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ENVIRONMENTAL PREDATION OF *BATRACHOCHYTRIUM DENDROBATIDIS* DETERMINES INFECTION DYNAMICS

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The occurrence pattern of *Batrachochytrium dendrobatidis* (*Bd*) is not homogeneous at local and regional scales.^{1,2} Sites which seem appropriate and in vicinity to long-term infected sites, are not always colonized by *Bd*. We hypothesized that the presence of resident microorganisms that prey on *Bd* contributes to explain the observed pattern of *Bd* colonization. The aim of this study was to better understand the interactions of *Bd* with resident microbiotic communities, with a focus on the impact of microorganisms on *Bd* viability, infection probability and infection intensity in amphibian hosts.

Sites in the Pyrenean mountain range with known history of absence or presence of *Bd* were sampled. The decrease in *Bd* zoospore viability after exposure to the water samples was assessed using a method combining ethidium monoazide with real-time PCR³. This method was also used to assess the effect of cultures of several freshwater microorganisms on *Bd* viability. Based on the results of these first experiments several microorganisms were selected for *Bd* zoospore ingestion experiments and for a *Bd* infection experiment with *Discoglossus scovazzi* tadpoles in the absence and presence of microorganisms.

We were able to show a significant correlation between the abundance of microorganisms and *Bd* zoospore persistence in the Pyrenean water samples. In pure culture, some but not all microorganisms were highly efficient in killing *Bd*. These highly effective species ingested *Bd* zoospores and prevented *Bd* colonization of tadpoles. In conclusion, environmental microorganisms dictate chytrid infection dynamics.

¹ Bosch, J., Carrascal, L. M., Duran, L., Walker, S. & Fisher, M. C. Climate change and outbreaks of amphibian chytridiomycosis in a montane area of Central Spain; is there a link? *Proceedings of the Royal Society B-Biological Sciences* **274**, 253-260 (2007).

² Walker, S. F. *et al.* Factors driving pathogenicity vs. prevalence of amphibian panzootic chytridiomycosis in Iberia. *Ecology Letters* **13**, 372-382 (2010).

³ Blooi M, Martel A, Vercammen F, Pasmans F (2013) Combining ethidium monoazide treatment with real-time PCR selectively quantifies viable *Batrachochytrium dendrobatidis* cells. *Fungal Biology* **117**, 156-162.