Morphospecies and genetic diversity of Bryozoa collected during M150 BIODIAZ in the remote Azores Archipelago

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Bryozoans from M150 BIODIAZ

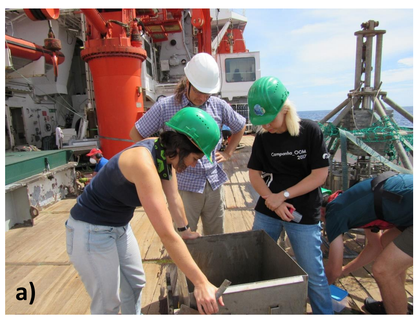


Fig. 1 – Looking for bryozoans during M150 BIODIAZ in **a)** Box Corer sample (photo by A. Narciso); **b)** *Lophelia* coral reef samples (photo by R. Cordeiro).

Bryozoa

- Aquatic, colonial, benthic, suspension-feeding invertebrates (> 6500 known extant species).
- Crucial in marine ecosystems as bioconstructors, provider of food for micropredators, and production of carbonate sediments [1].

M150 BIODIAZ (27 Aug-03 Nov 2018; [2])

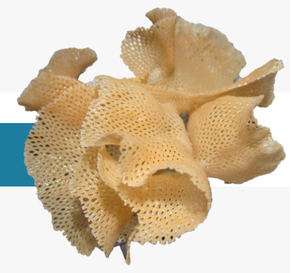
- Biological samples from 50 to 2550 m.
- Sampling gears: Agassiz-Trawl, Epibenthic Sledge, Rock Dredge, Henning- and Shipek-Grabs, Box Corer.
- Identification of 70 cheilostome + 15 cyclostome bryozoan morphospecies; several new to science.

1. Barcoding Azorean bryozoans

- Dataset comprises Azorean samples from M150, plus others retrieved from collections and recent sampling.
- Targeting the mitochondrial Cytochrome *C* Oxidase subunit I (COI).
- Phylogeographic reconstructions to unveil origin and diversity in the archipelago.
- Contribute to better understanding of the "Azorean Biogeographical Paradox" (strong affinities with Mediterranean/Eastern Atlantic taxa, despite the predominant eastward sea-surface circulation [3]).
- 116 BIODIAZ specimens barcoded so far (48 cheilostome and 9 cyclostome morphospecies).

M150 BIODIAZ goal

Conduct a comprehensive DNA barcoding survey of the Azorean marine fauna.



2. The genus Reteporella *and the family Phidoloporidae in the Azores*

Background

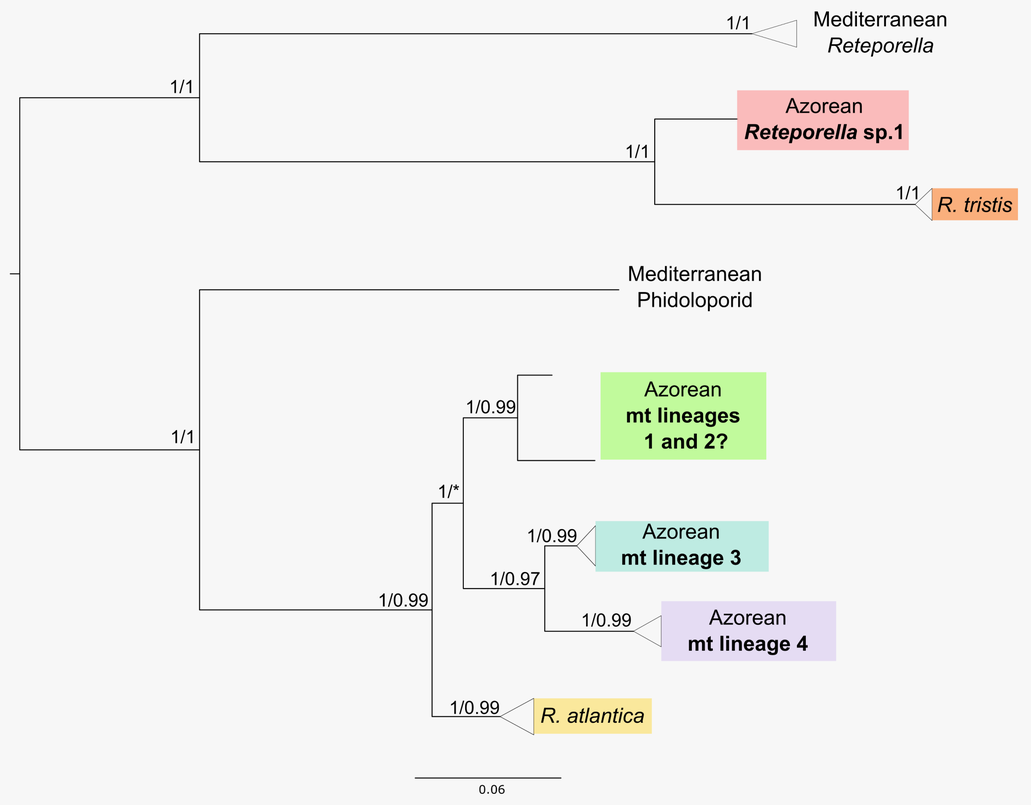
- Historical records report 10 *Reteporella* morphospecies in the archipelago.
- Morphology-based taxonomy only, no molecular analyses so far [4].
- Examination of historical collection material and recent samples suggest a distinctly greater diversity than hitherto reported.

Aim: Address the diversity, evolution, and biogeography of *Reteporella* and phidoloporids in the Azores and NE Atlantic.

Methods

- 124 Azorean samples collected from 10 to 500 m (M150 BIODIAZ and other collections, incl. scuba diving).
- Amplification of mitochondrial and nuclear markers with bryozoan-specific primers for phylogenetic reconstructions.
- Microsatellite genotyping by amplicon sequencing (SSR-GBAS) dataset [5,6] for population genetic analyses.
- Scanning electron microscopy (SEM) of selected taxa.

Results & Discussion



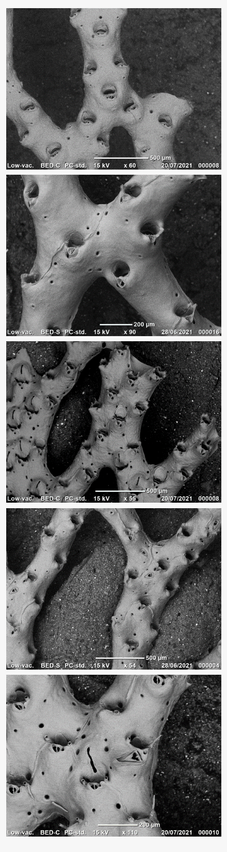


Fig. 2 – Phylogenetic reconstruction of the mitochondrial lineages of *Reteporella,* based on COI marker. Values on the nodes represent bootstrap support and posterior probability. Recognized species or putative lineages from the Azores Archipelago are identified with different colors. Top to bottom SEM images of Azorean taxa: *R. tristis,* mitochondrial lineages 2, 3, 4, and *R. atlantica. Reteporella* sp. 1 and lineage 1 not pictured.

- Only 2 out of 10 currently recognized morphospecies are represented in the molecular dataset.
- 4-5 lineages of putative new species (Fig. 2), awaiting validation based on nuclear data and morphology. Genetic divergence may suggest an early arrival of several lineages of *Reteporella* in the archipelago.
- The occurrence of two major clades (Fig. 2) might require a revision of the genus.

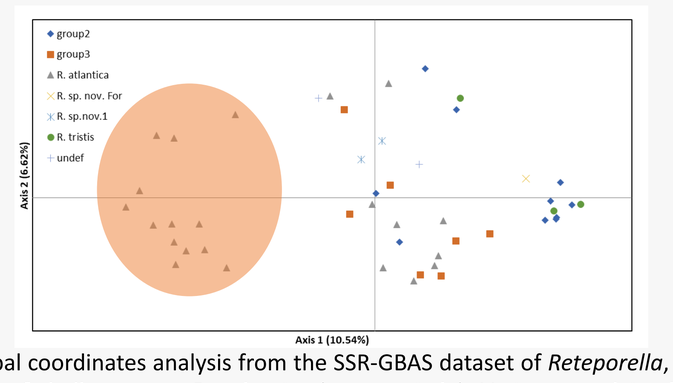


Fig. 3 – Principal coordinates analysis from the SSR-GBAS dataset of *Reteporella*, with clear differentiation of shallow-water *R. atlantica* (orange circle). Variance explained by axis 1 (10.54%) and axis 2 (6.62%). Putative species coded by colour and icon shape

- Shallow-water *R. atlantica* (< 25 m) form a well-supported and genetically differentiated lineage in the mitochondrial phylogeny (not depicted) and in the SSR-GBAS analyses (Fig. 3).
- We propose its evolution from deep-water ancestors, taking advantage of favorable niches at shallower depths.

References & Acknowledgements

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