is clear that the crisis is very serious indeed. The high rate of decline of amphibians provides an indicator for the state of the natural world in all regions and even niches where it is known. It is possible that such advance warning for both species and ecosystems could lead to protection measures which would save highly threatened species and habitats. Therefore, field studies followed by status assessments of such fauna as amphibians are crucial for all fauna and flora. This is particularly true for Data Deficient species which could become Extinct before we even know they are in trouble!

Fewer than 1000 of the 5000 known amphibian species have been assessed for their conservation status, although many more have been studied. Experts fear that more than 50 amphibian species have become extinct over the last 15 years alone, a conservative estimate considering the result of 18 extinctions from South Asia alone. Following a meeting of the Global Amphibian Specialist Group in January 2001, it was decided to implement a Global Amphibian Assessment (GAA) over a two-year period which will provide a blueprint for amphibian conservation in the world over the next 10 years.

The Global Amphibian Assessment (GAA), a collaborative project between Conservation International and the IUCN Species Survival Commission, is a comprehensive, strategic review of the overall conservation status of every species of amphibian, with an analysis of their conservation needs. It is being carried out regionally with experts from the region collecting initial data and entering it to a special GAA database. For regions where meetings of experts were already scheduled, GAA asks them to review this output, and for species-rich regions, specific workshops are being organized.

In South Asia, Dr. Sushil Dutta, Co-Chair, Declining Amphibian Population Task Force, South Asia (DAPTF-SA) was responsible for the initial compilation. In addition, as a follow-up for an earlier CAMP workshop for Indian amphibians held in 1997, which provided much of the information for the initial data entry, a similar workshop was planned for 2002 for all South Asia. This workshop was spearheaded by Sanjay Molur, also Co-Chair of DAPTF-SA.

The CAMP Workshop was developed by the IUCN SSC Conservation Breeding Specialist Group, which is one of the 100+ specialist groups of IUCN. The CAMP process combines several elements – scientific expertise, human social dynamics, participatory methodology and careful, systematic planning with the IUCN SSC Red List methodology of assessing species by applying objective, scientific criteria and assigning species to a category of threat.

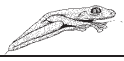
The two activities furnished a convenient and useful forum as most of the GAA and CAMP information needs are the same. Combining CAMP and GAA enhanced both methods. The assessments provide a means of making incisive, practical recommendations for further studies, for direct conservation action, for legislation, for public awareness, and other steps towards conserving species and their habitats.

The Draft Report was printed and distributed to participants at the workshop itself so they could make corrections, add items of information not available at the workshop and review their work. The corrected version will be published as a report and distributed to all South Asian professional wildlife biologists, foresters, policy makers, and politicians. An education programme to disseminate the information in the report to all levels of people using zoos, NGOs, participants, and a variety of methods is in the planning stage.

The information produced through the GAA will be drawn together and analyzed to prepare a comprehensive assessment of the status and conservation needs of amphibians, including information on geographic patterns of diversity, levels and types of threat, overall trends, habitat requirements, and conservation priorities. The output will be fully integrated into the official IUCN Red List of Threatened Species. It will be submitted to the national wildlife agencies of each South Asian country for consideration with reference to their legislation, wildlife policy and CBD strategic plans. The results will be directly linked to Conservation International's 'hotspot' conservation work.

The Amphibian CAMP and GAA Workshop was sponsored by Conservation International (Center for Applied Biodiversity Science and Critical Ecosystems Partnership Fund), Chicago Zoological Society, Columbus Zoo and others contributing in kind. The workshops were organized and facilitated by DAPTF, South Asia, Wildlife Information Liaison Development (WILD), Zoo Outreach Organisation (ZOO), CBSG, South Asia.

For more information, contact: Sanjay Molur, Co-Chair, DAPTF South Asia, Z.O.O., Box 1683, 65 Bharati Colony, Peelamedu, Coimbatore, TN 641004, INDIA.
herpinvert@vsnl.com



Froglog Shorts

DONATIONS We gratefully acknowledge receipt of these donations, received 1 June – 31 July 2002. **Individuals:** Ryan W. McCue, Paul Daniel, Eugenia Farrar, Bruce Woodward, Howard Youth. **Organizations:** San Francisco Zoological Society.

SCB Conference, July 2002 The annual meeting of the Society for Conservation Biology, held in Canterbury, UK from 14th to 19th July included a symposium on amphibian population declines, organised by Richard Griffiths and Tim Halliday. This symposium marked an anniversary of the first recognition of the amphibian decline phenomenon at the 1st World Congress of Herpetology, held at the same venue in 1989. The proceedings of the symposium will be published, sometime in 2003, in *The Herpetological Journal.* Abstracts can be seen at: **http://www.ukc.ac.uk/anthropology/dice/scb2002/abstracts/symposia/sympfourtn.html**

Visiting Scholar Program In Amphibian Biology The National Amphibian Conservation Center (NACC) at Detroit Zoo serves as a resource for academic, governmental, and other conservation-oriented amphibian biologists from around the world by providing a controlled environment for amphibian observation and non-invasive research on all aspects of amphibian biology. We are currently accepting applications for a newly created Visiting Scholar position, which supports top researchers from around the world for three-month terms to complement the continuous research programs of permanent staff. Qualified applicants will be amphibian biologists from diverse disciplines. *For full details, contact*:
Kevin Zippel, Curator, National Amphibian Conservation Center, Detroit Zoological Institute, 8450 West Ten Mile Road, Royal Oak, MI 48067, USA.
Tel: (248) 398-0903 ex. 3224
Fax: (248) 691-4194
ZippelK@zoo.ci.detroit.mi.us

Nebraska Governor Signs Reptile and Amphibian Trade Ban The Governor of Nebraska, Mike Johanns, has signed into law new rules by the state Game and Parks Commission that ban the commercial exploitation of Nebraska's 62 species of reptiles and amphibians. The new regulations outlaw the capture and sale of tens of thousands of reptiles and amphibians. It also ends a profitable business for a small number of dealers who sold the animals online to pet stores and out-of-state dealers. Supporters say that many species of turtles, snakes and lizards can't reproduce quickly enough to withstand the pressure applied by commercial collectors and dealers.

News from California…

The U.S. federal government has rescinded its designation of nearly 4 million acres for the protection of the California red-legged frog (*Rana aurora draytonii*) after a legal challenge by home builders who said it would impede development in a vast region of northern California. *For full details, see the San Francisco Chronicle, July 4th edition.*

…and in southern California, the mountain yellow-legged frog (*Rana muscosa*) has been officially listed as Endangered, effective August 1st, 2002. See *Federal Register* Vol. 67, No. 127 for details.

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FROGLOG is the bi-monthly newsletter of the Declining Amphibian Populations Task Force. John W. Wilkinson, Editor, Department of Biological Sciences, The Open University, Walton Hall, Milton Keynes, MK7 6AA, U.K.
Tel: +44 (0) 1908 - 652274.
Fax: +44 (0) 1908 - 654167
E-mail: **daptf@open.ac.uk**

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