

SOME FRESH-WATER DIATOMS FROM ALMORA DISTRICT, UTTARANCHAL STATE

P.K. MISRA*, RAJVEER SINGH CHAUHAN AND
SUNIL KUMAR SHUKLA

Phycology Laboratory, Department of Botany, University of Lucknow, Lucknow - 226 007

Eighteen taxa of fresh water diatoms collected from different aquatic habitats of district Almora. These habitats are Kosi River, Gagas River, Jageshwar and Ranikhet of district Almora, Uttaranchal state. These taxa belongs to 9 genera viz. *Cymbella* Ag., *Navicula* Bory, *Pinnularia* Ehr., *Gomphonema* Ag., *Synedra* Ehr., *Rhopalodia* Mueller, *Cocconeis* Ehr., *Achnanthes* Bory and *Melosira* Ag. All these taxa are being reported for the first time from the area.

Key words: Fresh-water/ Algae/ Diatoms/ Almora district/ Uttaranchal State.

Earlier works of Saxena & Venkataswarlu (1970), Kamat & Agarwal (1975), Gandhi (1999), Prasad & Mehrotra (1997), Misra *et al.* (2005), Misra & Shukla (2006) on fresh water diatoms shows that a large part of Uttaranchal state is still unexplored. So far, no work has been done on fresh water diatoms of Almora district of Uttaranchal state. Diatom samples have been collected from Kosi River of Kosi, Gagas River of Gagas, Jataganga River of Jageshwar and Dhobighat of Ranikhet of Almora district.

Almora is situated at 79°39' E and 29°35' N and an altitude of 1600 m above sea level. The annual average rainfall is 1152 mm. The algal samples were collected mainly in the month of December & April during which the temperature was 3.5° C (min) and 25° (max) respectively.

Fresh water diatoms from different parts of India have been studied by Gandhi (1956, 1957, 1958, 1959a, b, 1960, 1962a, b), Baharate & Tarar (1981), Tarar & Bodkhe (1998). Diatoms of Tamilnadu have been extensively studied by Iyengar & Subramanyam (1942, 1944a, 1944b) Iyengar & Venkataraman (1951), Desikachary (1952, 1954a,

b, c, 1962), Trivedi (1982), Prasad & Srivastava (1992) have studied the diatoms of Andaman and Nicobar Islands. Diatoms from Uttar Pradesh were reported by Singh (1961, 1962, 1963), Prasad & Singh (1996) have worked on diatoms as indicator of water pollution. Srivastava & Gupta (2004) have described several diatoms from pond and wet lands of Himachal Pradesh. Seth *et al.* (2006) have given a detailed account on earlier work done on diatoms of Himachal Pradesh.

MATERIALS AND METHODS

Slides of diatoms were prepared as per procedure of Patrick and Reimer (1966). Detailed studies were made by examining specimens under a Nikon E-400 with H-III Photomicrographic attachment in oil emersion lens.

Systematic descriptions:

Species identifications have been done after Tiffany & Britton (1952), Hustedt (1938, 1959). Prasad & Srivastava (1992) and Gandhi (1999).

Order – Bacillariales

Family – Cymbellaceae

Genus – *Cymbella* Ag.

1. *C. sumatrensis* Hustedt (Pl- 1, fig.1) Valve 45 µm long, 14 µm broad, striae 12 in 10 µm. **Collection Number & Date:** KUM/UT/20, 26.12.2004 **Locality:** Gagas River, Gagas, Almora.
2. *C. tumescens* A. Cleve (Pl. 1, fig.2) Valve 38 µm long, 11 µm broad, striae 12 in 10 µm, shape

Coarse, lineate, radial becoming close towards the ends. **Collection Number & Date:** KUM/UT/09/, 16.10.2003 **Locality:** Kosi River, Kosi, Almora.

3. *C. obtusa* Gregory (Pl. 1, fig. 3) Valve 35µm long, 10µm broad, striae 10 in 10µm, shape distinct, lineate, somewhat distantly placed in the middle but closer toward apices, radiate throughout the valve. **Collection Number & Date:** KUM/UT/09, 16.10.2003 **Locality:** Kosi River, Kosi, Almora.

4. *C. tumida* (Breb.) V.Heurek (PI-I, fig.4) Valve 58 µm long, 18µm broad, striae 19 in 10 µm, shape is punctate. **Collection Number & Date:** KUM/UT/32, 21.4.2005 **Locality:** Dhobighat, Ranikhet, Almora.

Family – Naviculaceae

Genus – *Navicula* Bory

5. *N. radiosa* var. *tenella* (Brebisson) Grunow (Pl. 1, fig.5) Valve 37 µm long, 11 µm broad, striae 10 in 10 µm, shape is fine. **Collection Number & Date:** KUM/UT/09, 16.10.03 **Locality:** Kosi River, Kosi, Almora.

6. *N. chandolensis* var. *capitata* Gandhi (Pl. 1, fig.6) Valve 27 µm long, 7 µm broad, striae 15 in 10 µm, shape is lineate. **Collection Number & Date:** KUM/UT/09, 26.12.2004 **Locality:** Gagas River, Gagas, Almora.

7. *N. subrhynchocephala* Hustedt (Pl. 1, fig.7) Valve 38 µm long, 8 µm broad, striae 14 in 10 µm Shape is lineate. **Collection Number & Date:** KUM/UT/09, 16.10.2003 **Locality:** Kosi River, Kosi, Almora.

8. *N. elginensis* (Gregory) Grunow (Pl. 1, fig. 8) Valve 21 µm long, 7 µm broad, striae 15 in 10 µm Shape slightly radial in middle and faintly lineate towards end. **Collection Number & Date:** KUM/UT/32, 21.04.2005 **Locality:** Dhobighat, Ranikhet, Almora

Family – Gomphonemaceae Genus – *Gomphonema* Agardh

9. *G. sphaerophorum* Ehrenber (Pl. 1, fig.9) Valve 30 µm long, 8 µm broad, striae 14 in 10 µm, shape more or less clearly punctate, slightly radial. **Collection Number & Date:** KUM/UT/09, 16.10.2003 **Locality:** Kosi River, Kosi, Almora.

10. *G. parvulum* (Kutzing) Grunow (Pl. 1, fig. 10) Valve 22 µm long, 5 µm broad, striae 15 in 10 µm, shape is radial. **Collection Number & Date:** KUM/UT/09, 16.10.2003 **Locality :** Kosi River, Kosi, Almora.

11. *G. olivaceum* (Lyngbye) Kuetzing (Pl. 1, fig. 11) Valve 18 µm long, 6 µm broad, striae 13 in 10 µm Shape Radial and indistinctly Punctate. **Collection Number & Date:** KUM/UT/09, 16.10.2003 **Locality:** Kosi River, Kosi, Almora.

Family – Fragilariaceae

Genus – *Synedra* Ehrenberg

12. *S. ulna* (Nitzsch) Ehr. var. *contracta* Qstr. (Pl. 1, fig. 12) Valve 57 µm long, 6 µm broad, striae 11 in 10 µm, Shape - Lineate, parallel, interrupted by a distinct linear near the margin of the valve. **Collection Number & Date:** KUM/UT/28, 18.04.2005 **Locality:** Jataganga River, Jageshwar, Almora.

13. *S. ulna* var. *amphirhynchus* (Pl. 1, fig. 13) Valve 42 µm long, 7 µm broad, striae 10 in 10 µm **Collection Number & Date:** KUM/UT/32, 21.4.2005 **Locality:** Dhobighat, Ranikhet, Almora

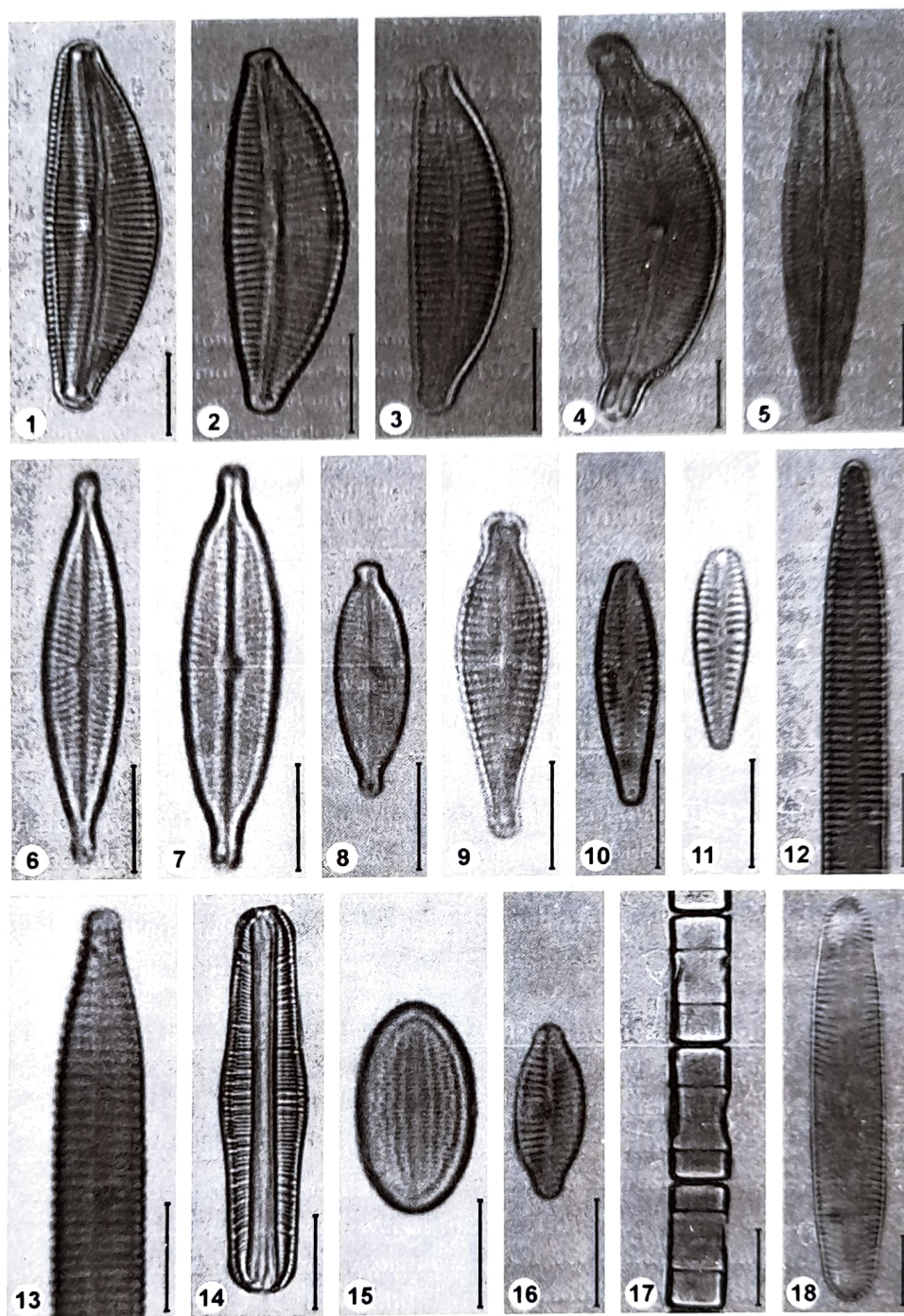
Family – Epithemiaceae

Genus – *Rhopalodia* Mueller

14. *R. gibba* (Ehr.) O. Mull. var. *ventricosa* (Ehrenberg) Grunow (Pl. 1, fig. 14) Valve 40 µm long, 8 µm broad, striae 21 in 10 µm **Collection Number & Date:** KUM/UT/20, 26.12.2004 **Locality:** Gagas River, Gagas, Almora.

Family – Achnanthaceae

Genus – *Cocconeis* Ehrenberg



Figures 1-18: Fig.1. *Cymbella sumatrensis* Hustedt. Fig.2. *Cymbella tumescens*. A. Cleve. Fig.3. *Cymbella obtusa* Gregory. Fig.4. *Cymbella tumida* (Breb.) V. Heurck. Fig.5. *Navicula radiosa* var. *tenella* (Brebisson) Grunow Fig.6. *Navicula chandolensis* var. *capitata* Gandhi Fig.7. *Navicula subrynchocephala* Hustedt Fig.8. *Navicula elginensis* (Greg.) Grunow Fig.9. *Gomphonema sphaeroporium* Ehrenberg Fig.10. *Gomphonema parvulum* (Kutz.) Grunow Fig.11. *Gomphonema olivaceum* (Lyngbye) Kuetzing Fig.12. *Synedra ulna* var. *contracta*. Qstr. Fig.13. *Synedra ulna* (Nitz.) Ehr. var. *amphirynchus* Fig.14. *Rhopalodia gibba* (Ehr.) O. Mull. var. *ventricosa* (Ehr.) Grunow Fig.15. *Cocconeis placentula* Ehrenberg Fig.16. *Achnanthes lanceolata* (Breb.) Grun. var. *elegans* Cleve Fig.17. *Melosira granulata* Ehr., Ralfs Fig.18. *Pinnularia gibba* Van Heurck) Boyer

15. *C. placentula* Ehrenberg (Pl. 1 fig. 15) Valve 19 µm long, 10 µm broad, striae 23 in 10µm, Shape distinctly punctate, radially arranged. **Collection Number & Date:** KUM/UT/09, 16.10.2003 **Locality:** Kosi River, Kosi, Almora.

Genus – *Achnanthes* Bory

16. *A. lanceolata* (Brebisson) Grunow var. *elegans* Cleve (Pl. 1, fig. 16) Valve 17 µm long, 6 µm broad, striae 16 in 10 µm, shape is fine, lineate, slightly more radiate in the middle than those of hypovalve. **Collection Number & Date:** KUM/UT/09, 16.10.2003 **Locality:** Kosi River, Kosi, Almora.

Family – Coscinodiscaceae

Genus – *Melosira* Agardh

17. *M. granulata* Ehr., Ralfs (Pl. 1, fig. 17) Diameter of Frustule – 7.5 µm, length of semicell – 17.5 µm **Collection Number & Date:** KUM/UT/20, 26.12.2004 **Locality:** Gagas River, Gagas, Almora.

Family – Naviculaceae

Genus – *Pinnularia* Ehrenberg

18. *P. gibba* (Van Heurck) Boyer (Pl. 1, fig. 18) Valve 5 µm long, 10 µm broad, striae 11 in 10 µm, Shape – Radial in middle and parallel towards pole. **Collection Number & Date:** KUM/UT/32, 21.04.2005 **Locality:** Dhobighat, Ranikhet, Almora.

DISCUSSION

Eighteen taxa of nine genera have been reported from Ranikhet, Gagas, Kosi and Jageshwar of Almora district, Uttaranchal State. Genus *Cymbella* Ag. is rich in Kosi River with various species, while genus *Rhopalodia* Mueller is rare in Kosi River. Genus *Gomphonema* Ag. is also rich in Kosi River, Kosi, while all other water bodies show poor but rare taxa of diatoms. All these taxa have been reported first time from the area.

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