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RESEARCH NOTE

First report of the benthic dinoflagellate, *Gambierdiscus belizeanus* (Gonyaulacales: Dinophyceae) for the east coast of Sabah, Malaysian Borneo

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SUMMARY

Species of the genus *Gambierdiscus* Adachi & Fukuyo, in particular *G. toxicus* Adachi & Fukuyo are known producers of neurotoxins associated with ciguatera fish poisoning (CFP). In this study live samples were collected from seaweed beds of the east coast of Sabah, Malaysian Borneo and a strain of *Gambierdiscus* was isolated and cultured. Examination of the thecal fine morphology was undertaken using light, epifluorescence, and scanning electron microscopy. Observed morphological features and their associated morphometric information enabled identification to *Gambierdiscus belizeanus* Faust. This represents the first report for the occurrence of *G. belizeanus* in the Asia Pacific region.

Key words: Asia Pacific, benthic dinoflagellate, *Gambierdiscus belizeanus*, Malaysia, morphology.

Gambierdiscus Adachi & Fukuyo is the only genus of Gonyaulacales confirmed to be responsible for ciguatera fish poisoning (CFP) (Adachi & Fukuyo 1979). Historically CFP has not been associated with Southeast Asia (Sadovy 1997). In Malaysia, only one poisoning case owing to the consumption of red snapper, *Lutjanus bohar*, has been reported (Sabah Fisheries Department). No CFP has ever been reported in Peninsular Malaysia. However, since the 1980s CFP cases in Hong Kong have risen owing to an increase in the reef live fish trade (Sadovy 1997). Studies attempting to understand the triggers of CFP have been undertaken (e.g. Lewis 1986; Kohler & Kohler 1992; Chateau-Degat *et al*. 2005; Litaker *et al*. 2009) but none to date has produced compelling evidence of the ability to predict occurrences of CFP. Under the international Hazard Analysis and Critical Control Points (HACCP), ciguatera toxins are one of the items that must be tested for in fish intended for export.

Several *Gambierdiscus* morphospecies have been detected in samplings in Malaysian waters although, as yet, none have been tested for toxin production. Sampling was carried out in Kota Kinabalu (Sabah), Redang Island (Kelantan), Port Dickson (Negeri Sembilan), and Langkawi Island (Kedah) (Fig. 1). Seaweed, coral fragments, seagrasses, and sand were collected and placed, underwater, into separate plastic bags. Samples were brought back to the laboratory without preservation. In the laboratory, samples were shaken vigorously to dislodge attached dinoflagellate cells. The suspension was then passed through a 120 μm and 20 μm mesh sieves. Material retained by the 20 μm mesh sieve was resuspended in sterile filtered seawater for cell isolation. Cells were isolated singly for culture using a very finely-drawn Pasteur pipette. A clonal culture, named GdSA03, was established in ES-DK medium and maintained at 26°C under a 14:10 h LD (light : dark) photoperiod. Initial identification was done under a light microscope (LM) and an epifluorescence microscope. For LM, cells were stained with Lugol's solution. For epifluorescent observation, cells were stained with 1% Calcofluor White stock solution (Fluka) and viewed under an Olympus IX51 epifluorescence microscope (Olympus, Melville, USA) with a UV filter (Lim *et al*. 2005). Morphological observation was

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