



Taxonomic enumeration on genus *Cymbella* (bacillariophyceae) from anjani dam of Jalgaon district, Maharashtra

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Abstract

Present article deals with the taxonomic enumeration of Genus *Cymbella* in Anjani dam of Jalgaon district Maharashtra, India. The aim of this investigation is to contribute information on diversity of diatoms in Jalgaon District. The present work is carried out from 2017 to 2019 during the course of investigation a total 22 taxa of genus *Cymbella* including 15 species 06 varieties and 01 form has been recorded from Anjani dam and are described systematically with illustrations.

Keywords: anjani dam, bacillariophyceae, *Cymbella*, diatoms, Jalgaon, Maharashtra

Introduction

Diatoms are unicellular, microscopic, photosynthetic algae with a distinctive cell wall made of a high quantity of silica and comprise two interconnected valves. This intricate siliceous frustule (valve) morphology is the basis for their taxonomy. They occur in most aquatic habitats found on earth and play an important role in aquatic ecosystems. They use light to grow, provide food for many other organisms and are sensitive to environmental change. The diatoms are most prominent and ecologically significant group of microalgae on the earth. The significant contribution in the field of diatom studies in Maharashtra were known through the work of Gonzalves and Gandhi (1952-1953) [15, 16], Gandhi (1954, 1956, 1958, 1959, 1960, 1962, 1998) [7, 8, 10, 11, 12, 13, 14], Sarode and Kamat (1984) Jadhavar and Papdiwal (2012, 2016) [18], Sonule and Mulani (2018). In North Maharashtra the work on diatom studies known through Barhate and Tarar (1983, 1985) [3, 4], Aher and Mahajan (2006), Kumawat and Jawale (2006), Narkhede (2006) [22], Dhande and Jawale (2009) [6], Nandan *et al.* (2009) [23], Borse and Kumawat (2014) [5], Patil (2016, 2019) [24, 25], Aher *et al.* (2017) [2], Mahajan (2019 a b) [20]. The present study is a step to explore and document the diversity of *Cymbella* from Anjani dam of Jalgaon district.

Materials and Methods

Anjani dam is located near the Palasdal village (20°54' North latitude and 75°19' East longitude) situated on Anjani river in the Erandol Tahsil of Jalgaon district, Maharashtra. The algal samples collections were made early in the morning between 7.00 to 09.00 am during May, 2017 to April, 2019 from different sites of Anjani dam. Diatoms were collected by using the plankton net and also by squeezing the hydrophytes. The diatoms were not usually found in very pure state in nature. The collections contained organic matter, calcium salts, sands etc. The samples collected in plastic bottles and fixed with 4% formalin. Diatoms were cleaned by acid treatment method (Sarode and Kamat 1984) [27] then observed under microscope under appropriate magnifications for taxonomic study. The line drawings were made with the help of mirror type of camera lucida. Identification was made up to species level based on the consultation of keys and description given in standard publications like Hustedt (1930), Sarode and Kamat (1984) [27], Gandhi (1960) and relevant research publications.

Taxonomic Enumeration *Cymbella affinis* Kuetz. Pl.1 Fig.1

Hustedt, 1930, P.362, Fig. 671

Valves 9.3 µm broad, 40.1 µm long, asymmetrical, dorsal side strongly convex and ventral side slightly convex; ends constricted, rostrate to sub-capitate; raphe slightly thick, arcuate with terminal fissures dorsally bent; axial area narrow, sub-linear; central area slightly widened with a distinct stigma on the ventral side; striae 10-12 in 10µm, s lightly radial, lineate, somewhat closer towards the ends Coll. No.121.

Cymbella aspera (Ehr.) Cleve. Pl.1, Fig.2

Hustedt 1930, P. 365, Fig. 680.

Valves 24.9-34.2 µm broad, 111.0-134.0 µm long, asymmetrical with strongly convex dorsal and straight or slightly convex ventral side; ends obtusely rounded; raphe thick, arcuate, slightly excentric with large, ventrally bent central pores and dorsally directed terminal fissures; axial area moderate, linear; central area slightly formed, rounded with an arcuate marking on the dorsal side; striae 8-10 in 10 µ, radial, clear and coarsely punctate.

Coll. Nos.2121, 191, 261,131.

Cymbella benghalensis Grun. Pl.1, Fig.3

Sarode P.T. and Kamat N.D., 1984 [27], P.167, Pl.19, Fig. 444

Valves 27.7 µm broad 105.4 µm long, asymmetrical, dorsal side strongly convex, raphe thick with prominent central pores and dorsally directed terminal fissures, striae 8-10 in 10 µm, radial and coarsely punctate.

Coll. No.191.

Cymbella bharatensis Sarode *et* Kamat. Pl.1, Fig.4

Sarode P.T. and Kamat N.D., 1984 [27], P.167, Pl.21, Fig. 479.

Valves 12.0 µm broad 54.3 µm long, asymmetrical, dorsal margin smoothly convex and ventral marginal most straight with a slight inflation in the middle, ends rounded, not acute; raphe thin and almost straight with central pores dorsally directed and terminal fissures curved; axial area narrow; central area slightly formed; striae 8-9 in 10 µm, slightly closely set towards the ends radial but convergent at the ends on the ventral side, finely punctate

Coll. No.171.

Cymbella cistula* (Hempr.) Grunow.*Pl.1, Fig.5**

Rai S.K., 2005, P.28, Fig.10

Valves 23.1 µm broad 105.4 µm long, curved, asymmetric, dorsal side convex, ventral side slightly concave with middle inflation; ends slightly constricted, produced rounded; raphe thick, arcuate, excentric with ventrally curved central nodules; axial area not narrow; central area elliptical with 3-4 isolated stigmata at the ends of the middle ventral striae; striae 7-10 in 10 µm, punctate, radiate.

Coll. No.241.

Cymbella cistula* (Hemp.) Grun. var. *woosungensis* Voigt.*Pl.1, Fig.6,**

Sarode P.T. and Kamat N.D., 1984, P.168, Pl.20, Fig.446

Valves 26.8 µm broad, 97.1 µm long, asymmetrical with dorsal margin strongly convex and ventral margin almost straight and inflated in the middle; striae 10-12 in 10 µm distinctly punctate and radial

Coll. No.181.

***Cymbella cymbiformis* (Ag.) Kuetz. var. *caldostagnensis* (Meist.) A. Cl. Pl.1, Fig.7**

Sarode P.T. and Kamat N.D., 1984, P. 168, Pl.20, Fig. 448

Valve 12.0 µm broad, 73.1 µm long, sickle shaped with convex dorsal margin and concave ventral margin with a median inflation; ends broadly rounded and truncate; raphe excentric with central pores ventrally curved; axial area narrow; central area slightly widened with three coarse punctae on the ventral side and two on the dorsal side; striae 11-12 in 10 µm, distinctly lineate and radial.

Coll. No. 231.

***Cymbella cymbiformis* (Ag.) Kuetz. var. *jimboi* (Pant.) A. Cl. Pl.1, Fig.8**

Sarode P. T. and Kamat N. D., 1984, P. 169, Pl.20, Fig.449.

Valve 12.7 µm broad, 73.5 µm long, sickle shaped and more inflated in the middle on the ventral side with broadly rounded ends; raphe thick with ventrally curved central pores and dorsally directed terminal fissures; axial area narrow; central area small; striae 9-12 in 10 µm, radial and linearly punctate.

Coll. No. 2101.

***Cymbella cymbiformis* (Ag.) Kuetz. var. *neri* (Pant.) A. Cl. Pl.1, Fig.9**

Gandhi H.P., 1956, P.204, Fig.21.

Valve 13.1 µm broad, 73.1 µm long, narrowly sickle shaped than the type with strongly inflated ventral side in the middle ends gradually narrowed and broadly truncate rounded, striae 9-10 in 10 µm radial and lineate

Coll. No. 131.

***Cymbella cymbiformis* (Ag.) Kuetz. var. *unipuncta* (Pant.) A. Cl. Pl. 2, Fig.1**

Gandhi H.P., 1956, P.204, Fig.17.

Valve 13.1 µm broad, 58.8 µm long, sickle shaped asymmetrical, dorsal side convex, ventral side almost straight or concave and inflated in the middle ends broadly rounded; raphe arcuate and thick with ventrally bent central pores and dorsally directed terminal fissures. Axile area fairly wide central area slightly enlarged with isolated punctum on the ventral side at the end of central striae. Striae 9-10 in 10 µm radial, strong and lineate.

Coll. No. 111.

***Cymbella lanceolata* (Ehr.) V. H. Pl. 2, Fig.2**

Sarode P. T. and Kamat N. D., 1984, P. 26, Pl. 20, Fig. 456

Valve 26.8 µm broad, 139.6 µm long, asymmetrical, dorsal margin convex, more tumid in the middle; ventral margin straight with a tumidity in the middle; ends obtusely rounded; raphe thick, slightly excentric with large ventrally bent central pores and dorsally directed terminal fissures; axile area wide, linear; central area slightly formed with an arcuate marking on the dorsal side; striae 9-10 in 10 µm in the middle and 11-12 in 10 µm towards the ends, radial, clear and coarsely punctate.

Coll. No. 2121.

***Cymbella lanceolata* (Ehr.) V.H. var. *cornuta* (Ehr.) Grun. Pl.2, Fig.3**

Sarode P. T. and Kamat N. D., 1984, P. 172, Pl. 20, Fig. 457.

Valve 23.1 µm broad, 125.8 µm long, asymmetrical dorsal margin convex, slightly more convex in the middle, ventral margin concave with a strong inflation in the middle; ends broadly rounded; raphe thick with dorsally directed central pores bifurcated terminal fissures; axial area narrow; striae 7-9 in 10µm punctate, strongly radial throughout

Coll. No. 141.

***Cymbella laevis* Naeg. Pl.2, Fig., 4**

Hustedt F., 1930, P. 353, Fig. 643.

Valve 9.7 µm broad, 40.1 µm long; nearly lanceolate, dorsal margin convex and ventral margin nearly straight or with a slight median inflation; ends rounded; raphe slightly thick, almost straight; axial area narrow, linear; central area small; striae 12-14 in 10 µm; lineate, radial, slightly wider on dorsal side.

Coll. No.191.

***Cymbella powaiana* Gandhi. Pl.2, Fig.5.**

Sarode P. T. and Kamat N. D., 1984, P. 174, Pl.20, Fig.462

Valves 18.0 µm broad, 65.6 µm long, asymmetrical, boat shaped, dorsal margin strongly convex, ventral margin straight with a slight inflation in the middle; ends constricted on the dorsal side, distinctly produced and subtruncate; raphe thick, arcuate, nearly central with central pores distinct and terminal fissures reflexed towards the dorsal side; axial area fairly wide, linear; central area large somewhat roundish without any stigmata; striae 7-8 in µm, coarsely lineate, radial throughout.

Coll. No. 291.

***Cymbella pusilla* Grun. Pl.2, Fig.6,**

Sarode P. T. and Kamat N. D., 1984, P. 175, Pl.20, Fig.464

Valves 8.6 µm broad, 35.6 µm long, asymmetrical, boat shaped, dorsal margin smoothly convex, ventral margin almost straight or slightly convex; ends slightly constricted, produced and slightly ventrally curved, somewhat acutely rounded; raphe thin and straight with terminal fissure bent ventrally; axile area narrow, linear; central area slightly dilated and elliptical in long axis; striae 12-15 in 10 µm, radial in the middle and convergent at the ends.

Coll. No. 2111.

***Cymbella tumida* (Breb.) V.H. Pl.2, Fig. 7**

Sarode P. T. and Kamat N. D., 1984, P. 176, Pl.20, Fig.468

Valves 19.4-20.2 µm broad, 70.3-76.5 µm long, asymmetrical and curved, broadly naviculoid, dorsal margin convex and ventral margin straight convex, raphe

excentric; axial area narrow; central area large rounded with ventrally placed prominent isolated dot; striae 9-10 in 10 µm radial and punctate.

Coll. Nos. 291, 1121.

***Cymbella tumida* (Breb.) V.H. f. *ventricosa* Gandhi. Pl.2, Fig. 8**

Sarode P. T. and Kamat N. D., 1984, P. 177, Pl.20, Fig.469
Valves 21.2 µm broad, 88.8 µm long, asymmetrical, boat shaped, ventral margin convex; ends constricted on dorsal side, raphe excentric; axial area narrow; central area large.
Coll. No. 111.

***Cymbella turgida* (Greg.) Cleve. Pl.2, Fig.9**

Sarode P. T. and Kamat N. D., 1984, P. 177, Pl. 21, Fig. 471.

Valve 12.0-13.1 µm broad, 60.0-62.2 µm long, lunate with strongly convex dorsal and almost straight or often ventrally gibbous ventral margin; ends more or less acute, rounded; raphe strongly excentric, straight with central pores dorsally bend and terminal fissures ventrally directed; axial area moderate, linear, central area small, elliptical; striae 9 in 10 µm, strong, lineate and radial; convergent at the ends on the ventral margin.

Coll. Nos.157, 281.

***Cymbella turgidula* (Greg.) Cleve. Pl.2, Fig.10**

Sarode P. T. and Kamat N. D., 1984, P. 178, Pl.21, Fig.472
Valve 10.8-11.2 µm broad, 35.2-39.7 µm long, asymmetrical with strongly convex dorsal margin and almost straight ventral margin; ends rostrate and obtuse; raphe excentric arcuate; axile area narrow central area slightly widened with two punctate on ventral side; striae 9-10 in 10 µm, coarsely but clearly punctate.

Coll. Nos. 2111,262.

***Cymbella ventricosa* Kuetz. Pl.2, Fig.11**

Sarode P. T. and Kamat N. D., 1984 ^[27], P. 178, Pl. 21, Fig. 473.

Valve 10.8 µm broad, 41.2 µm long, strong convex on the dorsal side and straight or, slightly convex on the ventral side with acutely ends; raphe thin and straight; axial area narrow; central area small; striae 13-16 in 10 µm, radial, coarse lineate and slightly convergent towards the ends.

Coll. No. 131.

***Cymbella vidarbhensis* Sarode et Kamat Pl.2, Fig.12**

Sarode P. T. and Kamat N. D., 1984 ^[27], P. 179, Pl. 21, Fig. 480.

Valve 13.8 µm broad, 58.8 µm long, lunate, dorsal margin strongly convex and slightly depressed towards both the ends; ventral margin almost straight and ventrally gibbous; ends rounded; raphe strongly excentric, straight with terminal fissures ventrally directed; axial area moderate, linear; central area small; striae 9-10 in 10 µm, strong and coarse, radial throughout.

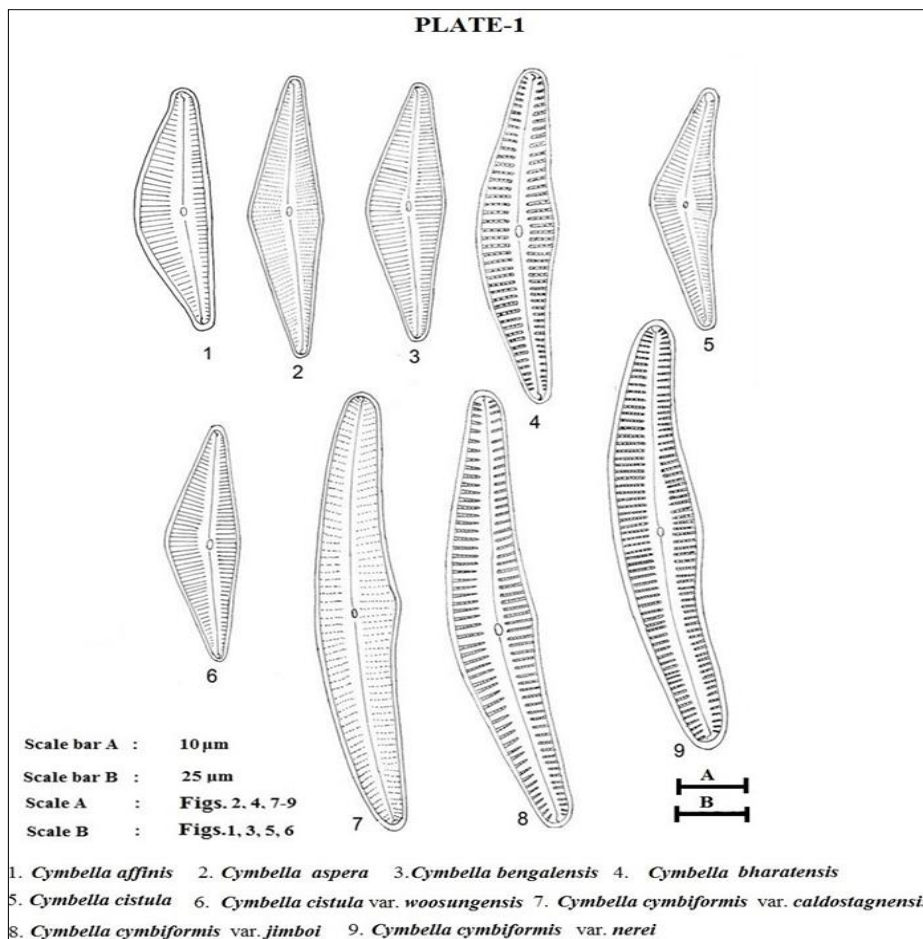
Coll. No 2111.

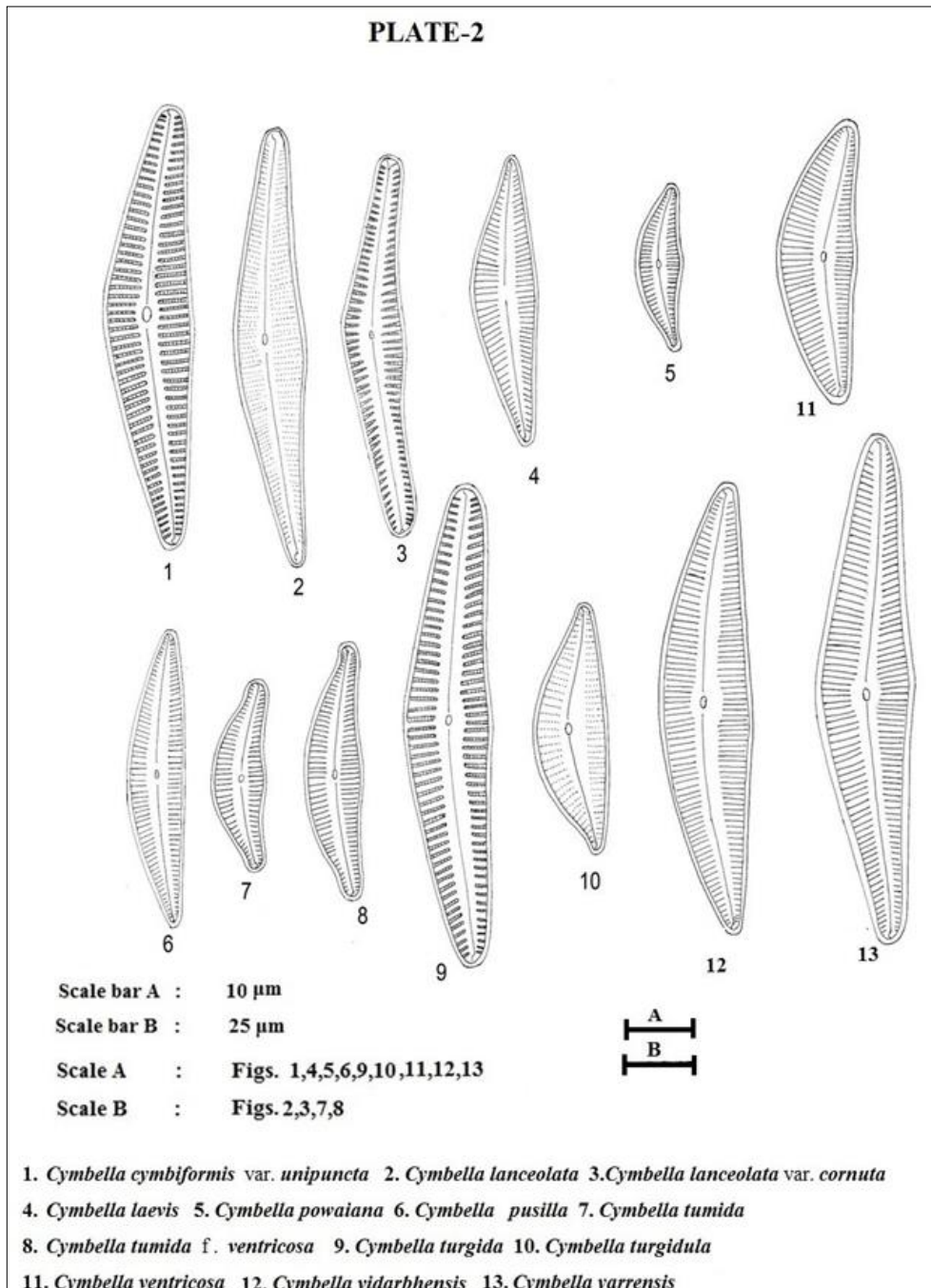
***Cymbella yarrensis* (A.S.) Cleve. Pl.2, Fig.13**

Sarode P. T. and Kamat N. D., 1984 ^[27], P. 179, Pl.21, Fig.476

Valves 21.2 µm broad, 88.8 µm long, asymmetrical lanceolate with dorsal margin more convex than ventral margin; ends acutely rounded, raphe thin and straight excentric with terminal fissure dorsally directed; axial area narrow very narrowly lanceolate central area small striae 12-15 in 10 µm strongly radial in the middle but less towards the ends and somewhat closer.

Coll. No. 121.





Conclusion

During the study total 22 taxa of genus *Cymbella* including 15 species 06 varieties and 01 form were reported from Anjani dam. They were recorded maximum in summer season and minimum in winter season.

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