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Conference Abstract

Towards a simple way to collect eDNA using a 3D-printed passive sampler

Héloïse Verdier‡, Lara Konecny§, Christophe Marquette|, Tristan Lefebure§

‡ University of Lyon - EUROFINS Hydrobiology, Lyon, France
§ University of Lyon, Lyon, France
| 3d.FAB ICBMS, Lyon, France

Corresponding author: Héloïse Verdier (heloise.verdier@univ-lyon1.fr)

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Abstract

Environmental DNA has emerged as a revolutionary approach to monitor aquatic biodiversity. The study of the DNA released by macro-organisms in their habitat offers a fast, non-invasive and sensitive approach to monitor their presence. Despite its many advantages, methodological challenges limit the widespread use of eDNA. Among them, eDNA sampling represents one of the most challenging step. Often based on the filtration of a large volume of water, this process can be long and tedious, requiring human intervention and special care, and which is not applicable to a wide range of habitats. As an alternative to filtration, passive eDNA sampling using natural substrates appears to be a promising solution. This approach uses the natural properties of some minerals (eg. silica), organisms (eg. sponges) or even communities (e.g. biofilms) to collect and preserved eDNA. Yet, such approaches are difficult to standardize and may not be applicable in many habitats. To circumvent that problem, we have designed 3D-printed samplers made of hydroxyapatite (HAp samplers), a mineral known for its high binding affinity with DNA. The shape of the samplers has been designed to facilitate their handling in laboratory and field experiments. Here we describe and test the ability of HAp samplers to recover freshwater eDNA. We show that HAp samplers recover DNA with high efficiency and are effective even on small amounts of waterlouse eDNA. However, the eDNA recovery is also highly variable across experiments. We show that by understanding the physico-chemical

interactions between DNA and the HAp sampler surface, we could improve the replicability of the process and provide a robust alternative to filtration.

Keywords

eDNA - passive sampling - 3D-printing - hydroxyapatite

Presenting author

Héloïse Verdier - University of Lyon / Eurofins Hydrobiology France

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