# Epidemiological landscape of Batrachochytrium dendrobatidis and its impact on amphibian diversity at global scale

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## Abstract

Chytridiomycosis caused by the fungal pathogen Batrachochytrium dendrobatidis (Bd) is a major driver of amphibian decline worldwide. The global presence of Bd is driven by a synergy of factors, such as climate, species life history, and amphibian host susceptibility. Here, using a Bayesian data-mining approach, we modelled the epidemiological landscape of Bd to evaluate how the infection varies across several spatial, ecological, and phylogenetic scales. We compiled global information on Bd occurrence, climate, species ranges, and phylogenetic diversity to infer the potential distribution and prevalence of Bd. By calculating the degree of co-distribution between Bd and our set of environmental and biological variables (e.g., climate and species), we identified which factors could potentially be related to Bd presence and prevalence using a geographic correlation metric, epsilon (ε). We fitted five ecological models based on: i) amphibian species identity, ii) phylogenetic species variability values for a given species assemblage, iii) temperature, iv) precipitation, and v) all variables together. Our results extend the findings of previous studies by identifying the epidemiological landscape features of the presence of Bd. This ecological modelling framework allowed us to generate explicit spatial predictions for Bd prevalence at global scale and a ranked list of species with high/low probability of Bd presence. Our geographic model was able to identify areas with high potential for Bd prevalence as potential risk areas and areas with low potential Bd prevalence as potential refuges (free Bd). At the amphibian assemblage level, we found a non-relationship with amphibian phylogenetic signals, but a significantly negative correlation between observed species richness and Bd prevalence indicated a potential dilution effect at the landscape scale. Our model may identify potential susceptible species and areas at risk of Bd presence which could be used to prioritize regions for amphibian conservation efforts and assess species and assemblage risk

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