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Phytoplankton community changes in Kuantan Port (Malaysia), with emphasis on the paralytic-shellfish toxin-producing dinoflagellate Alexandrium tamiyavanichii (Article)

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Abstract

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The Kuantan Port (Pahang, Malaysia, South China Sea) is a multi-cargo port located on the east coast of Peninsular Malaysia. The port has served as an important seaway to major ports in Asia-Pacific regions. In November 2013 and August 2014, two incidents of paralytic shellfish poisoning (PSP) have been consecutively reported in the Port. In this study, a field investigation was undertaken in the Port from April 2015 to May 2016 as an effort to continuously monitor the occurrence of HAB species following the PSP episodes in the year 2013–2014.Phytoplankton and hydrographic samples were collected for quantitative and qualitative assessments in a monthly interval. To precisely quantify the PSP-toxins producing species Alexandrium tamiyavanichii, a real-time quantitative PCR (qPCR) assay was applied to detect the motile cells and cysts. The results revealed the presence of A. tamiyavanichii but with extremely low cell abundances (<0.1% of the total abundances). The species was found co-existed with other Alexandrium species. Alexandrium abundance was associated with salinity and nitrogen to phosphorus ratios but negatively correlated with PO_4-P and NH_4-N as revealed in the canonical correspondence analysis. Low cell abundances of diarrhetic-shellfish toxins producing dinoflagellates (Dinophysis spp.) and fish-killing species (Prorocentrum sigmoides, Akashiwo sanguinea, Noctiluca scintillans, Chattonella spp.) were also encountered in the port. The results of this study would provide useful baseline information for the assessment and management of ballast water in Malaysian ports and its territorial waters. © 2019 Elsevier B.V.

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