Underestimated Contagious Hobby

Pet Amphibian Keeping in Central Europe: Andreas R. Hassl

Introduction:
Nurturing pet animals is an organisation of one’s leisure time with a continually increasing social impact in Western societies. Because of space cramping and time famine mammalian keeping is deemphasising, whereas the creation of ornamental aquaria or aquateria is constantly gaining prestige. More than 100.000 German families and in about 100.000 Austrian ones. Although I estimate that pet reptiles are about five times more frequent than pet amphibians, dwarf clawed frogs (Hyla arborea) and salamanders (Ambystoma mexicanum) are common ornamental aquaria stockings, and frogs, toads, newts, and salamanders are favourite pets of terrarium freaks. For a long time salmonellae are well known as health hazard of amphibian husbandry Pseudomonades, Enterobacteria, atypical Mycobacteriaceae, and - maybe - free-living pathogens have been detected, captive amphibians may very well - at least at times - be used as an acceptor of these bacteria. The role of pet frogs as an allatoca or as an acceptor of these bacteria is unknown.

Problem:
Housing captive amphibians usually span a few types of animal husbandry only: due to their biology amphibians are mostly unsuitable for thrilling public exhibitions and for conservation breeding for re-naturalisation.

Pet amphibian keeping usually is a long standing maintenance process for a minor number of ornamental aquaria per site. Few individuals of a small, selected number of feasible tropical amphibian housing in a few tanks, most of them averaged and commericated, showpieces provided with sympathy, mostly fed on diligently gathered insects, water table fluctuates appropriately for the species - are typical inmates of this type of amphibian keeping.

Sometimes amphibians are bred on a grand scale, either for the satisfaction of pet market needs or for food. Lots of individuals of only one amphibian species, densely stacked, yielded in numerous bare aquaria or terraria, due to efficiency considerations being in their best of health and accurately hygienic monitored, efficiently fed up with standard microbiological identification procedures. Our findings were compared and amended with data of other authors.

Changes in human behaviour and social structure open up new ecological niches for the emergence of novel infectious diseases. Close gathering between man and pet amphibians is such an anthropogenic change to habitats that increases the flow of pathogens, creates new infection routes, and thereby fosters disease emergence in man. Pet amphibian husbandry leads to the formation of a niche in which well-known, but rare infectious diseases increase in incidence (e.g. exotic salmonellae) or diseases will move into a new host population (e.g. MOTTs). Although until now no newly evolved pathogens have been detected, captive amphibians may very well - at least quantitatively - be affected by infectious diseases not found in free-living populations (e.g. infections with Mycobacterium ulcerans). As few captive amphibians are fed on rodents, mammalian parasites play an underpaid role. Essential pathogens potentially threatening human health in the course of pet amphibian keeping are therefore found in the taxon Pseudomonadaceae, Enterobacteriaceae, atypical Mycobacteriaceae, and - maybe - free-living amoebas also (Tab.1). All these pathogens are common, ubiquitous, and more or less facultative infectious agents.

Material, Methods & Discussion:
Between 2007 facets samples and 2 corpuses of amphibians living either in a vivarium or in households, 50 water samples and 98 snap samples of amphibian populated aquaria were analysed for the occurrence of parasites stages, enterobacteria, mycobacteria, and pathogenic fungi applying standard microbiological identification procedures. Our findings were compared and amended with data of other authors.

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Preliminaries:
The natural habitat of pathogens in case of keeping captive amphibians is composed of four partitions: amphibian, human, animal, and the inanimate environment; that covers all things not existing without amphibian husbandry or used elsewise. A fifth partition, an introducing vector or an obligatory secondary host, is usually not available in aquaria or terraria. This circumstance eliminates all infectious diseases whose causing agents depend on such hosts during the amphibians’ adaptation phase to captivity (quarantine) already. In addition, mere amphibian diseases are usually eliminated after a little while of husbandry due to care procedures and artificial epidemiological effects.

Only pathogens subsisting in subareas 1 (microbial contact zone), 2 (biofilms), and 3 (subsequent zoospor area) are subjects of our interest.

Results:

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Disease</th>
<th>Transmission Nr.</th>
<th>Hosts</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella typhimurium</td>
<td>Gastroenteritis</td>
<td>1</td>
<td>Xenopus laevis</td>
<td>30%</td>
</tr>
<tr>
<td>Salmonella berta</td>
<td>Gastroenteritis</td>
<td>1</td>
<td>Xenopus laevis</td>
<td>30%</td>
</tr>
<tr>
<td>Salmonella bovis-morbificans</td>
<td>Gastroenteritis</td>
<td>1</td>
<td>Xenopus laevis</td>
<td>30%</td>
</tr>
<tr>
<td>Salmonella albicaulis</td>
<td>Gastroenteritis</td>
<td>1</td>
<td>Xenopus laevis</td>
<td>30%</td>
</tr>
<tr>
<td>Mycobacterium ulcerans</td>
<td>Cutaneous infection, ocular disease, pneumonia, meningitis, peritonitis</td>
<td>1</td>
<td>Xenopus laevis</td>
<td>30%</td>
</tr>
<tr>
<td>Capillaria hepatica (= Calodium hepaticum)</td>
<td>Liver infestation</td>
<td>1</td>
<td>Xenopus laevis</td>
<td>30%</td>
</tr>
<tr>
<td>Glugea sp.</td>
<td>Gut infestation</td>
<td>1</td>
<td>Xenopus laevis</td>
<td>30%</td>
</tr>
<tr>
<td>Basidiobolus ranarum (= B. haptosporus?)</td>
<td>Keratitis?</td>
<td>1</td>
<td>Xenopus laevis</td>
<td>30%</td>
</tr>
</tbody>
</table>

Selected References: