

# The influence of ocean warming on the vermetid early colonization and on their interactions with the canopy macroalgal assemblage.

E.C. La Marca<sup>1,2</sup>, F. Ape<sup>2,3\*</sup>, A. Rinaldi<sup>1,2</sup>, M. Martinez<sup>1</sup>, M. Spoto<sup>1,4</sup>, S. Mirto<sup>1,2</sup>, V. Montalto<sup>1,2</sup>

<sup>1</sup> Institute of Anthropic Impacts and Sustainability in Marine Environment, National Research Council (IAS-CNR), Lungomare Cristoforo Colombo n. 4521 (ex complex Roosevelt), Loc. Addaura, 90149 - Palermo, Italy

<sup>2</sup> National Biodiversity Future Centre (NBFC), Piazza Marina 61, 90133 Palermo, Italy

<sup>3</sup> Institute of Marine Sciences, National Research Council (ISMAR-CNR), Via Gobetti 101, 40129 - Bologna, Italy

<sup>4</sup> Department of Biological, Geological, and Environmental Sciences (BiGeA), University of Bologna, Piazza di Porta San Donato, 1, 40126 Bologna, Italy

\*Presenting author email: [francesca.ape@cnr.it](mailto:francesca.ape@cnr.it)

The absorption by the ocean of the heat generated by greenhouse gases in the atmosphere is known as ocean warming (OW) and it mainly concerns the ocean's top layer, impacting the marine biota, the relationships among organisms and threatening the persistence of whole habitats and ecosystems. Here we investigated the response to OW of a Mediterranean ecosystem engineer at the settlement stage and if the facilitative interactions with a canopy macroalgal assemblage occurring at this stage may vary under OW conditions. A manipulative experiment was conducted for 35 days along a vermetid reef on the north-western coast of Sicily, employing geopolymer settlement discs and manipulating their temperature by using black and white PVC frames. Bare discs have been used as control substrates and the experiment has been repeated in the presence and absence of the macroalgal canopy. We found that the discs with the black frames reached temperature peaks 2.9°C higher than the other two disc types and the macroalgal canopy reduced these differences up to 0.29°C. Moreover, the settlement success of vermetids was significantly lower on the discs with the black frames and on the controls. These differences were attenuated by the canopy presence on the discs, although differences among treatments persisted. These results suggest that, although the macroalgal canopy may buffer the temperatures at the substrates, its presence is not decisive to favour the vermetid settlement under OW conditions, which consistently limit the early vermetid colonization and may threaten the persistence of vermetid bioconstructions in the Mediterranean.