

Harmful Algal Species in the Tebrau Strait: An SEM Observation of the Dinoflagellate Assemblage

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ABSTRACT

Harmful algal bloom (HAB) is a natural phenomenon due to the increase of algal cell density in the water column that subsequently causes deleterious effects to natural environments as well as mankind. HABs in the country mainly occurred when a particular group of dinoflagellate cells proliferate in the eutrophied semi-enclosed coastal water body. In this study, dinoflagellate species composition in the Tebrau Strait was determined by scanning electron microscope (SEM). Plankton samples were collected by a 20-micron plankton net haul at several locations of the strait. Samples were undergone fixation, serial dehydration and followed by critical point drying. Samples were then observed under a JEOL analytical SEM. Total of 11 dinoflagellate species were identified, with 7 species known to be associated with HABs events. The occurrence of a fish-killing unarmoured dinoflagellate, *Karlodinium veneficum* was reported for the first time from Malaysian waters. The presence of this and other potentially harmful dinoflagellate species in the strait should be taken seriously by the respective authorities in future expansion of aquaculture industry in the strait.

Keywords: Dinoflagellates, Tebrau Strait, SEM, morphology, *Karlodinium veneficum*.

INTRODUCTION

Malaysia is a country surrounded by waters with a total coastline of 4,675 km, and Johore is one of the states in the Peninsula that has the longest coastline. Aquaculture industry in the state is rapidly growing particularly in the Strait of Tebrau. Other than cockles and shrimp farming, culture of marine fishes in floating cages is one of the common aquaculture activities in the strait.

Harmful algal blooms (HABs) are not uncommon to the country, with increasing frequency and distribution over the last decade. New records of HAB species and expansion of places affected with these events have been reported (Lim *et al.*, 2004; Usup *et al.*, 2002). Parallel elevation of both aquaculture activities and HAB events in the country has triggered the issues of seafood safety as well as environmental deteriorations due to aquacultural activities. The current knowledge on the occurrence of HAB species in the country particularly in the Strait of Tebrau is far lacking. The only reported HAB outbreak in the strait was the blooms of *Prorocentrum minimum* in 2002 (Usup *et al.*, 2004). This information will be of crucial importance for future assessment and mitigation purposes.

In the present study, we aim to document the dinoflagellate assemblages as a species inventory in the Straits of Tebrau, particularly of those that are harmful. Plankton samples were collected from two selected sites and the dinoflagellate species were examined by using scanning electron microscope (SEM). This study was carried out at locations with intensive aquaculture activities on-going. By using this species inventory of harmful dinoflagellates we hope to provide further information to respective country authorities in monitoring and mitigating HABs as well as selection of aquaculture sites.