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TITLE: Biodiversity and distribution of meiofauna in the Gioia, Petrace and Dohrn Canyons (Tyrrhenian Sea)

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ABSTRACT:

Habitat heterogeneity is a major structuring agent of benthic assemblages promoting high turnover in species composition and ultimately contributing to overall higher diversity. Submarine canyons, a pervasive feature of the continental margins worldwide, increase habitat heterogeneity at multiple spatial scales. In the present study, we test the hypothesis that different topographic structures or/and food sources controlling the abundance, biomass and biodiversity (using meiofauna and nematodes as a model study) in canyon systems. To do so, we compared different topographic structures: canyon edge, thalweg and axis, and the upper shelf and open slope in the Gulf of Gioia (Gioia and Petrace Canyons) and in the Gulf of Naples (Dohrn Canyon) (Tyrrhenian Sea) at different depths. Our results suggest that meiofaunal abundance and biomass are generally higher in the canyon thalwegs than in the canyon edge or adjacent open slopes at regional scale. This pattern is not always confirmed for biodiversity and when thalwegs are compared to different topographic structures within the Gioia Canyon system. In our study, the role of food quantity and quality is preeminent to explain the spatial distribution of meiofaunal variables among different topographic structures at 200-m while habitat heterogeneity become relevant at 500-m and within the Dohrn Canyon. In Gioia and Petrace Canyons we observed a high food availability is associated to specific topographic structures (thalwegs) that influenced the meiofaunal abundance and diversity distribution and nematode diversity and species composition. Each topographic structure shows a high number of exclusive species that contributes to a high species turnover and high overall biodiversity in all canyon systems. Changes in nematode composition determine also differences in the functional diversity (trophic guilds composition) and life strategy of the nematode assemblages. Our findings reveal that the presence of different topographic structures influences the spatial distribution of food quality and quantity that determine the presence of exclusive taxa and species enhancing both local and regional diversity.

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