Endangered frogs – the vivisection connection

Thousands of amphibian species could face extinction in the next few decades due to the rapid spread of a parasitic fungus which is believed to have already wiped out 165 species.[1] Conservation organisations, along with zoos and aquariums, now plan to remove hundreds of species from the wild and rear them in captivity to 'prevent them from dying out'.[2] However well-meaning, their plan fails to address the cause of this deadly epidemic, which, as with so many other animal diseases, is a result of human activities - in this case, the international trade in the African Clawed Frog (*Xenopus laevis*) for vivisection.[3]

The Scale and Origin of the Epidemic

Chytridiomycosis, the disease caused by the parasitic chytrid fungus *Batrachochytrium Dendrobatidis,* or Bd,[4] has caused mass amphibian deaths in six countries, including Britain.[5] The fungus infects the skin of frogs, toads, salamanders and newts and is believed to interfere with their ability to absorb water.[6] It spreads through water courses and by amphibian-to-amphibian contact. Once it is established in an area, 50 per cent of amphibian species and 80 per cent of individuals can be expected to die within a year.[7] Warmer temperatures associated with climate change appear to have exacerbated its effects, making conditions in many regions ideal for the fungus to flourish.[8] But it is the international trade in amphibians which has enabled this fungus to reach new countries and continents where it has colonised suitable habitats.[9]

Scientists believe that Bd originated in southern Africa, where the fungus is common in frog populations yet mass die-offs, as witnessed in other areas, have not occurred.[10] The earliest known case of infection was in an African Clawed Frog – a species which naturally occurs in southern and central Africa – in 1938. This species does not show clinical signs of the disease in the wild and has never experienced mass deaths, making it an ideal host for transmission of the fungus.[11] Coincidentally but significantly, in the mid-1930s large numbers of African Clawed Frogs began to be caught in the wild and exported to laboratories around the world for use in pregnancy tests.[12] The test involved taking the urine of a woman and injecting it into a female frog. If the woman was pregnant the hormones in her urine would stimulate ovulation in the frog and within a matter of hours, the frog would spawn.[13]

When more effective pregnancy tests became available in the 1960s, many African Clawed Frogs were released into new environments all over the world.[14] Feral populations became established in many regions, including the UK, the US and South America.[15] Scientists believe that once the African Clawed Frog had carried Bd to new regions, other amphibian species could have distributed it further.[16] The American bullfrog (*Rana catesbeiana*) has been proposed as an important carrier because of the large international trade in this species for food.[17] In many countries, including Britain, populations established for the food trade have escaped and spread.

Victims of Vivisection

The demand for pregnancy testing in the 1940s and '50s made African Clawed Frogs widely available in European and North American laboratories, and scientists soon began to exploit their accessibility.[18] By the early 1950s, African Clawed Frogs were being used in developmental research in various countries, especially Britain.[19] They were the first vertebrate animal to be cloned,[20] and are now one of the most widely used vertebrate species in developmental, cellular and molecular research worldwide.[21] Scientists in these fields use African Clawed Frogs because

of their exceptional resistance to disease; the large size of their eggs and embryos which make them suitable for microsurgery; their relatively short life cycle; and, most importantly, their ability to reproduce year-round when injected with human hormones.[22]

Home Office statistics for 2006 show that 12,459 amphibians were used in 20,616 procedures. Although amphibians are sentient beings capable of feeling stress and pain, 17,728 of these procedures were performed without anaesthesia.[23] The statistics do not give a breakdown of the species used, but it is likely that the vast majority will be African Clawed Frogs. Some practices routinely carried out on African Clawed Frogs do not require reporting by the Home Office. These procedures include the euthanasia of frogs for tissues, organs, or oocytes (eggs which are not yet fully developed) if the oocytes are collected only once; and the euthanasia of those frogs bred but then not required for experiments. The above statistics are therefore likely to be a gross underestimate of the numbers of frogs used in Britain.

African Clawed Frogs are used mainly for egg harvesting and oocyte collection, both stressful procedures likely to cause pain and suffering. For egg harvesting, female frogs are injected with human chorionic gonadotropin (hCG) to induce ovulation.[24] They receive two injections, spaced five hours apart, directly into the dorsal lymph sac and ovulation usually occurs within 36 hours.[25] Oocyte collection, which requires surgical removal of a small section of ovary under anaesthetic, is much more common and more invasive.[26] An adult female frog may contain up to 30,000 oocytes, however only a few hundred are usually needed at a time, subjecting the frogs to repeated surgical procedures during their life,[27] which can be up to 20 years in captivity.[28]

A Cruel and Dangerous Trade

Although an increasing number of African Clawed Frogs are now captive bred for research, it is estimated that a third of those used in laboratories are still taken from the wild.[29] This not only subjects these animals to the physical and emotional trauma of capture and transport, it also facilitates the transfer of pathogens, such as Bd, to new areas where it may infect naïve species. Any attempts at protecting amphibian species from this deadly fungus, while the practice which started the epidemic continues, are futile.

While the African Clawed Frog provides a tragic example of the dangers inherent in the worldwide trade in animals for research, it is only one of many species transported around the globe for vivisection. This trade provides disease transmission opportunities that threaten not only native wildlife populations, but also livestock, the health of ecosystems, rural livelihoods and human health.

Large numbers of primates are transported around the world every year to be used in experiments. In 2006, British laboratories imported 2,845 primates,[30] the majority coming from Mauritius, the Philippines, China and Israel. While most imports are now from captive-breeding centres, many are first-generation animals whose parents were taken from the wild and could have harboured viruses such as Herpes B, Simian Retrovirus (SRV) and Simian Immunodeficiency Virus (SIV).[31] There is also a large international trade in various frogs[32] and fish[33] for research. However, most countries, including Britain, do not require the origins of these species used for research to be declared. Many of these animals are still wild-caught and their capture may threaten the survival of wild populations.[34]

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[1] McCarthy M. 2008. Frog numbers in peril from spread of killer fungus. The Independent, Jan 3.
[2] Smith L. 2008. Captivity is last chance for chicken frog. The Times, January 2.

[3] Weldon C, du Preez LH, Hyatt AD, Muller R and Speare R. 2004. Origin of the amphibian Chytrid fungus. Emerging Infectious Diseases 10(12):2100-2105.
[4] Weldon C, du Preez LH, Hyatt AD, Muller R and Speare R. 2004. Origin of the amphibian Chytrid fungus. Emerging Infectious Diseases 10(12):2100-2105.
[5] Smith L. 2008. Captivity is last chance for chicken frog. The Times, January 2.
[6] Imperial College London. 2007. Toads In A Hole? Fungal Disease Threatens UK Toad Population. *ScienceDaily*, December 6. Accessed January 8, 2008 at http://www.sciencedaily.com /releases/2007/11/071130234322.htm.
[7] McCarthy M. 2008. Frog numbers in peril from spread of killer fungus. The Independent, Jan 3.
[8] McCarthy M. 2006. Pregnancy test may have spawned deadly frog fungus. The Independent, February 4.
[9] Weldon C, du Preez LH, Hyatt AD, Muller R and Speare R. 2004. Origin of the amphibian Chytrid fungus. Emerging Infectious Diseases 10(12):2100-2105.
[10] Weldon C, du Preez LH, Hyatt AD, Muller R and Speare R. 2004. Origin of the amphibian Chytrid fungus. Emerging Infectious Diseases 10(12):2100-2105.
[11] Weldon C, du Preez LH, Hyatt AD, Muller R and Speare R. 2004. Origin of the amphibian Chytrid fungus. Emerging Infectious Diseases 10(12):2100-2105.
[12] Weldon C, du Preez LH, Hyatt AD, Muller R and Speare R. 2004. Origin of the amphibian Chytrid fungus. Emerging Infectious Diseases 10(12):2100-2105.
[13] McCarthy M. 2006. Pregnancy test may have spawned deadly frog fungus. The Independent, February 4.
[14] Garvey, N. 2000. "Xenopus laevis" (On-line), Animal Diversity Web. Accessed January 09, 2008 at http://animaldiversity.ummz.umich.edu/site/accounts/information/Xenopus_laevis.html
[15] Weldon C, du Preez LH, Hyatt AD, Muller R and Speare R. 2004. Origin of the amphibian Chytrid fungus. Emerging Infectious Diseases 10(12):2100-2105.
[16] Weldon C, du Preez LH, Hyatt AD, Muller R and Speare R. 2004. Origin of the amphibian Chytrid fungus. Emerging Infectious Diseases 10(12):2100-2105.
[17] Weldon C, du Preez LH, Hyatt AD, Muller R and Speare R. 2004. Origin of the amphibian Chytrid fungus. Emerging Infectious Diseases 10(12):2100-2105.
[18] Gurdon JB and Hopwood N. 2000. The introduction of *Xenopus laevis* into developmental biology: of empire, pregnancy testing and ribosomal genes. International Journal of Developmental Biology 44:43-50.
[19] Gurdon JB and Hopwood N. 2000. The introduction of *Xenopus laevis* into developmental biology: of empire, pregnancy testing and ribosomal genes. International Journal of Developmental Biology 44:43-50.
[20] Garvey, N. 2000. "Xenopus laevis" (On-line), Animal Diversity Web. Accessed January 09, 2008 at http://animaldiversity.ummz.umich.edu/site/accounts/information/Xenopus_laevis.html
[21] Schultz TW and Dawson DA. 2003. Housing and husbandry of *Xenopus* for Oocyte production. Lab Animal 32(2):34-39.
[22] Gurdon JB and Hopwood N. 2000. The introduction of *Xenopus laevis* into developmental biology: of empire, pregnancy testing and ribosomal genes. International Journal of Developmental Biology 44:43-50.
[23] Home Office. 2007. Statistics of Scientific Procedures on Living Animals: Great Britain 2006. London: The Stationary Office.
[24] Schultz TW and Dawson DA. 2003. Housing and husbandry of *Xenopus* for Oocyte production. Lab Animal 32(2):34-39.
[25] Schultz TW and Dawson DA. 2003. Housing and husbandry of *Xenopus* for Oocyte production. Lab Animal 32(2):34-39.
[26] Schultz TW and Dawson DA. 2003. Housing and husbandry of *Xenopus* for Oocyte production. Lab Animal 32(2):34-39.
[27] Schultz TW and Dawson DA. 2003. Housing and husbandry of *Xenopus* for Oocyte production. Lab Animal 32(2):34-39.
[28] Garvey, N. 2000. "Xenopus laevis" (On-line), Animal Diversity Web. Accessed January 09, 2008 at http://animaldiversity.ummz.umich.edu/site/accounts/information/Xenopus_laevis.html
[29] Reed BT. 2005. Guidance on the housing and care of the African Clawed Frog (*Xenopus laevis*). Research Animals Department, RSPCA.
[30] Home Office. 2007. Statistics of Scientific Procedures on Living Animals: Great Britain 2006. London: The Stationary Office.
[31] Prescott MJ. nd. Counting the cost: welfare implications for the acquisition and transport of non-human primates for use in research and testing. RSPCA.
[32] Schlaepfer MA, Hoover C and Dodd CK. 2005. Challenges in evaluating the impact of the trade in amphibians and reptiles on wild populations. Bioscience 55(3):256-264.
[33] DeTolla LJ, Srinivas S, Whitaker BR, Andrews C, Hecker B, Kane AS and Reimschuessel R. 1995. Guidelines for the care and use of fish for research. ILAR Journal 37(4)
[34] Schlaepfer MA, Hoover C and Dodd CK. 2005. Challenges in evaluating the impact of the trade in amphibians and reptiles on wild populations. Bioscience 55(3):256-264.