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The photophysiological performance of benthic microalgae towards different environmental variables in the southern temperate wetlands

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Microphytobenthos (MPB) or benthic microalgal unicellular microorganisms live in the surface and subsurface layers of the sediment in the coastal ecosystems. Despite of its microscopic size, it contributes to huge proportion of the world's primary productivity. MPB is the major food source for filter feeders and benthic invertebrates, which in turn is the primary food source for the larger animals. The biofilm mats formed by MPBs also alter the biostabilisation and sediment structure of the ecosystem. However, coastal area is a highly dynamic zone, and it is subjected to distinct changes, both physically and biogeochemically. Hence, MPB has to be well-adapted in order to survive in this hydrodynamic environment, particularly Tasmania, where the weather fluctuates dramatically seasonally. This study focuses on the photo-physiological performance of MPB towards different environmental stressors fortnightly throughout a year in two Tasmanian wetlands. The optimum photochemical efficiency (F_v/F_M) and maximum relative electron transport rate ($rETR_{max}$) show that MPB has better photosynthetic performance at both sampling sites during the winter than that of summer, when the temperature and irradiance are lower. This could mainly be due to the combined effects of extremely high temperature and irradiance that have exceeded the maximum threshold MPB could withstand, which in turn stresses the MPB. The initial slope, Alpha (α) and light saturation parameter (E_k) of $rETR$ vs Photosynthetically Active Radiation (PAR) curve are showing that MPB starts photosynthesising and reaches the maximum value quickly. This further supports the photosynthetic results that were observed during the summer.

Biography

ShiHong Lee is currently undertaking his final year PhD candidature at Institute for Marine and Antarctic Studies at University of Tasmania. He has been working as a research assistant with Professor Andrew McMinn, a leading scientist of sea ice ecosystem studies in Institute for Marine and Antarctic Studies. He published a paper after finishing his Bachelor of Marine Science (Honours) at University of Tasmania, entitled "Physiological response of temperate microphytobenthos to freezing temperatures".

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