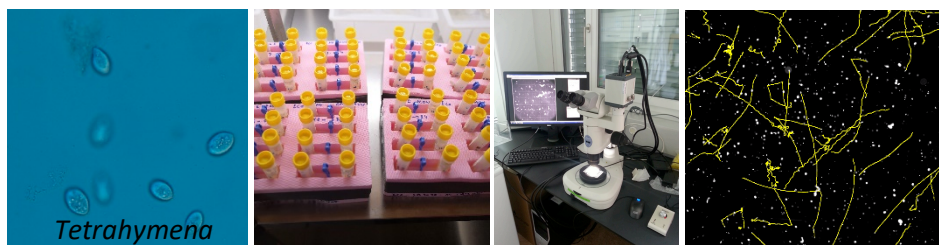*MSc Project*

Habitat matching under environmental stress: how population performance, niche construction and dispersal affect habitat-matching predictions.

We are looking for an enthusiastic MSc student who will be working on population dynamics using experiments and theory. The project involves laboratory work using microcosm experiments as well as individual-based modelling and is based at Eawag (Dübendorf).

Habitat matching theory predicts that for many species, dispersal is not a random process, but rather that individuals are able to sense the quality of their environment, allowing them to move to locations to which they are better adapted. It is hence in the best interest of the individual to leave habitats with a stressful environment, and it is generally assumed that dispersal increases with environmental stress. However, at the same time, strong environmental stress may be very costly for the individual, and prevent them from investing much energy in dispersal, potentially leading to individuals being trapped in a bad quality habitat. Furthermore, populations can also change their environment (niche construction), often at a high cost, which may hide the cue of a bad environment for other dispersers.

In this MSc project, you would use experimental microcosms to explore how a bad quality environment (pH stress) affects population performance, how populations can alter their environment (niche construction), and how these two aspects feed back in dispersal behaviour and habitat matching in metapopulations. In a second phase, you would develop a simple model to make more broad predictions on how this niche construction, the dispersal behaviour under environmental stress and population performance alter metapopulation dynamics, and how this alters expectations of habitat matching and population survival.

Requirements: Interest in ecology and metapopulation dynamics, and willingness to perform laboratory microcosm experiments with protist species using well-equipped facilities to perform automated video analysis. A good base knowledge of a programming language (Python, C++, Julia, …) is an advantage. The MSc project can start any time.

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More info: www.altermattlab.ch
We are looking forward to meeting you!