Editorial

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The 15th International Marine and Freshwater Mycology Symposium (IMFMS)

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The 15th International Marine and Freshwater Mycology Symposium (IMFMS 2018) was organized by the Third Institute of Oceanography, Ministry of Natural Resources, China at Xiamen Hotel, Xiamen, China from 26th to 28th September 2018. The main themes of this conference included marine fungal ecology, fungal communities in extreme marine habitats and marine fungal natural products. A total of nine keynote lectures was given by world renowned aquatic mycologists: Dr. Gaëtan Burgaud, Prof. Lei Cai, Dr. Brandon Hassett, Prof. Gareth Jones, Prof. Anake Kijjoa, Dr. Yuriko Nagano, Prof. Bin-Gui Wang, Prof. Guang-Yi Wang and Prof. Zong-Hua Wang. Oral presentations were categorized into five scientific sessions: “Diversity of aquatic fungi”, “Taxonomy and phylogeny of aquatic fungi”, “Community study of marine fungi”, “Fungi of the extreme marine habitats” and “Natural substances of marine fungi”. Two prizes were contested by students/young post-doctoral researchers for their presentations. The Kohlmeier prize for the best oral presentation was awarded to Yong-Zhong Lu for his talk entitled “A taxonomic reassessment of helicosporous hyphomycetes from freshwater habitats”. The Gareth Jones prize for the best poster was awarded to Chih-Chiao He for her poster entitled “Diversity of fungi associated with the red alga *Pterocladia capillacea* (S.G. Gmelin) Santelices et Hommersand through isolation and metagenomics”. The conference ended with a round-table discussion on topics related to the venue for the next IMFMS and this special issue in *Botanica Marina* for publishing selected contributions presented during the conference.

A search in the Web of Science database (as in November 2019) with the keywords “marine fungi” for the papers published in the past year revealed a dominance of papers related to secondary metabolites/natural products/enzymes of fungi isolated from the sea while the rest concerned diversity of fungi in/on various habitats/hosts including fungi of deep-sea environments, planktonic fungi, fungi associated with corals, sponges and seagrasses, and intertidal mangrove fungi. The latter topics

were all covered in the conference and some of the contributions are published in this special issue.

Until recently, with improvement of sampling techniques and development of new diagnostic methods, our knowledge on deep-sea fungal communities has dramatically increased. Ascomycota and Basidiomycota, either filamentous fungi or yeasts, were the dominant taxonomic groups in sediments of the deep-sea (Pang et al. 2019) while Chytridiomycota (Le Calvez et al. 2009) and Microsporidia (Sapir et al. 2014) were also reported. In this issue, Tang et al. report the fungal diversity of deep-sea sediments in Mid-Oceanic Ridge areas of the East Pacific and the South Indian Oceans using both culture and molecular techniques. Luo et al. describe the cultured fungi from sediment samples collected at the Chukchi Sea of the Arctic Ocean and their ability to grow at 4°C was tested. Jones et al. describe *Fusarium sedimenticola* M.M. Wang, F. Liu et L. Cai, a novel ascomycetous fungus isolated from deep-sea sediments of the southwest Indian Ocean, together with five other novel marine fungal taxa discovered on driftwood, mangrove wood and palm collected in India, Thailand, UK and Sweden. Tibell et al. have further provided an annotated list of filamentous fungi documented in coastal areas of Sweden.

By studying the ecology of fungi in seawater and sea ice of the Arctic Ocean, Hassett et al. (2019) concluded that the role of fungi in the marine environment is as important as that in freshwater ecosystems. Hassett et al. in this issue further elaborate on this topic by analyzing published sequences allowing a summary of the diversity of cultured and observed marine planktonic fungi from across the world.

The five papers published in this special issue cover nicely the topics that are currently conducted by marine mycologists and consistent with a recent review on marine fungi highlighting the different questions and challenges regarding the diversity and function of fungi in the marine environment (Amend et al. 2019).

We see in the last few years an increasing wave of interest on the study of fungi in the marine environment. While the effort is important, still little is known on the role of

fungi in the sea and whether some of the fungi recovered (especially of some common terrestrial genera, e.g. *Aspergillus* P. Micheli ex Haller, *Cladosporium* Link, *Penicillium* Link, *Trichoderma* Pers., etc.) are indeed active in the sea, i.e. if there is an ecological boundary between terrestrial and marine ecosystems for fungi. Using metatranscriptomics, Pachiadaki et al. (2016) but also Edgcomb et al. (2016) and Orsi et al. (2018) reported the presence, activity and functions of fungi in the deep biosphere and in Deep Hypersaline Anoxic Basins (DHABs). The abundance and diversity of marine fungi (predominantly yeasts) were found to benefit from ocean acidification in microcosm experiments using North Sea water (Krause et al. 2013a,b). Ocean warming was demonstrated to increase outbreaks of the coralline fungal disease (Williams et al. 2014). Knowing that fungal species have been shown to represent emerging pathogens, e.g. *Aspergillus sydowii* (Bainier et Sartory) Thom et Church on gorgonian corals (Soler-Hurtado et al. 2016), the effect of climate change on marine fungal communities is an area requiring further studies.

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