BENTHIC BIODIVERSITY IN EXTREME ENVIRONMENTS: ROSS SEA (ANTARCTICA)

One of the fastest rates of regional climate change on the planet is now occurring in Antarctica. Most of Antarctic marine metazoans (meio, macro, and benthic megafauna) appear to be unable to adapt to these rapidly changing conditions. As the biodiversity of Antarctic marine metazoans is still largely unexplored, there is a real risk that many species will become extinct before they have been described. Due to the limits of classical taxonomy Estimation of the biodiversity of Antarctic marine ecosystems could be influenced by not yet unidentified cryptic species. Furthermore, there are still very few studies concerning the associations between microbes and marine metazoans in Antarctic ecosystems. As the composition of microbial communities varies according to the host phylogeny, coevolution is thought to have been an important mechanism for modulating the relationships between microbes and their hosts. Antarctic ecosystems may represent an ideal laboratory for exploring biodiversity and the functions of microbial communities associated to benthic metazoans, and their adaptation to extreme conditions, also for understanding of conservation strategies and the biotechnological potential of polar ecosystems.

GOALS

- Exploring the "hidden" diversity of meio and macrofauna and the presence of cryptic species in the Ross Sea, through a combined approach of morphological and molecular taxonomy;
- Studying diversity and functions of microbial communities associated with the most representative taxa of the macro and megafauna of Antarctic sediments, through metagenetic and metatrascritomic analysis;
- Assessing the influence of environmental factors on the taxonomic composition and gene expression of microbiota associated to the Antarctic benthic invertebrates;
- Identifying potential ecological interactions between microbiota and Antarctic invertebrates and their coevolutionary processes, by analyzing the microbiota of phylogenetically related invertebrates.

INSTRUMENTS AND METHODS

In the framework of this research a combined approach based on microscopy (optics and electronics) and molecular analysis (genetics, metagenetics and metagenomics) and metatrascriptomics is used. Instrumental techniques of optical microscopy, electronic, epifluorescence, bioinformatics and statistical tools, PCR thermal cyclers and Biorad real time PCR, sequencer on high throughput platforms, spectrophotometers and spectrofluorimeters are used.

SUBJECTS

Ecology, Animal ecology, Zoology, Molecular ecology, Genetics

WORKING GROUP

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COLLABORATIONS

The research group has both national (Marche Polytechnic University, Anton Dohrn Zoological Station of Naples, CNR-ISMAR, Arsenal of Venice) and international (AZTI-Tecnalia, Marine Research Division, Spain; Aquatic Research & Consulting, Massachusetts USA) collaborations.