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# NEWLY RECORDED FRESHWATER DIATIOMS (BACILLARIOPHYCEAE) FROM TWO WETLANDS OF DISTRICT SIRAJGANJ, BANGLADESH

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**Abstract**

A total 9 diatoms taxa newly reported from the sediments of Joysagar and Sitlai Beel has been reported. These are *Navicula cuspidata* var. *heribaudii* Peragallo, *N. grimmei* Krabke, *Navicula americana* Ehr, *Pinnulara major* (Kutz.) Cleve, *P. braunii* (Grun.) Cleve. *P. brevicosta* Cleve, *P. divergens*, *P. acrosphaeria* Brebisson, *P. stauroptera* (Grun.) Cleve and *P. hemiptera* (Kutz.) Cleve.

*Key words:* Epipelic diatoms, Wetlands, Northern Bangladesh, Joysagor, Sitlai Beel.

## Introduction

Diatoms are good indicator of lake water pH (Batterbee *et al*. 1986). Since 1970's it has been apparent that diatom analysis of sediment cores for the purpose of re-constructing lake acidification relating to fallout of acidic pollutants from the atmosphere has considerable potential (Berge 1975, Davis and Berge 1980).

The ecology of epipelic diatoms are less well studied than their pelagic counterparts in various limnological studies in Bangladesh, except the work of Sultana *et al*. (2003). The seasonality and diversity of sediment diatoms and some of their taxonomic descriptions from two wetlands Joysagar and Sitlai Beel of Sirajganj, northern part of Bangladesh have been studied by Nahar and Khondker 2009 and Nahar *et al.* 2010. The present report on diatoms is a continuation of epipelons analysis of same areas i.e. Joysagar lake and Sitlai Beel.

## Materials and Methods

The study sites Joysagar lake and Sitlai Beel are the part of Grameen Bank Fisherics Project, situated under Thana Rayganj and Tarash, repectively of Sirajganj district. Joysagar's geographical location is in between 24°28′40″ and 24°28′50″ E latitude and 89°25′24″ and 89°25′42″ N longitude. On the other hand the geographical location of Sitlai Beel is 24°28′10″ and E latitude and 89°26′30″ N longitude. The water area of

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Joysagar lake is 0.226 $Km^2$ having a length of 475.84 m and breadth 475.48 m. The water area of Sitlai Beel is 0.04 $km^2$ having a length of 243.84 m and breadth 170.68 m. The taxonomy of diatom is based on the structure of ciliceous cell wall of frustules. In order to see the structure clearly the organic parts of the diatom must be removed. To prepare clean frustules diatoms collected from surface sediment of two lakes were treated by the wet combustion method (Van der Werff 1958). Mud sample weighing 1 g was taken in a Pyrex test tube. Thirty per cent of hydrogen per oxide and a few crystals of potassium dichromate was used to start cleaning of the frustules. After combustion was completed 30 ml of distilled water was added to the suspension and kept at room temperature. Next day the water above the sediment was poured down. The suspension was rinsed in the same way for three times. After cleaning 0.2 ml of well mixed diatom suspension was smeared on acid cleaned cover glass (22 × 22) and air dried. The cover glass was finally mounted on acid cleaned slide with hyrax, a mounting medium of high refractive index (Tolonen *et al.* 1986 and Charles 1986). Both the percentage frequency of the constituent taxa and the concentration of valves (Battarbee and Kneen 1982) were calculated. One slide from each sampling point of the two lakes was counted for each sample date (De Nicola 1986).

The permanent slides were made under oil immersion at a magnification of 1000x via Nikon Optiphot, UFX-11WA microscope fitted with a Nikon FX-35WA camera, Japan. All the images of diatom samples were transferred to digital files and plates of photomicrographs were prepared keeping the scale attached to them. The species were identified with the help of Germain (1981), Hustedt (1930), Wuthrick (1975), Tolonen *et al.* (1986).

**Results and Discussion**

The following nine fresh water diatoms were recorded from Joysagar lake and Sitlai Beel, in Sirajganj district, These species of Bacillariophyceae have been identified as new records for Bangladesh.

**Order: Naviculalis**
**Family: Naviculaceae**

**1. *Navicula cuspidata* Kutz. var. *heribaudii* Peragallo (Pl. 1; Fig. 1)**

(Germain 1981, 172, Pl. 64, Fig. 3)
Cell length 65 - 110 µm, breadth 25.5 µm, striae 2 in 10 µm. Valve lanceolate with tappering ends. Axial area narrow with slightly broad central area. Striae punctate, thick, raphae central.

**2. *Navicula grimmei* Krabke** **(Pl. 1; Fig. 2a-c)**

(Germain 1981, 215. Pl. 80. Figs 15 - 18, Hustedt 1930, 273. Fig. 448)
Cell length 6.5-11mm, breadth 3.5-3.8 μm, striae 5-9 in 10 μm. Valve clliptical with captate ends, axial area linear, narrow, central area rounded, raphae straight, transapical striae radial, punetuate.

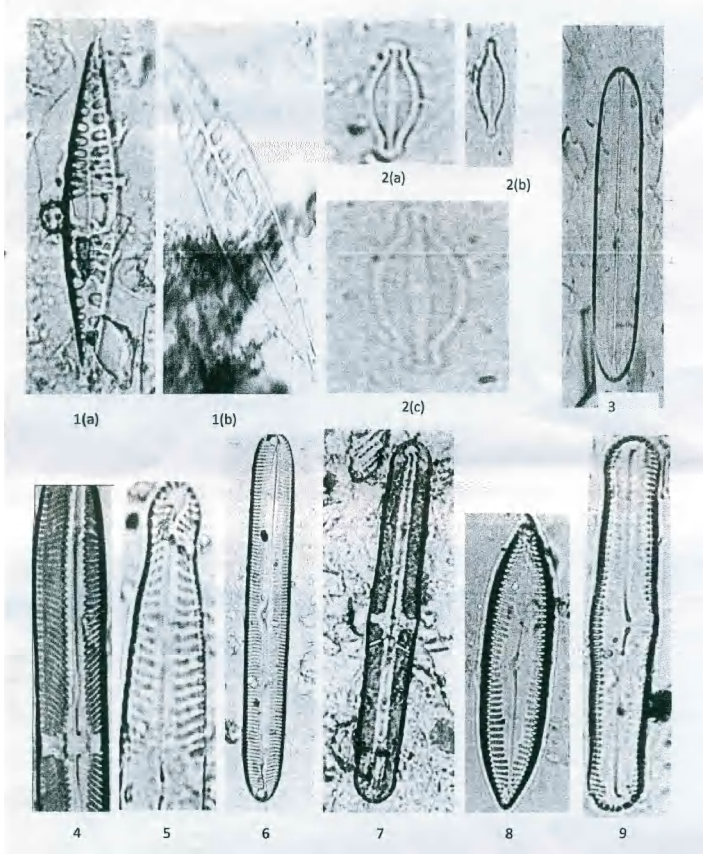


Plate 1. Fig : 1(a-b). *Navicula cuspidata* var. *heribaudii*, 2(a-c). *Navicula grimmei*, 3. *Navicula americanas,* 4. *Pinnularia divergens*, 5. *Pinnularia braunii*, 6. *Pinnularia major*, 7. *Pinnularia brevicosta*, 8. *Pinnularia hemiptera*. 9. *Pinnularia stauroptera*.

**3. *Navicula americana* Ehr.** **(Pl. 1; Fig. 3)**

(Germain 1981, 205. Pl. 77. Fig. 1, Hustedt 1930, 280. Fig. 464)
Cell length 68.4 - 147.2 μm, breadth 17.7 - 26.1 μm, striae 16 - 20 in 10 μm. Valve broadly linear with broadly rounded ends, axial area having narrow part with thin raphae

and with lateral expansion, linear, raphae more or less straight with central and polar nodules oppositely curved and thicker, striae punctate, transapical, radiate.

**Genus: *Pinnularia* Ehrenberg**

**4. *Pinnularia divergens* W. Smith (Pl. 1; Fig. 4)**

(Germain 1981, 253, Pl. 89, Fig. 20, Pl. 90, Fig. 1-7)
Cell length 84 μm, breadth 12 μm, 8 striae in 10 μm. Valve linear with rounded ends. Axial area linear widening towards the central end to form a transverse fascia up to each margin.

**5. *Pinnularia braunii* (Grun.) Cleve (Pl. 1; Fig. 5)**

(Germain 1981, 245, Pl. 88, Fig. 17; Hustedt 1930, 318, Fig. 578)
Cell length 40 - 100 μm, breadth 8.7 - 12 μm, 7 - 10 striae in 10 um. Valve linear with attenuated cuneate apices, axial area linear widening towards the centre which forms a broad transverse fascia, central ends of the raphac turned to one side, striae radiate at central area, convergent towards the centre and divergent towards the tips.

**6. *Pinnularia major* (Kutz.) Cleve (Pl. 1; Fig. 6)**

(Germain 1981, 259, Pl. 93, Fig. 3; Hustedt 1930, 333, Fig. 614; Nhyama 1971, 271, Pl. 5, Fig. 2)
Cell length 175.5 - 380.4 μm, 25 - 34 striae in 10 μm. Valve broadly linear with rounded ends, raphae complex with question marked terminal ends and central ends are turned to one side, axial area lincar with slightly tappering towards the ends and central area asymmetrically rounded, striae paralled crossed by a broad hand.

**7. *Pinularia brevicosta* Cleve (Pl. 1; Fig. 7)**

(Hustedt 1930, 330, Fig. 609)
Cell lenght 80 - 120 μm, breadth 10 - 15 μm, striae 7 - 10 in 10 μm. Valve linear, axial area linear, central area widening to form a fascia up to each margin. Raphe thread like, terminal ends question marked, turned to one side.

**8. *Pinnularia hemiptera* (Kutz.) Cleve (Pl. 1; Fig. 8)**

(Hustedt 1930, 330, Fig. 608)
Cell length 41. 7 - 50.7 μm, breadth 11.7 - 12.3 μm, striae 7 - 9 in 10 μm. Valve linear elliptical, outer line convex, axial area narrow, raphae thread like, both the central terminals curved to one side, transapical striae parallel.

**9. *Pinnularia stauroptera* (Grun.) Cleve (Pl. 1; Fig. 9)**

(Federovich 1980, 431, Fig. 3)

Cell length 30 - 133 µm, breadth 8 - 171.2 µm, striea 5 - 10 in µm. Valve linear slightly widened at the centre with broadly rounded ends, axial area linear about three fourth of the breadth of the valve, raphae straght with rounded central nodules turned to one sides, terminal ends turned to the same sides, striae parallel, short.

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