

MSc Project

Explore unknown groundwater biodiversity using environmental DNA (eDNA) metabarcoding

We are looking for an enthusiastic MSc student who will be working on eDNA metabarcoding and groundwater diversity. The project involves molecular biology work (DNA extraction and PCRs for the construction of a sequencing library), and data analyses of complex datasets, and is part of a larger research program based in the Altermatt lab at UZH/Eawag.

Background

Groundwater organisms are largely understudied, and little is known about the fauna inhabiting underground habitats. Reasons for this lack of knowledge are the difficulty to access groundwater, and the apparent scarcity of organisms that can make sampling problematic. One method to solve these issues is the use of environmental DNA (eDNA) metabarcoding. A preliminary study performed by our lab showed that eDNA could be a valuable tool for investigating groundwater biodiversity, and we were able to show different patterns according to the sites geology or land-use. However, we also revealed a high unknown diversity with a lot of DNA sequences that could not be assigned to any species present in reference databases. To confirm these first observations, 20 sites were sampled across Switzerland. With these groundwater samples, we would like to evaluate the effect of different environmental factors (e.g., land-use, geology or depth of the aquifer) on groundwater biodiversity, targeting more specifically metazoan taxa.

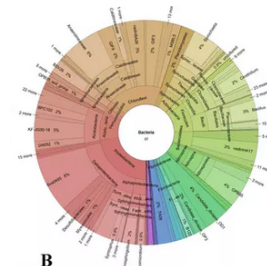
Aim

In this MSc project, you would work on groundwater eDNA samples collected all over Switzerland. You would perform all steps of the metabarcoding library preparation, from DNA extraction to sequencing. Once the sequences acquired, you would process the data using dedicated bioinformatics pipelines, and try to identify the species present in the samples. The diversity observed could then be linked to land-use, geology or past glaciation events, for example.

Requirements

Interest in environmental DNA and ecology of aquatic metazoans and interest/skills in molecular biology, interest in developing your skills in the molecular lab and in the analysis of complex datasets. Ideally some experience in molecular laboratory methods (PCR, Sequencing, etc.).

The MSc project can start any time.



Contact/Supervision:

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More info: www.altermattlab.ch and <https://grundwasserfauna.amphipod.ch>

We are looking forward to meeting you!