Final Remarks of Special Issue “Biodiversity of Macroalgae”

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Macroalgae are a diverse and pervasive element of rocky shores [1] but a few species can also be found on soft bottoms or living in the water column. Macroalgae are responsible for the high primary production of coastal areas, providing food resources in situ for many grazing species of gastropods, peracarid crustaceans, sea urchins or fishes. Moreover, a significant part of their primary production is exported as particulate organic matter to many different coastal habitats (e.g., beach wrack) and the deep sea, and in these habitats it can be consumed by detritivores, decomposed or buried in the sediment [2,3]. Additionally, living macroalgae form sea forests or macroalgal beds that provide habitat and refuge for many other organisms, thereby enhancing local biodiversity [4,5].

Despite the relevant ecological role of macroalgae, there are still many areas of the world where our knowledge about macroalgal diversity has important gaps. For example, in this volume, Islam et al. [6] reported for the first time the presence of the genus *Chondria* for the marine flora of Bangladesh. Moreover, Mantri et al. [7] provided in this volume a comprehensive review of the current knowledge of macroalgae in India, as well as significant inputs about their economic potential.

Long-term studies are always needed because, even in those areas where the diversity of macroalgae is well known, studies, as presented in this issue by Titlyanov et al. [8], are very important to detect changes in biodiversity related to global change. Unfortunately, global change is not the only threat that endangers macroalgal diversity. The study in this issue by Garcia et al. [9] showed how biodiversity of canopy-forming macroalgae has been reduced on urban shores in comparison with areas with lower population density. Moreover, the only canopy species that seems to tolerate the multiple stressors associated with urbanisation is the non-indigenous species *Sargassum muticum* (Yendo) Fensholt. Biological invasions are another main threat for biodiversity and the arrival of a non-indigenous species can have impacts of different magnitudes on native assemblages. Therefore, an early detection of the arrival of non-indigenous species is very important. In this way, the study by Petrocelli et al. [10] reported in this issue the first molecular evidence of the presence of *Caulacanthus okamurae* Yamada (Rhodophyta) in the Mediterranean Sea.

Macroalgal beds or forests may serve as habitat for a wide range of organisms, including both animals and other macroalgae. Therefore, it is very important to explore the diversity associated with these habitats, particularly at wide spatial scales, as did the paper by Franco et al. [11] in this issue. These studies provide relevant information in order to evaluate potential changes in the associated diversity in macroalgal forests in a future scenario of global change.

This Special Issue shows the current worldwide interest in the field of macroalgal biodiversity and it will be a very useful tool to support and inspire future studies about this exciting topic. However, there are still important knowledge gaps to be explored. In this Special Issue only studies focused on macroalgae from marine rocky shores were presented, while studies about macroalgal biodiversity in freshwater habitats and marine soft bottoms and plankton were not submitted. Moreover, there are many cryptogenic species and poorly studied genera of macroalgae that need comprehensive revision to clarify their

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taxonomic and systematic position. Finally, studies focused on changes in functional or taxonomical biodiversity due to anthropogenic disturbances were unfortunately not included in this Special Issue, despite their relevance in biodiversity conservation. We are currently living through a biodiversity crisis, with many species becoming extinct before we can notice their existence and they are formally described in science. In this biodiversity loss scenario, it is critical to increase our knowledge about diverse taxa such as macroalgae, and thus more initiatives like this Special Issue will be needed in the future.

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