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# Invertebrate diversity in Icelandic freshwater springs

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## Abstract

Freshwater springs may be considered as ecotones between surface and subsurface water habitats and have the potential to house a diverse and highly specialized invertebrate fauna. Cold and thermal springs are common feature in Iceland, which makes the country a perfect place to study temperature influences on stygobiont and crenobiont invertebrates. The objective of the study is to analyze microfauna and invertebrate community composition in Icelandic freshwater springs at the surface-subsurface water interface and assess temporal, environmental, and spatial influences on them. In order to achieve this aim we compare classical species identification methods based on morphological characteristics with genetic species identification through a metabarcoding approach.

Over 35 freshwater springs have been sampled, both at the surface of each spring and within the subsurface, i.e. the groundwater. We developed a novel method for sampling the groundwater, based on a modified electric fishing gear which is inserted into the spring opening. Invertebrates were identified to as low taxonomic levels as available keys allowed. Additionally, environmental DNA (eDNA) has been extracted from water samples of the springs. We amplified the eDNA with primers targeting bacteria, protozoans, fungi, and eukaryotes, and sequenced them via Illumina MiSeq.

First results indicate that Icelandic spring habitats are highly diverse, with the groups Chironomidae, Ostracoda and Copepoda in general being the most abundant taxa. In warm springs, the thermophilic *Scatella thermarum* (Diptera, Ephydriidae) can be found in great numbers. From several sampling sites we collected the groundwater amphipod *Crangonyx islandicus*, which is endemic to Iceland.

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