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BELLEROCHEA MALLEUS (BRIGHTWELL) VAN HEURK: A NEW RECORD FROM NORTH ARABIAN SEA AFTER TASMAN SPIRIT OIL SPILL

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ABSTRACT: Present report is a first record from the area of North Arabian Sea which describes morphological features of marine centric diatom *Bellarochea malleus* isolated after 1.5 year of Tasman Spirit Oil Spill during Bioremedial Project (BP). Hydrographic parameters, cell count along with comparison of morphometric data with other reports has also been documented.

KEYWORDS: North Arabian Sea, Morphological features, *Bellarochea malleus*, Tasman Spirit Oil Spill, Hydrographic parameters.

INTRODUCTION

Bellerochea is a common widespread marine planktonic genus (Hernandez-Becerril, *et al*., 2013). Its presence is linked with high turbidity and nutrient rich surrounding area (Yahia-Kefi, *et al*., 2005). This genus has not been previously reported from Northern Arabian Sea bordering Pakistan. In this study it has been documented for the first time from the area of study.

MATERIALS & METHODS

Phytoplankton samples were collected from 16 different locations of Sea view affected area of Clifton, Karachi (Fig. 1) during Bioremedial Project after Tasman Spirit Oil Spill. The samples were immediately fixed in formalin and then examined under light microscope.

Observations:

***Bellerochea malleus* (Brightwell) Van Heurck (Fig. 1a &1b)**

Hendey, 1964, p. 112, Plate 6, Fig. 5; Round *et al*. 1990, p. 280, Fig. b; Hasle & Syvertsen, 1997, p. 229, Plate 48 (p. 228); Teanpisut & Patarajinda, 2007, Fig. 2:24 (p. 121).

Cells united and assembled in the form of chains, rectangular, broader than long in girdle view, lanceolate to triangular valves, weakly silicified; gaps generally very small between cells due to curvature of valve, chromatophores numerous, discoid plastids.

Morphometric data: Apical axis: 13 µm

Local Distribution: *Bellerochea malleus* was found very rare at station 3 of Bioremedial Project (Table 1).

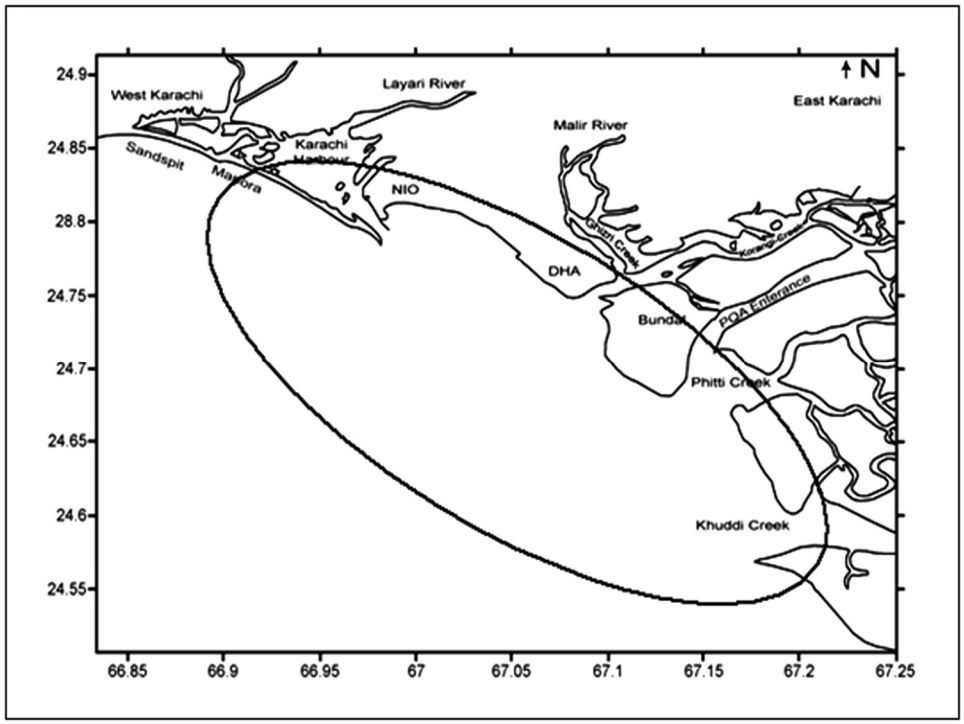

Fig. 1. Map showing affected area of Sea view Clifton Karachi.

Table 1: Collection date, hydrographic parameters and site of *Bellerochea malleus* recorded during BP

S. No.	Date	Site	Latitude	Longitude	pH	Salinity (‰)	Water Temperature (°C)
1.	18/04/05	Station 3	24.768	66.9641	8.2	36	25.8

General Distribution: Hendey 1964: British Coastal Waters; Shameel & Tanaka, 1992: North Arabian Sea; Hallfors, 2004: Baltic Sea; Teanpisut & Patarajinda, 2007: Chang Island, Gulf of Thailand; Liu, 2008: Chinese Seas; Mather *et al.*, 2010: Canadian Coastal Waters; Anonymous, 2011: Taiwan.

DISCUSSION

In the year 2003 largest ever recorded incident of an oil spill was observed in the area of North Arabian Sea bordering Pakistan at Clifton beach Karachi resulted in the addition of high amount of Iranian crude oil in the coastal belt. Previous findings showed

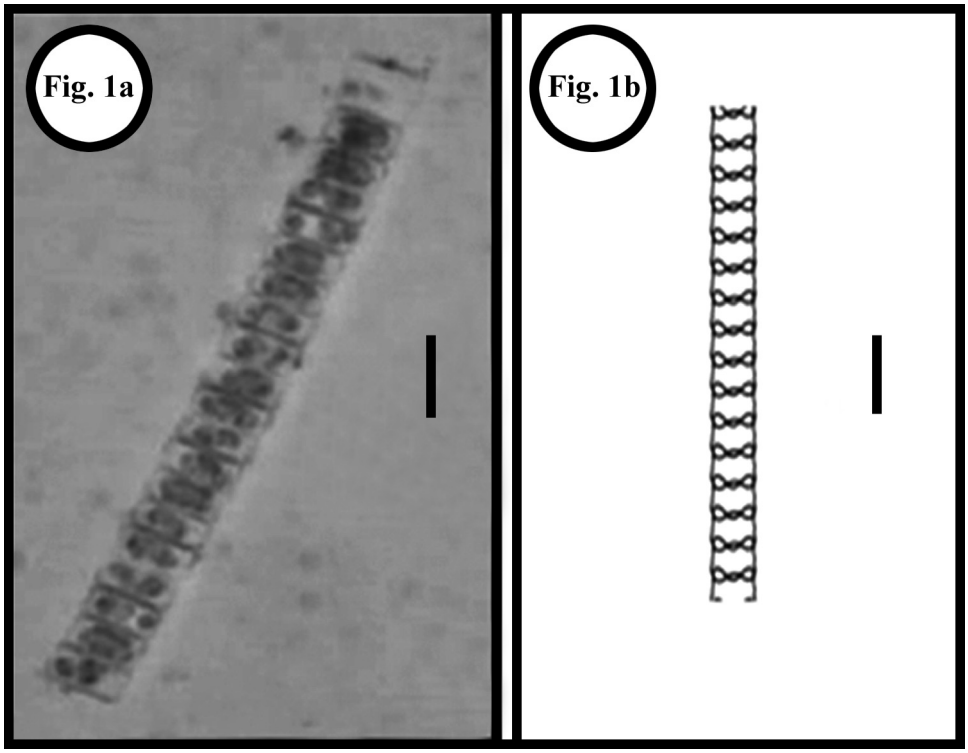

Fig. 1a. *Bellerochea malleus*. View of chain in Light Microscope. Scale bar = 13µm
Fig. 1b. *Bellerochea malleus*. Representation of Line diagram. Scale bar = 13µm

adverse effects of crude oil on phytoplankton (Adekunle, *et al.,* 2010; Hallare *et al.,* 2011) specifically on diatom community structure (Jaiswar *et al.,* 2013) in different areas of the world affected by an oil spill. Though a great many studies were conducted to evaluate the effects of crude oil on living organisms after Tasman Spirit Oil Spill incident (Hassan & Javed, 2011; Saifullah & Chaghtai, 2005; Khursheed *et al*., 2008; Meo *et al*., 2008). However, present study also aimed to analyze the hazardous effects of Tasman Spirit Oil Spill on the centric diatom species assemblages.

Table 2. Comparison of morphometric data of *Bellerochea malleus* isolated from different locations

	Subrahmanyan, 1946 (Madras Coast, Indian)	Hendey, 1964 (British Coastal Water)	Hasle & Syvertsen, 1997	Hernandez-Becerril *et al*., 2013 (Puerto Rico)	Present study (North Arabian Sea)
Apical axis	**50 µm - 78 µm**	**110 µm**	**22µm - 210 µm**	**20 µm - 55 µm**	**13 µm**
Pervalvar axis	**-**	**20 µm**	**13 µm - 34 µm**	**18 µm - 45 µm**	**-**

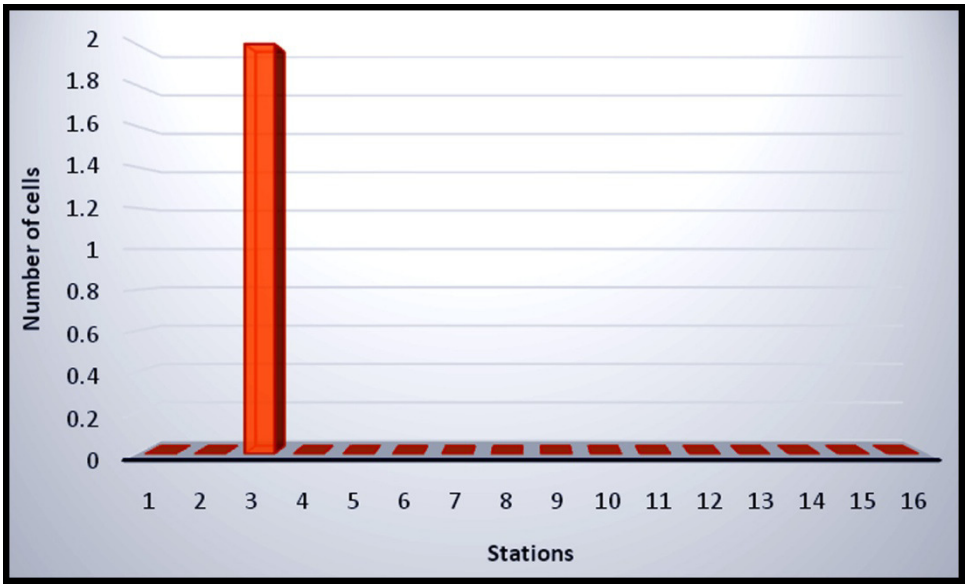

Fig. 2. Cell count of *Bellerochea malleus* during Bioremedial Project.

In this study *Bellerochea malleus* was recorded for the first time from North Arabian Sea bordering Pakistan. Observed facts revealed that cell count of this species was very low and isolated only from one station during the study period. Morphometric data (Table 2) showed that diameter of the cells presently studied was below the recorded range reported by other researchers from respective areas of their study. It was described earlier that the presence of *Bellerochea malleus* is interconnected with nutrient rich environment (Yahia-Kefi, *et al*., 2005). The observed low cell count and its presence in only one sample of BP after 1.5 year of spill indicates the hazardous effects of crude oil on its assemblages as well as gradual recovery in the environmental condition of the affected area.

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