

Guest editorial

## Amphibian decline: The urgent need for amphibian research in Europe

A paper published in this issue of *The Veterinary Journal* describes an outbreak of tuberculosis on a bull frog farm in Brazil (Ferreira et al., 2005). Despite the fact that mycobacteriosis is supposed to be a quite common disease in amphibians, documented cases are scarce. Unfortunately, this applies to amphibian diseases in general in Europe, where research effort is falling behind that in the USA and Australia. Most of the known amphibian diseases have only been described from isolated case reports. In depth studies on epidemiology and host pathogen interactions are largely lacking. The consequence of this lack of information is that no appropriate preventive and/or curative measures can be taken in case of disease outbreaks.

Globalization has promoted the spread of microorganisms between populations both indirectly (e.g. on materials) and directly (e.g. mass importations of amphibians for the pet trade) with possibly disastrous effects. The classic example of a pandemic amphibian disease is chytridiomycosis, a fungal disease caused by *Batrachochytrium dendrobatidis* that is held responsible for massive amphibian die offs and even for the extinction of several species worldwide, the most famous of which being the Costa Rica golden toad (*Bufo periglenes*). This pathogen was described in Longcore et al. (1999) but actually has been around for at least a century. The massive worldwide amphibian die offs are now considered a major threat to amphibian biodiversity. In addition, amphibians are valuable bio-indicators. If these get lost, important indicators for the loss of biodiversity in ecosystems in general will be missing. This was first noticed in 1989. Since then, the interest in amphibian population declines has been growing.

Our knowledge of the current status of the world's amphibian species has recently been advanced by the publication of the Global Amphibian Assessment (Stuart et al., 2004), which reveals that about a third of the world's amphibian species are threatened with extinction. Curiously we are largely ignorant about

the status of many European species. An astonishing example is the only recently acknowledged situation of the Sardinian brook salamander (*Euproctus platycephalus*). This species was supposedly widespread on the island of Sardinia. Recent research, however, clearly demonstrates that only very few populations of the animals are still viable and that the species might very well face extinction (Lecis and Norris, 2003). It is noteworthy that this has happened in Europe, a region that is supposed to be very well investigated and monitored. Even more surprising is the wealth of amphibian species yet to be described, as recently demonstrated by Meegaskumbura et al. (2002) on the island of Sri Lanka. The AmphibiaWeb web site (<http://elib.cs.berkeley.edu/aw/>) keeps records of all described amphibian species and adds an average of one or two new species each week. Tackling the amphibian decline issue, therefore, urgently requires research into amphibian diversity and population status.

A particular threat to native European amphibians may be diseases introduced by non-native amphibian species. Bullfrogs (*Rana catesbeiana*) are native to North America, but are farmed in huge numbers in South America to be eaten in Europe and elsewhere, creating a global route for the transmission of pathogens. There are several viable populations of bullfrogs in Europe and a recent report suggests that one of these populations in Britain is infected with chytridiomycosis. Another potential global transmission route for disease is provided by the trade in *Xenopus* for medical research. It has recently been suggested that chytridiomycosis originated in Africa and has been distributed globally via the trade in *Xenopus* (Weldon et al., 2004).

In the light of the importance of environmental factors to amphibian health, research concerning the causes of amphibian decline requires a multidisciplinary approach, involving veterinarians, herpetologists, microbiologists, toxicologists etc., of the kind being led in the

USA by James Collins (see <http://lifesciences.asu.edu/irceb/amphibians/>), the amphibian monitoring website of Integrative Research Challenges in Environmental Biology [IRCEB]). This would allow the identification of risk factors affecting amphibian health, their effects at the population and meta-population levels. It necessitates the development of diagnostic tools and of strategies for appropriate control measures. The work of Ferreira et al. (2004) is to be encouraged as a step in the right direction.

Frank Pasmans

*Clinic for Avian and Exotic Animal Diseases  
Faculty of Veterinary Medicine, Ghent University  
Salisburylaan 133, B-9820 Merelbeke, Belgium*

Frank Mutschmann

*Exomed Am Tierpark 64  
10319 Berlin, Germany*

Tim Halliday

*Professor in Biology, The Open University, UK,  
International Director  
IUCN/SSC Declining Amphibian Populations Task Force  
Department of Biological Sciences  
The Open University, Walton Hall, Milton  
Keynes, MK7 6AA, UK*

Peernel Zwart

*Department of Veterinary Pathology  
Faculty of Veterinary Medicine, Utrecht University  
Yalelaan 1, PO Box 80.158 3508 Utrecht  
The Netherlands*

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