

# Impact of temperature increase on meiofaunal communities and the buffer effect of canopy-forming macroalgae on vermetid reefs

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Through a field colonization experiment, we studied the effects of simulated climate change on the vermetid reef meiofaunal community and how the presence of a macroalgal canopy could mitigate thermal stress. To do this, we placed 30 geopolymer concrete discs with a topographic design along a vermetid reef, on the north-western coast of Sicily, and manipulated temperatures using white (Ta) and black (T+) PVC frames placed around the discs. Each treatment (Ta and T+) and control (CTRL; no frame) was replicated in the presence (+C) or absence (-C) of the macroalgal canopy (*Cystoseira sp.*). After 35 days, the discs were collected, vegetation coverage was assessed through photo analysis, and meiofauna associated with each disc and the macroalgal canopy were extracted and identified. Temperature measurements revealed that T+ discs experienced higher temperatures during low-tide periods compared to Ta and CTRL discs, but the substrate under the macroalgal canopy had lower temperature fluctuations. We found significantly lower meiofaunal abundances on T+ discs, only in the absence of the macroalgal canopy, with significant changes in community composition among treatments. The meiofaunal colonization, regardless of the T treatment, was significantly lower on discs under the macroalgal canopy, on which we found lower vegetation coverage, but high abundances were found on the macroalgal canopy itself. Our results suggest that increased temperatures due to climate change could negatively impact meiofaunal communities on vermetid reefs, but the presence of a macroalgal canopy may provide additional substrate for colonization and offer some protection from thermal stress.