

RACE

Risk Assessment of Chytridiomycosis to European amphibian biodiversity

18 of 81 European amphibian species are experiencing some degree of extinction threat and even widespread species are disappearing from large portions of their ranges.

The RACE team has found that a newly emerged infectious pathogen, *Batrachochytrium dendrobatidis*, a previously undiagnosed threat to Europe's amphibians, is infecting over a third of European amphibian species and at least 10% of our amphibians are dying in the wild from the disease, chytridiomycosis. Nevertheless the extent that this invasive infectious disease is impacting on amphibian biodiversity is almost completely unrecognised by European conservation agencies, governments and academic institutions. RACE will assess the risk that chytridiomycosis poses to European amphibians and will implement the first pan-European attempt to mitigate disease.



A core objective of RACE is to establish a mapping project that will act as a real-time repository of data from *B. dendrobatidis* surveillance programmes throughout Europe. Using field-data on the prevalence, intensity and timing of infection/mortalities, spatial-genetic information will be used to identify the timing, and frequency, of *B. dendrobatidis* introduction(s) into Europe, as well as assessing the differential virulence of genotypes. These spatial and genetic data will be used to parameterise mathematical models focused on defining the principle drivers of chytridiomycosis including identifying the importance of introduced non-native amphibian species in vectoring spread of the disease into Europe. The environmental envelope associated with chytridiomycosis will be identified and projected using current models of climate change in order to assess future risk. Where appropriate, *ex situ* captive breeding programs may be recommended for highly at-risk species, and in tandem we will be developing antifungal based therapies to treat infected populations.

The global trade in amphibians is substantial. Many of these widely-traded species are known to vector *B. dendrobatidis* and several have established themselves as invasive non-native species: principle culprits are the African clawed frog *Xenopus laevis*, the North American Bullfrog *Rana catesbeiana* and the Cane toad *Bufo marinus*.



Midwife toad and Common toad mortalities resulting from chytridiomycosis

RACE aims to train and mentor the development of new national chytridiomycosis-surveillance efforts, and collaborators involvement in RACE will be used to leverage region-specific funding from government and non-governmental organisations. In this manner RACE will develop approaches to understanding where *in situ* and captive-breeding conservation efforts are most necessary to mitigate the effects of chytridiomycosis and to preserve amphibian biodiversity; these approaches will be formalised into a European Threat Abatement Plan (ETAP). RACE's overarching goal is to identify and prioritise conservation efforts in the light of this novel and devastating panzootic disease.

Partners

Imperial College London, UK - coordinator
Zoological Society of London, UK
Experimental Ecology Centre of Moulis, FRANCE
Université de Savoie, FRANCE
Museo Nacional de Ciencias Naturales (MNCN), SPAIN
Helmholtz Center for Environmental Research – UFZ, GERMANY
Self-financed partner
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