Universität Basel

Research Project

EpiEcoEvo: The role of temperature and transmission route on parasite epidemiological, ecological and evolutionary dynamics

Third-party funded project

Project title EpiEcoEvo: The role of temperature and transmission route on parasite epidemiological, ecological and evolutionary dynamics
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Organisation / Research unit
Departement Umweltwissenschaften / Evolutionary Biology (Ebert)
Department
Departement Umweltwissenschaften
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Despite their clear importance and potential to broadly influence host populations, little is known about pathogen interactions within a broader ecosystem. This project will use the well-studied *Daphnia magna-Pasteuria ramosa* as a model host-parasite system to investigate how various factors (temperature, route of transmission and selection for host resistance) interact to influence the repeatable seasonal epidemic dynamics observed in nature in order to further understand the ecological and evolutionary drivers of epidemics. The novelty offered by this project is that it will be using a combination of field observations, mesocosm and laboratory experiments along side with mathematical modelling, aiming to quantify and measure the relative importance of factors that are often recognised to be important for epidemic dynamics. These factors are not well understood, and provide a comprehensive understanding of host-parasite-community dynamics and the ecological, evolutionary and epidemiological processes that govern them. The novelty offered by this project is that it demonstrates interactions between parasites, hosts and other species in the ecosystem, as well as the long-term impact of temperature on host-parasite communities. The combination of different approaches proposed in this project allow us to disentangle the complex relationships between hosts, parasites, the broader ecological community, and the abiotic environment and gain further insight to the rules that govern epidemic cycles and ecological feedback loops. By doing so, it allows to estimate the effect of climate change (in particular warmer summers) on the future dynamics of this host-parasite system. Understanding the drivers of infectious disease dynamics and the complex mechanisms of transmission and their relationship to the biotic and abiotic environment are more important than ever as we face the dual and linked challenges of global change and emerging infectious diseases.

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