

Species gap analysis in DNA barcode reference libraries of macrobenthic fauna from transition and coastal waters along the western European Atlantic coast

Sofia Duarte^{1*}, Naiara Rodríguez-Ezpeleta², Ángel Borja³ and Filipe O. Costa¹

¹Centre of Molecular and Environmental Biology (CBMA), University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal

²AZTI Tecnalia, Marine Research Division, Txatxarramendi ugarte a z/g, 48395 Sukarrieta, Bizkaia, Spain

³AZTI Tecnalia, Marine Research Division, Herrera Kaia Portualdea z/g, 20110 Pasaia, Gipuzkoa, Spain

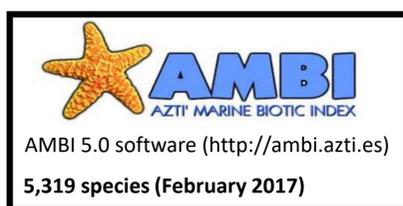
*sduarte@bio.uminho.pt

ABSTRACT

Comprehensive and reliable DNA barcode reference libraries are essential elements of any DNA-based monitoring tool. Ideally, reference libraries should cover the full sweep of species in the target ecosystem, with a balanced geographic representation of each species distribution range. It is therefore essential to assess the missing taxa and geographic breadth of the existing records. We conducted a species gap analysis for the most prominent groups of marine benthic invertebrates - Annelida, Crustacea and Mollusca - which are relevant for the biomonitoring of coastal ecosystems in the Western European (EU) Atlantic Coast.

METHODS

1) List of species



2) Taxonomic classification



3) Geographic distribution



Final checklist with 2,525 species of Annelida, Crustacea and Mollusca occurring in the Western EU Atlantic coast

4) Species-gap analysis

BOLDSYSTEMS

<http://v4.boldsystems.org>

Mitochondrial cytochrome C oxidase subunit I (COI)

RESULTS

The synonym-filtered checklist comprised 2,525 species - 1,055 Annelida, 853 Crustacea and 617 Mollusca. The % of species missing COI barcodes was above 50% for all the targeted groups (51% Crustacea, 56% Mollusca and 59% Annelida) (Fig. 1).

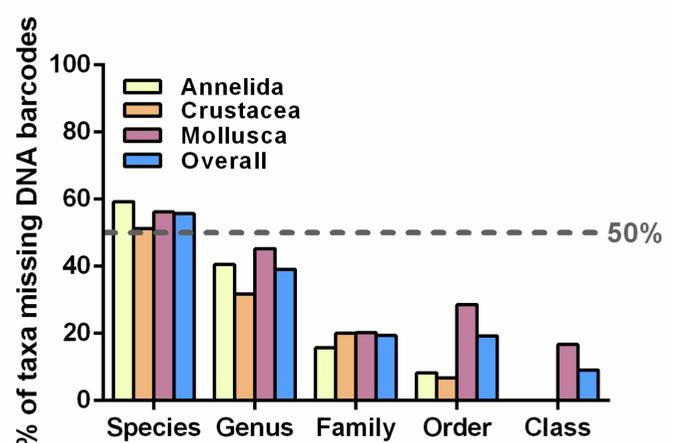


Figure 1. % of species, genera, families, orders and classes missing COI barcodes, compared to checklists of Annelida, Crustacea and Mollusca occurring in the Western EU Atlantic coast retrieved from AMBI.

All classes of Crustacea and Annelida in the checklist were represented by COI barcodes, but for Mollusca representative taxa were missing barcodes for 2 classes out of 6 (Fig. 1). Annelida and Crustacea lack representative barcodes for more than ca. 6% of the orders, and up to ca. 30% of the molluscan orders were also missing (Fig. 1). At the family level, the gap was between 15% (Annelida) and 20% (Crustacea and Mollusca) (Fig. 1).

SIGNIFICANCE

Although the targeted species belong to dominant groups occurring in Atlantic European coasts, current reference barcode libraries are still lacking a fair proportion of relevant species and higher taxonomic levels. This study indicates where to prioritize efforts to complete the reference libraries, starting from the higher taxonomic ranks down to the species level for these three large taxonomic groups, but efforts must also be extended to other groups if not yet conducted (e.g. Echinodermata, Nemertea, Bryozoa).

FUNDING SOURCES

This work was developed in the scope of a short-term scientific mission of the COST Action CA15219 - DNAqua-Net. Support from FCT to SD (SFRH/BPD/109842/2015) is also acknowledged.



Universidade do Minho



CBMA

Centro de Biologia Molecular e Ambiental
Centre of Molecular and Environmental Biology



Transforming
Science into
Business

