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Meiofauna as a tool within the framework of European Directives: setting the basis for its use in Greece

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The need to assess and monitor the environmental status of marine ecosystems is growing worldwide due to the cumulative impacts anthropogenic activities have on the seas. For the effective management of the marine environment and its resources, European Directives (*e.g.* Water Framework Directive (WFD), Marine Strategy Framework Directive, Habitat Directive) require an ecosystem-based approach that covers all aspects of marine ecosystems and rests on advanced scientific information and on integrated, multidisciplinary, collaborative approaches. Despite the holistic approach and the vast number of indicators used in environmental assessment, meiofauna have not yet been integrated in monitoring initiatives for a number of reasons, mainly due to gaps in their taxonomy, lack of experts, and the more sophisticated laboratory procedures required for their analysis. However, this will need to change, as the ubiquitous and abundant meiofauna may offer the development of assessment indicators and monitoring tools for a wide range of marine habitats and ecosystems, from where the commonly used macrofauna are scarce, such as the deep sea. Having this in mind, we explore the dynamics of meiofaunal communities from a subset of stations of the Greek WFD coastal monitoring network that covers a wide range of environments and anthropogenic impacts in Greece. Our focus is on the possible use of meiobenthic features (*e.g.* different hierarchical levels and aspects of diversity) and selected key taxa/populations (e.g. kinorhynha, copepod nauplii) as indicators of environmental status that may apply to a range of habitats and types of impacts. First insights on abundance, diversity, population dynamics (*e.g.* sex and developmental stage ratios), their relationship with levels of disturbance, and an attempt to calibrate known indices for use with meiofaunal data will be presented.

Keywords: Environmental assessment, monitoring, anthropogenic impacts, Mediterranean Sea

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Effects of temperature range changes and interspecific competition to population development and behaviour of marine nematodes

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Global average temperature, frequency of extremes and temperature fluctuations are expected to rise in the future, with many implications for organisms. The amplitudes of temperature variation and the species ability to tolerate thermal stress are crucial for species fitness and survival in rapid changing environments like the

intertidal. Sympatric populations of closely related species often compete for mutual resources. Small differences in their life-histories or responses to environmental variation can differentiate their niche breadth and support coexistence. The present experiments examine population fitness and behavioural responses of a free-living nematode, *Halomonhystera disjnucta*, under different temperature regimes in the presence or absence of a competitor. Both stressors (temperature and competition) affected species life-history traits and population development in different ways; *H. disjuncta* showed higher fitness under a daily fluctuating regime and lower under increased constant temperature. The presence of a closely related competitor had a negative effect on population fitness and taxis behaviour of the species. Interaction of competition and temperature stress was apparent and can influence the response of individual species, the stronger effects of competition being under the highest temperature. Thermal stress affects not only species fitness but also species interactions, which in turn will affect species coexistence.

Keywords: Population fitness, interspecific interactions, competition, taxis, thermal stress

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Unraveling fatty acid bioconversion in harpacticoid copepods facing a changing environment

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Global climate change is threatening coastal marine ecosystems by causing changes in oceanographic conditions such as temperature and pCO_2. These shifts affect the physiological performance and productivity of organisms in marine food webs and thus the overall functioning of the ecosystem. A better understanding of the physiological response and adaptive capacity of coastal marine organisms is critical to assess their fate in a rapidly changing ocean. Harpacticoid copepods are a dominant component of estuarine benthic meiofauna, efficient grazers on diatoms, and a major food source for juvenile fish. They are known to contain high levels of polyunsaturated fatty acids (PUFAs), which are essential dietary constituents for fish and humans as the latter can't produce these omega-3 and omega-6 fatty acids themselves. Harpacticoid copepods on the other hand are able to bioconvert PUFAs that originate from primary producers. This capacity might be an essential strategy for harpacticoid copepods to respond quickly to environmental changes, since climate change reduces the amount of PUFAs within primary producers, and thus, their availability for higher tropic levels.Our research aims to uncover the genetic pathways of PUFA bioconversion in harpacticoid copepods and how this mechanism responds to a combination of a reduced PUFA diet and realistic ocean warming. Our species of interest is *Platychelipus littoralis*, a harpacticoid copepod occurring abundantly in the Westerscheldt estuary, the Netherlands. We generated RNA-Seq data and fatty acid profiles from *P. littoralis* subjected to different diet and temperature treatments. Even when fed a PUFA-deficient diet (i.e. the chlorophyte *Dunaliella tertiolecta*), *P. littoralis* maintained similar PUFA levels compared with a control treatment. By means of a