



Conference Abstract

# Macroinvertebrate community assessment and biomonitoring of European water bodies. Is a multimarker approach necessary?

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## Abstract

The present work, included in the European Project BIOWAT, aims to develop and validate the use of genomic tools or metabarcoding for its utilization as a routine method for river biomonitoring in different European Biogeographical regions. The project included sampling points in three biogeographic regions, Mediterranean (Spain), Continental (Germany) and Boreal (Finland). The current development of the study was designed using mock communities obtained from the three mentioned areas and different aspects were tested: DNA extraction methods, selection of informative region (16S vs COI), design and performance of primers, bioinformatic pipeline, etc...

Although the use of COI has become very popular, and its barcode database is more complete, the use of mitochondrial 16S as taxonomic marker can provide similar or even better results when accompanied by a rich local barcode database Elbrecht 2016. In this presentation, the results and conclusions obtained for the biomonitoring of nine rivers (3 for each of the biogeographic regions) using 16S as DNA marker and a local barcode

database are shown. The results of ecological status assignment using 16S marker were promising, showing a good correlation between morphological determinations and metabarcoding data for most of the studied rivers. However, in some cases, the metabarcoding data showed a jump in the ecological status class (to better or worst status), highlighting the existence of some problems related with primers (for some taxonomic groups) or missing taxa in the barcode database that still need to be solved prior the utilization of this method on a routine basis.

Additionally, for the studied Mediterranean rivers, a complementary analysis using COI as marker was made, using the universal primers developed by Elbrecht and Leese 2017. In general, this marker showed better results in the identification for some taxa, whereas other included in the mock communities were not identified showing important problems that could be related with primers (sometimes not well covering characteristic taxa present in other biogeographic regions) or the lack of a complete COI macroinvertebrate barcode databases in the Iberian Peninsula for the case of Spain Múrria 2020.

Our results show that both markers have the potential to produce a good identification of benthic macroinvertebrates, showing an acceptable correlation between morphology and metabarcoding approaches. However, none of them is able to amplify all of the present groups, so the parallel use of both markers (mitochondrial 16S and COI) in a multimarker approach could solve some of the problems, giving a more complete profile of the macroinvertebrate community. This approach has already been proposed and can lead the future of macroinvertebrate community assessment Ficetola 2020, Martins 2020.

## Keywords

metabarcoding, benthic macroinvertebrates, mitochondrial 16S, COI, biomonitoring

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