

HARMFUL MICROALGAE ASSEMBLAGE IN THE AQUACULTURE AREA OF AMAN ISLAND, NORTHERN STRAIT OF MALACCA

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ABSTRACT A field survey was carried out in Aman Island, the northern Strait of Malacca, to investigate the occurrence of harmful microalgae. The area is known for marine finfish cage-culture and blood cockle farming. Plankton samples were collected fortnightly between July 2011 and September 2013. A total of 58 phytoplankton genera were recorded; 37 belong to the diatoms, and 21 genera were dinoflagellates. Harmful microalgae species were identified microscopically, of which nine are bloom-forming species that responsible for fish kills. These included *Akashiwo sanguinea*, *Chaetoceros affinis*, *Cha. curvisetus*, *Cha. laevis*, *Ceratium furca*, *C. fusus*, *Cochlodinium* sp., *Karlodinium australe* and *Noctiluca scintillans*. Three *Alexandrium* species were identified from the samples, i.e. *A. leei*, *A. affine* and *Alexandrium* sp. Pulau Aman; some species in the genus have been known to associate with Paralytic Shellfish Poisoning (PSP). Diarrhetic Shellfish Poisoning (DSP)-toxin producers were also encountered in the water samples, viz. *Dinophysis acuminata*, *D. caudata*, *Dinophysis* sp. and *Prorocentrum micans*. The harmful diatom, *Pseudo-nitzschia* spp. that associated with Amnesic Shellfish Poisoning (ASP), was commonly found in the water samples. Cell abundance of each harmful microalga was enumerated. The results showed that cell densities of harmful microalgae were relatively low throughout the sampling period. The microalgae community was dominated by *Ceratium furca* in May 2012, with cell densities exceeding 70,000 cells L⁻¹; no fish kill event was reported during the time. Even though no fish kill or shellfish poisoning was reported in the area, the presence of harmful microalgae albeit at low cell densities, may pose a potential threat to human health and seafood biosecurity. Therefore, regular phytoplankton monitoring is necessary to safeguard human health and seafood industries in the country.

(Keywords: Aman Island; blood cockle; fish-cage; Harmful Algal Bloom; Malaysia; Strait of Malacca)

INTRODUCTION

Aman Island, an island in the northern part of the Straits of Malacca, is a very important marine finfish (grouper, snapper and sea bass) aquaculture area and blood cockle farming. In 2012, it produced 1.8×10^3 tonnes of marine fish valued RM 18.26 million (Department of Fisheries Malaysia). To date, there has been very limited baseline data on the occurrence of harmful algal bloom (HAB) in the waters surrounding Aman Island. Red discoloration of the coastal waters caused by the dinoflagellate, *Ceratium furca* (Ehrenberg) Claparède et Lachmann was reported in 2007 [1]. However, their effect on fisheries was not investigated. The presence of several PSP toxin producers, *Alexandrium* species in the waters has also been reported [2]. Yet, the abundance and distribution of these species and other potential harmful algae are still under-studied.

About 300 phytoplankton species are considered harmful, and causes negative impacts to the

economy, environment and public health [3]. Harmful microalgae are normally found in low cell numbers. However, under favorable environmental conditions, it may form extensive blooms that are capable to cause devastating effects on the environments and humans [4].

Microalgal species that are considered harmful are divided into two main groups: the toxin producers, which are capable to produce biotoxins that contaminating seafood or killing fishes; and the high-biomass plankton, which cause anoxia in the surrounding waters and subsequently cause mortalities of marine life. Several HAB species have the characteristics of both groups. Blooms of harmful algae posed high impacts on fishery industries by causing mass mortality in culture fishes, especially in fish cages due to oxygen depletion or fish gill damage [5]. HABs are also accompanied by shellfish toxicity events due to bioaccumulation of the biotoxin in the filter-feeding