Pakistan Journal of Marine Sciences, Vol. 23(1&2), 09-12, 2014.

SCANNING ELECTRON MICROSCOPIC EVIDENCE OF *COCCONEIS CONVEXA* GIFFEN FROM NORTH ARABIAN SEA, PAKISTAN

Asma Tabassum, Hina S. Baig and Aliya Rehman
Department of Botany, University of Karachi, Karachi-Pakistan (AT, AR);
National Institute of Oceanography, Karachi-Pakistan (HSB).
email: centricdiatomist@gmail.com

ABSTRACT: Marine epiphytic diatom *Cocconeis convexa* Giffen was observed from a sample collected just after an incidence of Tasman Spirit Oil Spill in 2003. This species was isolated from only one sample collected from station # 2 along the sandy beach of Clifton, Karachi. Morphological characters described in this study were observed from Scanning Electron Microscopic (SEM) image, this is the first report from North Arabian Sea Pakistan.

KEYWORDS: North Arabian Sea, electron microscopic evidence, *Cocconeis convexa*.

INTRODUCTION

Cocconeis Ehrenberg is widely distributed marine diatom genus characterised by heterovalvate in structure with at least 280 described species (Suzuki *et al*., 2012). It's one valve is regarded as raphe sternum whereas the other one with rapheless sternum (Round *et al*., 1990). It is evidenced that many of the recorded species of this genus are found in epilithic, epiphytic and epizoic condition (Riaux-Gobin, 1991; Al-Kandari *et al.*, 2009; Suzuki *et al*., 2012; Car *et al*., 2012). A great many studies conducted on

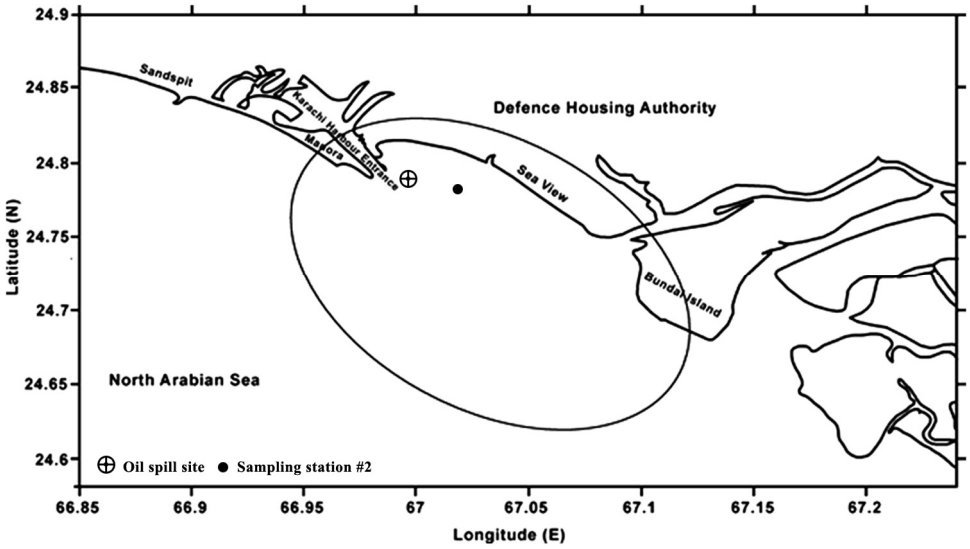

Fig. 1 Map showing site of oil spill and station from which *Cocconeis convexa* recorded.

morphology and taxonomy of species of *Cocconeis* from different oceanic environments (Holmes, 1985; Round *et al*., 1990; Stefano *et al*., 2000; Gari & Corigliano, 2007; Jahn *et al.*, 2009; Suzuki *et al*., 2012). *C. convexa* was first established by Giffen in 1967 and then studies carried on its identification and description by other workers from different parts of the world (Suzuki *et al*., 2001; Navarro and Lobban, 2009). However there is no report of description of this species from northern Arabian Sea bordering Pakistan. Present paper is the first detailed scanning electron microscopic morphological illustration of *C. convexa* from the area of study.

MATERIALS & METHODS

Present research was conducted on phytoplankton samples collected just after Tasman Spirit Oil Spill from the affected area of Sea view Clifton Karachi (Fig. 1). Materials and methods including protocol of Scanning Electron Microscopy have already been discussed in earlier reports (Tabassum *et al*., 2010; Tabassum *et al*., 2011). The species was isolated from the sampling station # 2 on 19th November 2003 with Latitude 24°80'816N and Longitude 66°99'215E from the area of study.

Observations & Results:

Cocconeis convexa Giffen (Fig. 2)

Suzuki *et al.*, 2001, p. 60, Figs1-8 (p. 61); Navarro and Lobban, 2009, p. 140, Figs 73 & 74 (p. 141).

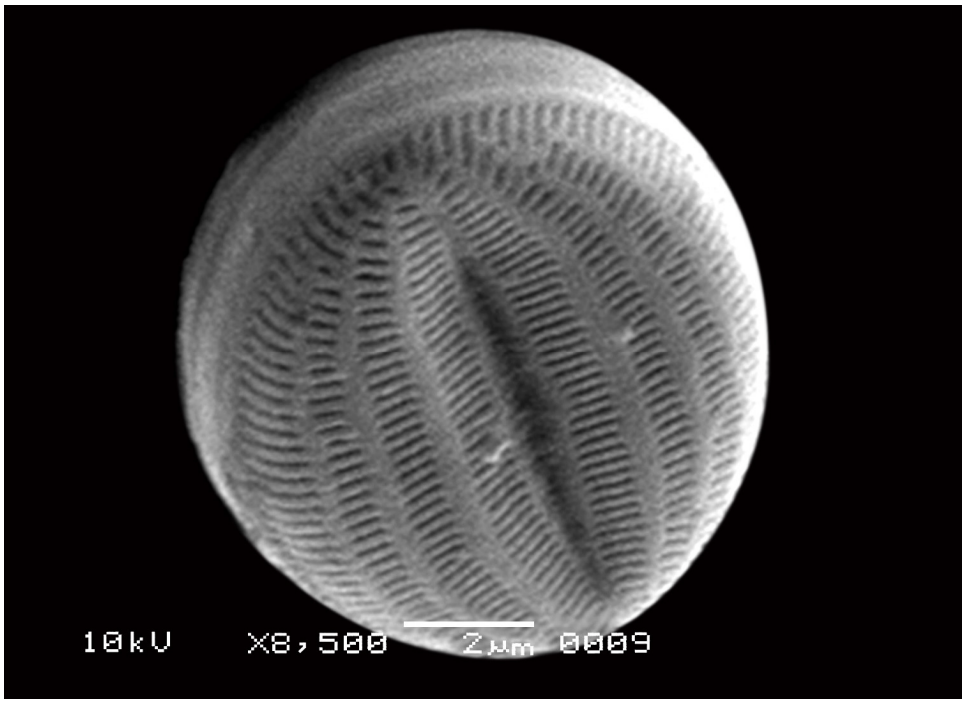

Fig. 2. *Cocconeis convexa*: Scanning Electron Micrograph: Outer view of rapheless valve.

Cells usually solitary, sessile, valves heterovalvate, elliptical to rhombic, rapheless valve convex, thicker, striations alveolate with parallel hyaline spaces, raphe valve concave, bears straight slit.

Morphometric measurement: 2 µm - 10 µm

General Distribution:

Suzuki *et al.*, 2001: Isuzu Island Tokyo; Navarro and Lobban, 2009: Western Pacific Islands of Yap & Guam.

DISCUSSION

Diatoms are considered as the biological indicator of water quality (Noga *et al*., 2013) and species of genus *Cocconeis* have been recorded from the environmental stress condition of water bodies (Sabater, 2000). In present study *C. convexa* was described very first time from northern Arabian Sea bordering Pakistan under environmentally stress condition as result of an oil spill. It was observed that the species was rarely present during the study and isolated only from one station. Moreover observation shows raphe and rapheless valves with striations on its surface having hyaline rays.

REFERENCES

Al-Kandari M., F.Y. Al-Yamani and K. Al-Rifaie. 2009. Marine Phytoplankton Atlas of Kuwait's Waters. Kuwait Institute for Scientific Research, Lucky Printing Press, Kuwait. pp. 1-350.

Car A., A. Witkowski, S. Dobosz, D.D. Burfeind, A. Meinesz, N. Jasprica, M. Ruppel, K.J. Kurzydłowski and T. Płociński, 2012. Description of a new marine diatom, *Cocconeis caulerpacola* sp. nov. (Bacillariophyceae), epiphytic on invasive *Caulerpa* species, *Euro. J. Phycol.* 47: 4, 433-448.

Gari, E.N. and M.C. Corigliano. 2007. Spatial and temporal variations of *Cocconeis lacentula* var. *euglypta* (Ehrenb.) 1854 Grunow, 1884 in drift and periphyton. *Braz. J. Biol*. 67(4): 587-95.

Holmes, R.W., 1985. The morphology of diatoms epizoic on cetaceans and their transfer from Cocconeis to two new genera, Bennettella and Epipellis , *Brit. Phycol. J.*, 20(1): 43-57.

Jahn R., W.H. Kusber and O. Romero. 2009. *Cocconeis pediculus* EHRENBERG and *C. placentula* EHRENBERG var. *placentula* (Bacillariophyta): Typification and taxonomy. *Fottea* 9(2): 275–288.

Navarro, J.N. and C.S. Lobban. 2009. Freshwater and marine diatoms from the western pacific islands of Yap and Guam, with notes on some diatoms in damselfish territories, *Diat. Res.* 24:1, 123-157, DOI: 10.1080/0269249X.2009.9705787.

Noga, T., J. Stenek-Tarkowska, N. Kochman, L. Peszek, A. Pajaczek, and K. Wozniak. 2013. Application of diatoms to assess the quality of the waters of the Baryczka stream, left-side tributary of the river San. *J. Ecol. Eng.* 14(3): 8-23.

Rriaux-Gobin, C. 1991. The diatom genus Cocconeis from an intertidal mud flat of North Brittany: source and diversity. *Can. J. Bot*. 69: 597-601.

Round, F.E., R.M. Crawford and D.G. Mann. 1990. *The Diatoms, Biology & Morphology of the Genera*. Cambridge University Press, Cambridge, pp. 1-747.

Sabater, S. 2000. Diatom communities as indicators of environmental stress in the Guadiamar River, S-W. Spain, following a major mine tailings spill. *J. Appl. Phycol.* 12: 113–124.

Stefano M.D., D. Marino and L. Mazzella, 2000. Marine taxa of Cocconeis on leaves of Posidonia oceanica, including a new species and two new varieties, *Euro. J. Phycol.* 35: 3, 225-242, DOI: 10.1080/09670260010001735831.

Suzuki H., T. Nagumo and J. Tanaka. 2001. Morphology of the marine epiphytic diatom *Cocconeis convexa* Giffen (Bacillariophyceae). *Diatom* 17: 59-68.

Suzuki H., T. Nagumo and J. Tanaka. 2012. *Cocconeischuralis*: a new marine diatom (Bacillariophyta, Cocconeidaceae) from Japan. *Phytotaxa.* 68: 36-44.

Tabassum, A., S.H. Baig, and R. Aliya, 2010. First Scanning Electron Microscopic report of *Chaetoceros pseudocurvisetus* (Bacillariophyceae) isolated from North Arabian Sea during Tasman Spirit Oil Spill. *Pak. J. Mar. Sci.* 19(1&2): 1-5.

Tabassum, A., S.H. Baig, and R. Aliya, 2011. *Bellerochea malleus* (Brightwell) Van Heurk: A new record from North Arabian Sea after Tasman Spirit Oil Spill. *Pak. J. Mar. Sci.* 20(1&2): 87-91.