

BENTHIC HARMFUL DINOFLAGELLATE ASSEMBLAGES IN A FRINGING REEF OF SAMPADI ISLAND, SARAWAK, MALAYSIA

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ABSTRACT

A study on the presence and relative abundance of benthic harmful algal bloom (BHAB) forming dinoflagellate species was carried out in the coral reefs of Sampadi Island, Sarawak, Malaysia. The study involved deployment of fiberglass screens as an artificial substrate for the benthic epiphytic microalgae. The screens were placed for 24 h above the seafloor along a 100 m transect at 10 m intervals. BHAB species attached to the screens were identified and cell abundances were enumerated under a light microscope. The BHAB community at the study site was dominated by *Prorocentrum* spp. and *Coolia* spp. Other BHAB species collected included *Amphidinium* spp., *Gambierdiscus* spp. and *Ostreopsis* spp. Total cell densities collected on the screens ranged from 5 to 100 cells per 100 cm². The two BHAB groups of primary concern, *Gambierdiscus* spp. and *Ostreopsis* spp. were detected at relatively low abundances of 0.6–4.2% and 1.8–16% respectively. This study has shown that potentially toxic BHAB species were present in the coral reef and the artificial substrate approach could provide a convenient quantitative method for the collection of clean samples for identification and enumeration purposes.

Keywords: *Amphidinium*, benthic harmful algal bloom, *Coolia*, *Gambierdiscus*, *Ostreopsis*, Sampadi Island.

INTRODUCTION

Benthic dinoflagellates are one of the important components in benthic microalgae assemblages of tropical and subtropical coastal environments. The ecology of five major genera of benthic dinoflagellates, viz. *Amphidinium*, *Coolia*, *Gambierdiscus*, *Ostreopsis* and *Prorocentrum* has been well-studied (Tindall and Morton, 1998; Tosteson et al., 1998; Vila et al., 2001). These species are found in benthic ecosystems associated with substrates such as seaweeds, coral rubbles and sand particles. Species in some genera are known to be producers of biotoxins related to ciguatera food poisoning (CFP), diarrhetic shellfish poisoning (DSP), palytoxin (PITX) seafood poisoning and clupeotoxism (Shimizu et al., 1982; Holmes et al., 1995; Lawrence et al., 2000; Holmes and

Teo, 2002; Durando et al., 2007; Aligizaki et al., 2011). Increase in incidences of these poisonings (e.g., Ciminiello et al., 2006; Barroso Garcia et al. 2011; Tubaro et al., 2011) and toxin discovery (Ciminiello et al., 2008, 2010) in the recent years have led to concomitant increase in studies of harmful benthic microalgae (BHAB) worldwide.

In Malaysian waters, long-term data on BHAB occurrence and its relationship to environmental conditions is lacking. Even though occurrences of BHAB species have been reported in some selected reefs and islands (Leaw et al., 2001, 2010, 2011; Mohammad-Noor et al., 2009), the data obtained were limited in spatial and temporal coverage. The lack of such basic information makes it difficult to gauge the potential significance of BHAB related