

sciforum-102316: Distinct communities of Bacteria and unicellular eukaryotes in the different water masses of the Cretan Passage water column (Eastern Mediterranean Sea)

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Introduction

The Eastern Mediterranean Sea (EMS) presents unique environmental traits and complex oceanic processes that affect microbial communities and influence their role in maintaining vital ecosystem functions and services. Despite the heavy anthropogenic stress and predictions of climate change impact, microbial ecology studies in the EMS are limited.

Methods

Two sampling expeditions were conducted in offshore areas south of Crete in August 2019 and February 2020. A total of 14 seawater samples were collected across depths up to 1000 m, from all three EMS water masses. Those underwent DNA extraction and a high-throughput sequencing of their 16S and 18S rRNA genes for bacterial and unicellular eukaryotic analysis, respectively. Moreover, differences between interspecies microbial associations were also evaluated between the top and bottom water masses.

Results

CTD profiling indicated that winter mixing affected the upper 300 m of the water column, with uniform deep waters across sampling seasons. Bacterial and unicellular eukaryotes varied significantly by water mass of origin, with seasonal species fluctuations recorded in the surface layer. Moreover, eukaryotic diversity was higher in all water masses, especially in the intermediate layer, during winter. Photosynthetic taxa were more abundant in winter, while heterotrophs and grazers dominated the deepest waters. Finally, microbial associations were five times higher in the surface network, indicating numerous ecological niches.

Conclusions

To our knowledge, this is the first study that has applied molecular biology tools to examine the ecology and networking of both planktic prokaryotes and unicellular eukaryotes in the EMS. Distinct taxa were found across the three water layers of the EMS, showing differences in microbial diversity and structure, which, however, require further interseasonal samplings to be statistically verified. Overall, these findings underline the need for further exploration and understanding of microbial ecology in one of the most understudied marine habitats.



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