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NEW RECORDS OF *CHAETOCEROS* EHRENBERG FROM WETLANDS OF COX'S BAZAR, BANGLADESH

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Abstract

Eleven species of brackish water *Chaetoceros* Ehrenberg newly recorded from Bangladesh have been illustrated and described in the present paper. The species are: *Chaetoceros aequatorialis* Cleve, *C. constrictus* Gran, *C. decipiens* Cleve, *C. denicus* Cleve, *C. didymus* Ehrenberg, *C. diversus* Cleve, *C. pelagicus* Cleve, *C. pendulus* Karsten, *C. pseudobrevis* Pavillard, *C. seychellarus* G.H.H. Karsten and *C. tetrastichon* Cleve. All of these species have been described here with citation of relevant references and collections examined.

Introduction

Chaetoceros Ehrenberg is one of the largest genera among marine phytoplankton and is represented globally by nearly 400 species (Tomas, 1997). In Bangladesh, so far 20 taxa of this genus were described, illustrated and published mostly from the northern Bay of Bengal (Islam and Aziz, 1975; 1980). During a recent study on algal diversity in the coastal wetlands of Cox's Bazar, 11 taxa of the genus *Chaetoceros* were found to occur, which were not recorded earlier from Bangladesh. In this paper, these newly recorded taxa are described and illustrated.

Materials and Methods

The present study was carried out in two wetlands of Cox's Bazar, a tourism city of Bangladesh situated in the northern coasts of the Bay of Bengal. The studied wetlands were: Bakkhali river and Reju canal. This two wetland maintains the flow of entire watershed area of the city of Cox's Bazar. Bakkhali river estuary is located in the southernmost part of Cox's bazar. This river originated from south-eastern hill of Mizoram, India. This is the widest and longest river of Cox's Bazar. Length of Bakkhali river within Cox's Bazar district is about 67 km. Cox's bazar fish landing center is located in the bank of this river. City wastewater and all sorts of drainage discharges are dumped into it. Reju canal is another important river of Cox's bazar originated from north Arakan Mountain of Myanmar. This river produces huge fish and named famous for its marvelous scenario. Many eco-resorts are made in the bank of this river. Salinity of this river was lower than Bakkhali river. A total of 144 phytoplankton samples were collected from September 2018 to August 2020. Phytoplankton concentrates were collected with the help of sedimentation technique using Lugol's iodine (Wetzel and Likens, 2000). In a 1L capacity polystyrene bottle containing 1 ml Lugul's iodine was filled with the sample water and was transported to the National Professor A.K.M. Nurul Islam Phycology, Limnology and Hydrobiology Laboratory, Department of Botany, University of Dhaka for analysis. A random

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checking of the sedimented planktonic material was carried out under light microscope (Nikon Optiphot, UFX-11A microscope fixed with a Nikon FX-35WA camera, Japan) at a magnification of 100-400×. The species were imaged along with the measurement of taxonomic features particularly length and breadth of each cell, filament, etc.

Taxonomic enumeration

A total of 11 brackish water species of *Chaetoceros* have been identified as new reports from Bangladesh. The illustrated taxonomic descriptions of these taxa are given below.

Class: Bacillariophyceae, Family: Chaetocerotaceae
Genus: *Chaetoceros* Ehrenberg

1. *Chaetoceros aequatorialis* Cleve **(Fig. 1)**

(Doan-Nhu *et al.* 2014, 171, Figs 28-29, 37)

Straight chain of cells, cells cylindrical, narrow in shape, valve center convex dissimilar, setae of upper valve originating from centre of valve, then running backwardly but slightly convex to outside, lower setae originated from marginal valve and running backwardly and slowly make a sharp end, lower setae larger, apical axis 29.4 µm.

Collection no. 5 (R2), 8 Oct 2020, Cox's Bazar, Bangladesh.

2. *Chaetoceros constrictus* Gran **(Fig. 2)**

(Doan-Nhu *et al.* 2014,188, Figs 98-99)

Straight chain of cells, cells rectangular, wide in shape, uniform in diameter, setae long, straight, marginal, not very long, upper setae upward and lower setae downwardly directed and other setae spread horizontally, separation disc very prominent, chloroplast make a different pattern, inter cellular setae twisted with each other, chain 34 µm in wide.

Collection no. 5 (R2), 8 Oct 2020, Cox's Bazar, Bangladesh.

3. *Chaetoceros decipiens* Cleve **(Fig. 3)**

(Cupp 1943, 115, Fig. 70; Doan-Nhu *et al.*, 2014, 176, Figs 48-51)

Syn. *Chaetoceros grunowii* Schütt

Cells 70-75 µm long, 78-80 µm broad, straight chain of cells, unitedly connected cells form a long stiff chain, in girdle view cells rectangular but oval in valves, sizes of cells may slightly vary with season, setae broad, slightly curved, setae without a basal portion, arising at corners of valves perpendicular to chain axis, fusing together in pairs for some distance, terminal setae shorter and thicker than others, cells are relatively large, usually yellow brown in color, plate or disc like chloroplast, numerous in number.

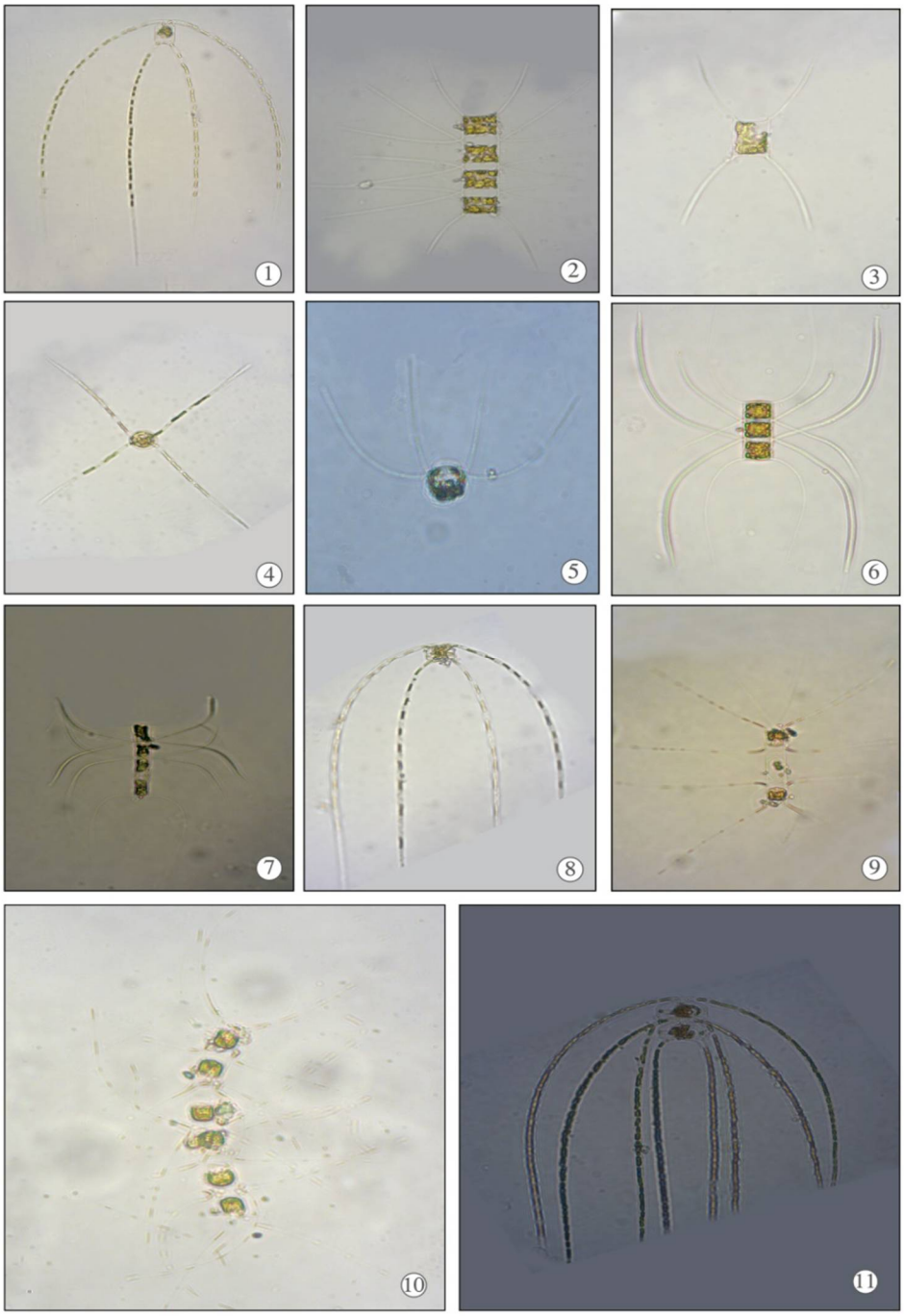
Collection no. 4 (R1), 8 Nov 2020, Cox's Bazar, Bangladesh.

4. *Chaetoceros denicus* Cleve **(Fig. 4)**

(Doan-Nhu *et al.* 2014, 167, Figs 17-18)

Cells tubular in shape, narrow, straight connected to each other make a stiff chain, valves circular, elongated girdle, intercalary band form, setae long, segmented disc like chloroplast seen in setae, from starting point they slightly twisted each other, intercalary band present, greenish brown in color, cells 7-8 µm in diameter, cells size may vary with season and nutrition.

Collection no. 4 (R1), 8 Nov 2020, Cox's Bazar, Bangladesh.



Figs 1-11. 1. *Chaetoceros aequatorialis* Cleve, 2. *C. constrictus* Gran, 3. *C. decipiens* Cleve, 4. *C. denicus* Cleve, 5. *C. didymus* Ehrenberg, 6. *C. diversus* Cleve, 7. *C. pelagicus* Cleve, 8. *C. pendulus* Karsten, 9. *C. pseudobrevis* Pavillard, 10. *C. seychellarus* G.H.H. Karsten, 11. *C. tetrastichon* Cleve. (Figs 1,8,11 magnification ×100; Figs 2-7, 9-10 magnification ×400).

5. ***Chaetoceros didymus*** Ehrenberg **(Fig. 5)**

(Cupp 1943, 121, Fig. 75A; Simonsen, 1974, Pl. 6, Fig. 15)

Straight chain, solitary cells, cells four–cornered in broad girdle view, with concave surfaces, valves with a semicircular protuberance in the centre, visible in broad girdle view. setae arising from corners of cells, crossing each other at their base, both setae arranged downwards, chain 10-31 µm in wide.

Collection no. 6 (R3), 8 Sep. 2020, Cox's Bazar, Bangladesh.

6. ***Chaetoceros diversus*** Cleve **(Fig. 6)**

(Cupp 1943, 132, Fig. 87)

Chain straight, not twisted, usually short, 3-5 cells found in chain, cells square in shape, setae arising from the corner of the cell, two types setae, one larger other shorter, setae twisted at the base or where they originated, small and thin setae more of less curved, often straight, and heavy or long setae almost cup shaped more curved and slightly thinner in ends, chloroplast more prominent and greenish brown in color. Apical axis 9.0-11.8 µm.

Collection no. 5 (R2), 8 Oct 2020, Cox's Bazar, Bangladesh.

7. ***Chaetoceros pelagicus*** Cleve **(Fig. 7)**

(Subrahmanyan, 1946, 140, Fig. 234; Cupp 1943, 129, Fig. 81)

Cells cylindrical, narrow, elongated cells straight connected to each other make a stiff chain, short, dumble shaped, uniform in diameter, two types setae, one upward and other downwards, greenish brown in color, cells 16.2 µm in broad, cells size may vary with season and nutrition.

Collection no. 4 (R1), 8 Oct 2020, Cox's Bazar, Bangladesh.

8. ***Chaetoceros pendulus*** Karsten **(Fig. 8)**

(Cupp 1943, 114, Fig. 69)

Cells always solitary, cells up to 17 µm in width, chain of cells straight, cells rectangular, wide in shape, cells connectedly make a chain, valves unlike, valve center convex, apertures moderately wide, setae very long curved posteriorly, setae started thick but slowly it makes a thin and pointed end, chromatophores very small, distributed far out in the setae, very large in size.

Collection no. 5 (R2), 8 Oct 2020, Cox's Bazar, Bangladesh.

9. ***Chaetoceros pseudobrevis*** Pavillard **(Fig. 9)**

(Doan-Nhu *et al.* 2014, 196, Figs 123, 132-133.)

Cells cylindrical, tubular, narrow, elongated cells straight connected to each other make a stiff chain, valves circular, elongated girdle, intercalary band form, setae long, free not twisted, segmented disc like chloroplast seen in setae, from starting point they slightly make pointed tip in setae, intercalary band present, greenish brown in color. Apical axis 31-33 µm in long, cell size may vary with season and nutrition.

Collection no. 4 (R1), 8 Nov 2020, Cox's Bazar, Bangladesh.

10. ***Chaetoceros seychellarus*** G.H.H. Karsten **(Fig. 10)**

(Doan-Nhu *et al.* 2014, 171, Figs 38-39.)

Long straight chains, robust long setae arch towards end of chain, terminal setae curve a round before arising out of the chain, apical axis 15-32 µm.

Collection no. 5 (R2), 8 Oct. 2020, Cox's Bazar, Bangladesh.

11. *Chaetoceros tetrastichon* Cleve **(Fig. 11)**

(Cupp 1943, 108, Fig. 63)

Straight chain of cells, cells rectangular, wide in shape, valve center convex, apertures moderately wide, two types of setae, one type long, wide, free other type of setae twisted to each other, curved posteriorly, setae started thick but slowly it makes a thin and pointed end, segmented disc like form found in setae, intercalary band present, cells 19-20 µm in width, robust in size.

Collection no. 5 (R2), 8 Oct 2020, Cox's Bazar, Bangladesh.

Adding these 11 newly reported species of *Chaetoceros* in Bangladesh, the total number stands 31. There are still ample scopes of carrying out research on this most abundant marine phytoplankton in the vast pelagic region of the Bay of Bengal situated near the vicinity of Bangladesh.

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