

**FIRST DETAILED TAXONOMIC REPORT OF *COSCINODISCUS JONESIANUS*
FROM NORTH ARABIAN SEA AFTER TASMAN SPIRIT OIL SPILL**

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ABSTRACT: This study concerns first detailed taxonomic record and distribution of *Coscinodiscus jonesianus* from North Arabian Sea bordering Pakistan after an incident of Tasman Spirit Oil Spill. The study comprised of 5 phytoplankton samples collected immediate after Tasman Spirit Oil Spill (TSOS) and 16 samples after 1.5 year of spill in Bioremedial Project (BP). Scanning Electron Microscopic illustrations along with morphometric comparisons have also been presented.

KEYWORDS: North Arabian Sea, taxonomic record, *Coscinodiscus jonesianus*, Tasman Spirit Oil Spill.

INTRODUCTION

Since Ehrenberg in 1839 erected the genus *Coscinodiscus*, it has been reported by various workers from different coastal zones of the world (Holmes, 1967; Ferrario and Sar, 1994; Lee, 1989; Lee *et al.*, 1992; Fernandes *et al.*, 2001; Sar *et al.*, 2008; Sar *et al.*, 2010; Gomez and Souissi, 2010). More than 14 species of this genus have been described from Pakistani coastal waters (Moazzam 1973; Sahmeel and Tanaka, 1992; Tabassum and Saifullah, 2012).

Coscinodiscus jonesianus was examined in detail by Greville (1962), Ostenfeld (1915), Prasad and Livingston (1996) and Sar *et al.*, 2008. Earlier it was only reported by Shameel and Tanaka (1992) but its detailed taxonomic description was not documented by any researcher from Pakistani coastal zone. Present study is the illustration of first detailed taxonomic record of *Coscinodiscus jonesianus* from North Arabian Sea bordering Pakistan with comparison of their morphometric measurements with reports of other workers.

MATERIALS & METHODS

Area of study and materials and methods (Tabassum *et al.* 2010; Tabassum *et al.* 2011) including protocol of Scanning Electron Microscopy (Tabassum *et al.* 2010) have already been described in earlier reports.

Observations and results:

***Coscinodiscus jonesianus* (Greville) Ostenfeld (Fig. 1a, b and c)**

Lee, 1989, p. 70-72, Figs. 1-19 (p. 73-75); Hasle and Syvertsen, 1997, pp. 107, Plate 17 (p. 102); Sar *et al.*, 2008, p. 404 & 405, Figs. 4-9 & 10-14. Date of sampling: 19 November 2003.

Morphometric data: Apical axis: 113 μ m

Valves discoid, solitary, rounded with slightly convex face, drum shaped in girdle

view, large central areolae present in radial rows with distinct marginal ring of processes, cribra present with centric arrangements, chromatophores numerous with discoid plastids.

It was commonly found at station 2 (24° 80'816 N: 66° 99'215 E) of Tasman Spirit Oil Spill but was not recorded from stations of Bio remedial Project. *C. jonesianus* was reported by several authors (e.g., Lee, 1989: Korean and Mexican Coastal Waters; Shameel and Tanaka, 1992: North Arabian Sea; Hasle and Syvertsen, 1997; Caraus, 2002: Romania; Hallfors, 2004: Baltic Sea; Liu, 2008: Chinese Seas; Sar *et al.*, 2008.

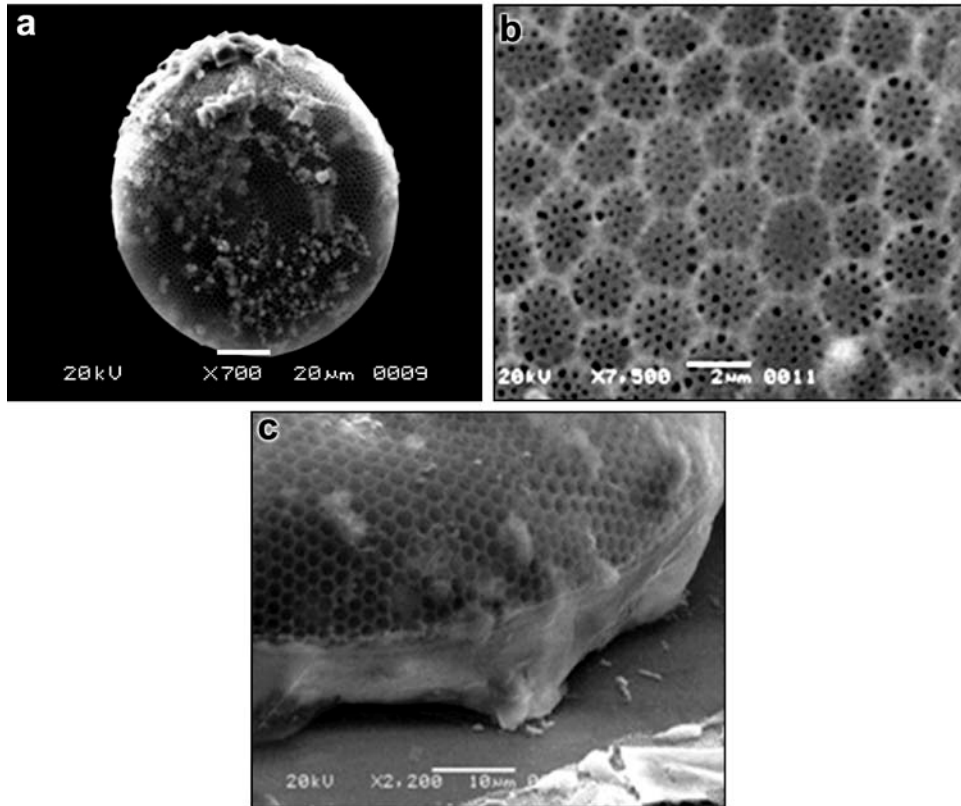


Fig. 1. a, *Coscinodiscus jonesianus*. Scanning Electron Microscopic valve view of a cell showing areolae. Scale bar = 20 μm; b, *Coscinodiscus jonesianus*. Scanning Electron Microscopic view of areolae in 2 μm; c, *Coscinodiscus jonesianus*. Scanning Electron Microscopic structure in girdle. Scale bar = 10 μm.

Table 1: Comparison of apical axis of *C. jonesianus* recorded from different locations by different workers.

	(Korean and Mexican coastal waters) Lee, 1989	(Buenos Aires, Argentina) Sar <i>et al.</i> , 2008	Hasle and Syvertsen, 1997	(North Arabian Sea) Present study
Apical axis	102μm - 146μm	106μm - 226μm	140μm - 280μm	113μm

DISCUSSION

C. jonesianus was only mentioned in a checklist by Shameel and Tanaka (1992) from Pakistani coastal zone but its detailed taxonomic description was not presented by any of the worker from this area. In this study *C. jonesianus* is described by the help of morphological characteristics shown in Scanning Electron Microscopic illustrations. Valve morphology showed drum shaped cells in girdle view. Large central areolae arranged in radial rows with distinct marginal ring of processes. Cribra also present with centric arrangements. Moreover comparative measurement of apical axis with reports of other workers also agreed well (Table 1). This study also showed that *C. jonesianus* was commonly recorded only from 1 station out of 5 during TSOS (Table 2). Whereas it was absent in samples of BP.

REFERENCES

- Caraus, I. 2002. The algae of Romania. *Biologie*, 7: 1-694.
- Ehrenberg, C.G. 1839. Über die Bildung der Kreidefelsen und des Kreidemergels durch unsichtbare Organismen. *Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin* 1838: 59-147.
- Fernandes, L.F., L. Zehnder-Alves and J.C. Bassfeld. 2001. The recently established diatom *Coscinodiscus wailesii* (Coscinodiscales, Bacillariophyta) in Brazilian waters. I: Remarks on morphology and distribution. *Phycol. Res.* 49: 89-96.
- Ferrario, M.E. and E.A. Sar. 1994. Valve morphology of *Coscinodiscus janischii* Schmidt (Bacillariophyceae). *Memoirs of The California Academy of Science*; Lugar: USA; Ano: 17: 63-68.
- Gomez, F. and S. Souissi, 2010. The Diatoms *Odontella sinensis*, *Coscinodiscus wailesii* and *Thalassiosira punctigera* in the European Atlantic: recent introductions or overlooked in the past? *Fresenius Environ. Bull.* 19(8): 1424-1433.
- Greville, R.K. 1962. Description of new and rare Diatoms. Serie V. *Transactions of the Microscopical Society of London*, n.s. 10: 18-29.
- Hallfors, G. 2004. Checklist of Baltic Sea Phytoplankton species (including some heterotrophic protistan groups). *Baltic Sea Environ. Proc.* No. 95: 1-208.
- Hasle, G. R. and E.E. Syvertsen. 1997. Marine Diatoms (5-386). In: *Identifying Marine Phytoplankton*. (Ed): C. R. Tomas. Academic Press, San Diego, California, pp. 1-385.
- Holmes, R.W. 1967. Auxospore formation in two marine clones of the Diatom Genus *Coscinodiscus*. *Amer. J. Bot.* 54(2): 163-168.
- Lee, J.H. 1989. The Diatom Genus *Coscinodiscus* Ehrenberg: *C. Jonesianus* (Ehrenberg) Ostenfeld. *Korean J. Phycol.* 4(2): 69-78.
- Lee, J.H., Y.H. Jung, and C.I.I. Choi. 1992. The Diatom Genus *Coscinodiscus* Ehrenberg: *C. wailesii* Gran & Angst. *Korean J. Phycol.* 7(1): 55-62.
- Liu, R. (J.Y., Liu) (Ed.) 2008. Checklist of biota of Chinese Seas. pp. 1-1267. Beijing: Science Press, *Academia Sinica*.
- Moazzam, M. 1973. Taxonomic and seasonal studies of planktonic centric diatoms from Manora channel (Lower Harbour) Karachi. MSc. Thesis Kar. Univ. 350pp.

- Ostenfeld, C.H. 1915. A list of phytoplankton from the Boeton Strait, Celebes. *Dansk Botanisk Arkiv*. 2, 1-18.
- Prasad, A.K.S.K. and R.J. Livingston. 1996. A micromorphological and systematic study of *Coscinodiscus jonesianus* (Bacillariophyta) from Florida Coastal Waters. *Nova Hedwigia*, Beiheft. 112, 247-263.
- Sar, E.A., I. Sunesen and F. Hinz. 2008. Fine morphology of *Coscinodiscus jonesianus* and *Coscinodiscus cymmutatus* and their Transfer to *Coscinodiscopsis* Gen. Nov. *Diatom Res.* 23(2): 401-421.
- Sar, E.A., I. Sunesen and R. Jahn. 2010. *Coscinodiscus perforatus* revisited and compared with *Coscinodiscus radiatus* (Bacillariophyceae). *Phycologia* 49(6): 514-524.
- Shameel, M. and J. Tanaka. 1992. A preliminary checklist of Marine algae from the coast and inshore waters of Pakistan. *Crypt. flora Pak.* 1:1-64.
- 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.
- Tabassum, A. and S.M. Saifullah. 2012. *Centric Diatoms from North Arabian Sea Shelf of Pakistan*. LAP Lambert Academic Publishing. pp. 1-136.