

## Harmful Algal Blooms in Malaysian Waters (Ledakan Alga Berbahaya di Perairan Malaysia)

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### ABSTRACT

*Harmful algal blooms (HABs) events have been increasingly reported in the country, not only of the frequency and severity of the events, but also involved more species than previously known. In this paper, a decadal review of HABs events in Malaysia is summarized. Bloom events caused by harmful dinoflagellate species including the shellfish poisoning events were highlighted. Paralytic shellfish poisoning (PSP) is no longer restricted to Sabah coasts and Pyrodinium bahamense. Bloom of Alexandrium minutum was reported for the first time in the Peninsula with six persons hospitalized including one casualty after consuming the contaminated benthic clams. Algal blooms that are associated with incidence of massive fish kills have been reported from both east and west coasts of the Peninsula in conjunction to finfish mariculture losses. The culprits of these bloom events have been identified as the dinoflagellates, Cochlodinium polykrikoides, Neoceratium furca, Prorocentrum minimum, Noctiluca scintillans and a raphidophyte, Chatonella ovata. In this paper, some of these HABs species were characterized morphologically and genetically, including their toxicity. Therefore, with the increase of coastal utilization and eutrophication, prevention, management and mitigation strategies, such as site selection, moving pens, clay spraying should be adopted to minimize the impact of these natural events.*

*Keywords: Diatom; dinoflagellates; harmful algal blooms; Malaysia; mitigation*

### ABSTRAK

*Laporan kejadian ledakan alga berbahaya (HAB) yang kian meningkat bukan sahaja daripada segi kekerapan kejadian, tetapi juga melibatkan lebih banyak spesies yang tidak diketahui sebelumnya. Dalam kertas ini, pelbagai kejadian HAB pada dekad yang lepas telah dirumuskan. Kejadian ledakan akibat dinoflagelat yang berbahaya dan keracunan kerang-kerangan juga dititik beratkan. Keracunan kerang-kerangan yang melumpuhkan (PSP) tidak lagi tertumpu hanya pada perairan Sabah dan Pyrodinium bahamense. Ledakan Alexandrium minutum telah dilaporkan untuk kali pertama di perairan Semenanjung dan menyebabkan enam mangsa keracunan akibat termakan loka tercemar. Satu kes kematian direkodkan. Ledakan alga juga menyebabkan kejadian kematian ikan secara besar-besaran dan kerugian marikultur di perairan timur dan barat Semenanjung. Organisma penyebab kejadian tersebut telah dikenal pasti sebagai dinoflagelat; Cochlodinium polykrikoides, Prorocentrum minimum dan Noctiluca scintillans serta satu raphidofit; Chatonella ovata. Sebahagian daripada spesies HAB tersebut telah dikenal pasti secara morfologi, genetik dan toksisiti. Oleh itu, dengan peningkatan penggunaan perairan pantai dan proses eutrofikasi, strategi pencegahan, pengurusan dan mitigasi seperti pemilihan lokasi, pemindahan sangkar, penyemburan tanah liat harus diguna pakai dalam usaha meminimumkan impak kejadian semula jadi ini.*

*Kata kunci: Diatom; dinoflagelat; ledakan alga berbahaya; Malaysia; mitigasi*

### INTRODUCTION

Harmful algal bloom (HAB) is a natural phenomenon due to increase in density of microalgal species in the marine and freshwater environments. This incidence is not only causing adverse effects to the natural surrounding environments, but accumulation of algal-origin toxins in filter-feeding shellfish has caused human food poisoning. Massive bloom of microalgae also caused fish kills in the natural or finfishes mariculture by excretion of bioactive compounds or due to hypoxia/anoxia in the surrounding environments.

HABs events have been increasingly reported in the country over the last decade. This may be the cause of increasing utilization of coastal inhabitants, maricultures

and other human coastal activities that led to eutrophication of the coastal waters. Industrialization, urbanization and commercial agricultural plantation also led to nutrient runoff and nutrient enrichment in the freshwater and marine coastal systems that subsequently promote algal-bloom.

### HABS EVENT IN THE DECADE

For the past decade, several major HABs events have been reported in the country (Figure 1 and Table 1). In 2001, an incident of shellfish intoxication was reported following a massive bloom of a marine dinoflagellate in a semi-enclosed lagoon of Tumpat, the north-eastern of Peninsular Malaysia (Figure 1(a)). The event was widely