
# Report of a Fish Kill Due to a Dinoflagellate Bloom in Perak and Penang, Malaysia

ROZIAWATI MOHD RAZALI[1,*], NURIN IZZATI MUSTAPA[1], WAN NORHANA MD. NOORDIN[1], MASAZURAH A. RAHIM[1], KIENG SOON HII[2], PO TEEN LIM[2], CHUI PIN LEAW[2], HARMAN MUHD-FAROUK[1], KU KASSIM KU YAACOB[1]

[1]Fisheries Research Institute, Department of Fisheries Malaysia, 11960 Batu Maung, Pulau Pinang, Malaysia
[2]Bachok Marine Research Station, Institute of Ocean and Earth Science, University of Malaya, 16310 Bachok, Kelantan, Malaysia

*E-mail: roziawati@dof.gov.my | Received: 03/01/2022; Accepted: 13/09/2022


E-ISSN: 2073-3720
https://doi.org/10.33997/j.afs.2022.35.3.004

## Abstract

A fish kill incident was reported at the marine fish culture areas north of Perak and south of Penang, Malaysia, on 26 May 2020. An investigation was carried out at 10 stations in Kerian, Perak and Seberang Perai Selatan, Penang. Seawater samples were collected to identify microalgae species and determination of dissolved inorganic nutrients. The physical parameters of water such as salinity, pH, temperature and dissolved oxygen were measured *in situ* while the dissolved inorganic nutrients were analysed spectrophotometrically. The dominant microalga was identified as *Margalefidinium fulvescens* (Iwataki, Kawami & Matsuoka) Gómez, Richlen & Anderson, 2017, based on the morphological and molecular characterisation of the large subunit ribosomal gene. Long rounded and ellipsoidal cells, 30-43 µm in length, appeared in chains of single, two, four or eight cells. The sulcus was slightly narrow surrounding the cell about one turn, but the cingulum was rather deep, encircling the cell approximately twice, and the chloroplasts were brownish, granular and scattered peripherally. The highest *M. fulvescens* cell counts were recorded at $6.22 \times 10^5$ cells $L^{-1}$ and $4.61 \times 10^5$ cells $L^{-1}$ in Kerian, Perak and Seberang Perai Selatan, Penang, respectively. The physical parameters of the seawater from the affected sites were within the Malaysian Marine Water Quality Standard (MMWQS) for aquaculture. However, slightly higher levels of nitrate, phosphate and ammonia were noted at several stations. Although the exact cause of the bloom was undecided, it could be due to nutrient discharge along the coasts, which also concurred with the transition phase of the northeast to the southwest monsoon.

**Keywords:** LSU rDNA, fish mortality, fish kill, microalgae bloom, *Margalefidinium fulvescens*

## Introduction

Perak and Penang are two main marine fish producing states in Peninsular Malaysia. Intensive fish farming areas are situated in Kerian and Larut Matang districts in Perak (Figs. 1, 2). Meanwhile, for Penang, the Seberang Perai Selatan district is a significant culture area (Figs. 1, 2). In 2019, aquaculture production from Perak and Penang contributed about 6,948.16 and 21,329.19 tonnes of marine fish, respectively, with an approximate value of MYR687.58 million (USD154.40 million) (Department of Fisheries, 2019). This constituted about 76.4 % of the total cultured marine fish in Malaysia. The main species cultured are barramundi (*Lates calcarifer* (Bloch, 1790)), brown-marbled grouper (*Epinephelus fuscoguttatus* (Forsskål, 1775)), snubnose pompano (*Trachinotus blochii* (Lacépède, 1801)), giant trevally (*Caranx ignobilis* (Forsskål, 1775)) and mangrove red snappers (*Lutjanus argentimaculatus* (Forsskål, 1775)).

Unfortunately, harmful algal blooms (HABs) often affect these two states. HABs are commonly associated with public health impact, commercial fisheries, and tourism, leading to economic losses (Shumway, 1990; Hallegraeff, 2003; Basti et al., 2019). Several types of microalgae are involved in HAB events. Some HAB species include *Alexandrium* spp., *Dinophysis* spp., *Pyrodinium bahamense var compressum* (Böhm) Steidinger, Tester & Taylor, 1980,