

Fine Structure of the Diatoms *Thalassiosira* and *Coscinodiscus* (Bacillariophyceae): Light and Electron Microscopy Observation

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ABSTRACT

A study was carried out to examine the morphology of diatom species in Sarawak, Malaysia. Plankton sampling was conducted using 20 µm mesh-size plankton net at two estuaries in Kuching, Sarawak, Malaysia; Santubong and Samariang Batu. Plankton samples were brought back to the laboratory and treated with acid wash before detailed observation under the light and electron microscopes. All samples were identified to species level based on the transmission and scanning electron microscope (TEM and SEM). A total of twenty seven genera with forty species of diatom have been found in the two estuaries. Species from the genus *Thalassiosira* and *Coscinodiscus* were commonly found in the samples during the study period. Species was identified based on the cell dimension, valve striation and process pattern. A total of five species of *Thalassiosira* viz. *T. pacifica*, *T. gravida*, *T. angulata*, *T. diporocyclus*, and *T. tenera* and three species of *Coscinodiscus* viz. *C. radiatus*, *C. marginatus*, and *C. asteromphalus* were found and fine morphological features of the species were documented and discussed. This study represents one of the few taxonomic studies of diatoms using advanced electron microscopy in the region.

Keywords: Diatoms, fine morphology, TEM, SEM, *Thalassiosira*, *Coscinodiscus*

INTRODUCTION

Phytoplankton is group of photosynthetic microalgae that served as a primary producer and important component in the food web. Diatoms represent one of the most important members of the group and are characterized by having a siliceous cell wall (frustule). They contribute up to 45% of the total primary production in the ocean (Mann, 1999), and 20-25% globally (Werner, 1977). It is estimated that 20% to 25% of all organic carbon fixation is carried out by diatom (Round *et al.*, 1990). The members of this class are mostly unicellular, with some member formed chain of cells and colonial aggregations. Diatoms belong to phylum Bacillariophyceae with approximately 100,000 known species (Round *et al.*, 1990).

Diatom is identified based on the structure of their cell wall features. The diatom frustules consisted of two valves, with an epitheca (larger upper valve), and a hypotheca (smaller lower valve) structure. The shape, size, number, and arrangement of chloroplasts and the presence or absence of pyrenoids may also be used for identification on generic and species specific level. With an increasing amount of information on details of the siliceous diatom cell wall, especially obtained with electron microscopy, a need for a generally accepted terminology became evident in the early 1970s (Mann, 1978).

In Malaysian coastal waters, the studies of phytoplankton were very limited, particularly in diatom species. A study of diatom identification in Malaysia coastal area was conducted by Shamsuddin (1990) since 1979 with more than 100 species had been identified. However, most of the diatom observed in the study were identified to the genus level due to lack of electron microscopy observation. In this study, diatom samples collected by plankton haul in two estuarine waters in Sarawak were examined under scanning and transmission electron microscope. Forty two species from twenty seven genera were identified. We reported in this paper eight species from