



Original Research Article

Taxonomic assignment of the benthic toxigenic dinoflagellate *Gambierdiscus* sp. type 6 as *Gambierdiscus balechii* (Dinophyceae), including its distribution and ciguatoxicity



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ABSTRACT

Recent molecular phylogenetic studies of *Gambierdiscus* species flagged several new species and genotypes, thus leading to revitalizing its systematics. The inter-relationships of clades revealed by the primary sequence information of nuclear ribosomal genes (rDNA), however, can sometimes be equivocal, and therefore, in this study, the taxonomic status of a ribotype, *Gambierdiscus* sp. type 6, was evaluated using specimens collected from the original locality, Marakei Island, Republic of Kiribati; and specimens found in Rawa Island, Peninsular Malaysia, were further used for comparison. Morphologically, the ribotype cells resembled *G. scabrosus*, *G. belizeanus*, *G. balechii*, *G. cheloniae* and *G. lapillus* in thecal ornamentation, where the thecal surfaces are reticulate-foveated, but differed from *G. scabrosus* by its hatchet-shaped Plate 2', and *G. belizeanus* by the asymmetrical Plate 3'. To identify the phylogenetic relationship of this ribotype, a large dataset of the large subunit (LSU) and small subunit (SSU) rDNAs were compiled, and performed comprehensive analyses, using Bayesian-inference, maximum-parsimony, and maximum-likelihood, for the latter two incorporating the sequence-structure information of the SSU rDNA. Both the LSU and SSU rDNA phylogenetic trees displayed an identical topology and supported the hypothesis that the relationship between *Gambierdiscus* sp. type 6 and *G. balechii* was monophyletic. As a result, the taxonomic status of *Gambierdiscus* sp. type 6 was revised, and assigned as *Gambierdiscus balechii*. Toxicity analysis using neuroblastoma N2A assay confirmed that the Central Pacific strains were toxic, ranging from 1.1 to 19.9 fg P-CTX-1 eq cell⁻¹, but no toxicity was detected in a Western Pacific strain. This suggested that the species might be one of the species contributing to the high incidence rate of ciguatera fish poisoning in Marakei Island.

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