

REPORT FROM THE BENTHIC ECOLOGY GROUP ON BOARD THE YERSIN YATCH — ANDREIA'S TEAM (MBe Lab/OOM-EBMF), 24 to 27 of August 2017, Madeira (Portugal)

Andreia Braga-Henriques, Postdoctoral researcher and deep-sea coral expert at the MBe Lab/Oceanic Observatory of Madeira - Marine Biology Station of Funchal (EBMF) & Marine and Environmental Sciences Centre (MARE); <http://www.mare-centre.pt/en/user/351>;

Elizaveta Akoulina, PhD student from the Federal State Institution «Federal Research Centre «Fundamentals of Biotechnology» of the Russian Academy of Sciences») - Summer Internship at the Marine Biological Station of Funchal

Ana Nóbrega, Graduate student from the University of Minho - Summer Internship at the Marine Biological Station of Funchal

Aims

The MBe Lab team based at the EBMF (Funchal) aims to collect baseline information on poorly known (and unknown) marine ecosystems of Madeira to contribute for a better science-based management of Macaronesian biodiversity. Three main questions underpin the biodiversity surveys planned for the Monaco Explorations campaign:

- (1) How species-rich are upper insular slopes of Madeira archipelago compared to their counterpart Macaronesian regions? And what kind of communities can be found on the summit of Desertas-Madeira ridge?
- (2) Are some marine populations experiencing distribution shifts or range expansions / contractions in response to climate change?
- (3) What are the habitat preferences of certain vulnerable benthic communities?

Study area & Methodology

To accomplish our research goals, we used a Van Veen grab to collect seafloor samples (and associated mega, macro and infaunal communities) in three study areas (Fig.1): (1) eastern slope of Ilhéu Chão (Deserta Island); (2) Desertas-Madeira Ridge; and (3) southern slope of Ponta de São Lourenço. The dredging operation was carried out on board the barge (a flat-bottomed boat) with the aid of a powered winch during high tide and it took 2 hours per transect, on average. We sampled 21 stations, ranging from 5 to 8 sampling sites per single-day transect at each study area. The transects were stratified by depth, ranging from 8 to 122 m depth.



Figure 1: Dredge stations at the Madeira Archipelago: (1) western slope of Ilhéu Chão (Deserta Island); (2) Desertas-Madeira Ridge; and (3) southern slope of Ponta de São Lourenço.

All organisms measuring more than 3 mm were sorted, counted, identified to the lowest possible taxonomic level, labelled and preserved in several chemical solutions (buffered formaldehyde, ethanol), dry or frozen at -80°C at Yersin lab facilities. One acrylic aquaria filled with fresh seawater was also used for live maintenance of selected specimens as well as to take photographs of collected organisms prior dead. Further taxonomic examination will be carried out at the EBMF facilities and by international experts from other international institutions. Voucher specimens will be preserved and deposited in the marine collection of the Funchal Natural History Museum (MMF).

Outcomes

The 4-day mission under the Monaco Explorations campaign provided exciting new knowledge for a better understanding of the diversity, ecology and distribution patterns of benthic communities on upper insular slopes of Madeira archipelago. In total, we gather a collection of 258 samples of marine invertebrates (sessile, mobile, free-living) and algae, including some taxa mentioned in the OSPAR list of threatened and/or declining species & habitats - a mechanism by which 15 Governments & the EU cooperate to protect the marine environment of the North-East Atlantic (Fig. 2).



Figure 2: Some examples of marine invertebrates and algae collected at the Madeira Archipelago: sea-urchins, crustacean, maërl, black coral, and sea pen.

For instance, we found a number of cold-water coral species (hard corals, soft and black corals) as well as Maërl, that are coralline algae of paramount importance due to their carbon sequestration value. To date, the updated inventory of the coral fauna of Madeira accounts for more than 80 species based on records from museum collections, fishermen reports and fragmented literature (A. Braga-Henriques, pers. comm. 2017). If we take into account that bottom-trawling never occurred in Madeira and this archipelago, together with the Azores and the Canaries are part of a large-scale bottom trawl closure (Council Regulation (EC) No. 1568/2005), the discoveries made during this campaign will definitely call the attention of local stakeholders, conservation managers, media and general public.

Preliminary observations also seem to indicate the presence of the kelp *Laminaria* (brown algae) in the region, which confirmed will be a new record for the marine waters of Madeira. Further surveys using underwater mobile platforms, such as remotely operated vehicles or drop-down-cameras, are needed to verify if tall kelp beds occur in this region.

Distributional data of the species collected will be integrated in regional biodiversity databases such as Specify and BIODIVMARMADEIRA. All database entries will be subject to quality checks and taxonomic validation by experts.

Moreover, the chemical properties and potential biotechnological applications of some coral and sponge herein collected will be investigated, including steroid and fatty acid content. This study will be carried out in the scope of a on-going collaboration between the MBe Lab and the BBLab – Laboratory of Biomaterials and Bioanalysis of the University of Madeira/OOM.

The 17 sediment samples collected at the different sampling sites will be used to investigate the association between seafloor characteristics (e.g. grain size) and the benthic communities. Some sub-samples were kept refrigerated for detection and further isolation of dinoflagellate resting cysts, in the scope of another collaboration with colleagues from the University of Madeira and MARE/University of Lisbon.

Acknowledgments

AB-H is financially supported by the Oceanic Observatory of Madeira project (M1420-01-0145-Feder-000001-Observatório Oceânico da Madeira-OOM).



MBe Lab
Madeira Marine Biodiversity and Conservation Ecology