ISSN: 2278-4632
Vol-10 Issue-6 No. 15 June 2020

CONTRIBUTION TO DESMIDIACEAE GENUS–*CLOSTERIUM* NITZS. FROM JALGAON DISTRICT, MAHARASHTRA

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ABSTRACT

During the systematic investigation of desmidflora of Jalgaon district, Maharashtra, author visited to different fresh water habitats of Jalgaon district and recorded15 taxa of genus *Closterium* Nitzsch.Of these *Closteriumacutum* (Lyngb.) Breb.var. *linea* (Perty) West *et* West,*C.dianae*Ehr. var. *brevius* (Wittr.) Petkoff, *C.dianae* Ehr. var.*pseudodianae* (Roy) Krieg, *C.moniliferum* (Bory) Ehr. var. *malinvernianiforme* (Gronble) Kossinskaja are reported first time from Maharashtra. *Closteriumdianae*Ehr.var.*dianae*f. *dianae*isnewly added to Indian desmids while C. *archerianum* Cleve, *C.closterioides* (Ralfs.) Levis *et* Peetrs var. *closterioides* ,*C. cynthia* DeNot.,*C. kuetzingii*Breb.,*C.lanceolatum*Kuetz.,*C.leibleinii*Kuetz. var. *recurvatum*W. *et* G. S. West,*C.lunula* (Muell.) Nitzsch, *C. rectimarginatum* Scott *et*Prescott, *C.setaceum* Ehr. var. *minor* Kumawat and *C.tumidulum* Gay.are recorded from the study area. All the taxa are systematically described with illustrations.

Key words: Desmidiaceae, *Closterium*, Jalgaon district, Maharashtra.

INTRODUCTION

Our knowledge of desmids in Maharashtra is known through the work of Dixit (1937), Gonzalves and Joshi (1943), Kamat (1963, 1968,1974), Ashtekar and Kamat (1978), Freitas and Kamat (1978), Pingle (1988), Bodas (1991),Kalantri and Gunale(1992), Nandan(1993),Tarar*et.al* (1998),Pendse*et.al* (2000),Kumawat(2002),Divekar*et.al* (2005),Jawale*et.al* (2005),Kumawat*et.al* (2007), Mahajan and Nandan (2007,2008)Dhande*et.al* (2016).

The present communication includes total 15 taxa of genus *Closterium*Nitzsch which belongs to 07 species, 07 varieties and 01 forma. Of these 04 varieties have been reported new in Maharashtra and 01 forma is addition to Indian desmid population.

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MATERIAL AND METHODS

The present research work was carried out during August, 2017 to July, 2019. Algal samples were collected fortnightly or monthly intervals from the various fresh water bodiesof Jalgaon district through plankton net or by hand or scrapping from other objectsin water between 7.30 to 9.00 am in plastic vials. Collected samples were tagged and labelled then preserved with 4% formalin solution on the spot.Morpho taxonomy was performed in the Research Laboratory, Department of Botany, S. V. P, Arts and Science College, Ainpur. Morphological details were studied by using Labomed make Trinocular Research Microscope (Labomed Lx 400) . Camera lucida drawings were made with the help of mirror type of camera lucidafrom fresh as well as preserved material.The measurement of taxa was taken with the help of stage ocular micrometer. Identification of the taxa was based on standard literatures (Turner, 1892; West and West 1905,1908, 1912) and other relevant research publications. The collections have been deposited at Department of Botany, S. V. P. Arts and Science College, Ainpur bearing Accession numbers JD101 to 300.The numbers in the brackets at the end of description of each taxon , indicate the code numbers of algal samples.

RESULTS AND DISCUSSION

Systematic Enumeration

Closteriumacutum(Lyngb.)Breb.var. ***linea***(Perty) West *et* West**Pl. 1, Fig.1**B. N. Prasad and P. K. Misra, 1992, P. 100, Pl. 16, Fig. 2.

Cell 10.4 µm broad, 124.2µm long, straight, gradually attenuated to acute andfaintly curved apices; chloroplast with 10 pyrenoids, arranged in a row.

Habitat: Road side ditches near MotheWaghoda,August 2018, (JD204).

This alga is a new record for Maharashtra.

ClosteriumarcherianumCleve**Pl. 1, Fig. 14**

JiřiRůžička, 1973, P. 198, Pl.5, Fig. 10.

Cells 24.2 µm broad, 205.8µm long; relatively stouter and less curved in themiddle; apices obtuse; apex flattened at the end, wall thickened at thesides.

Habitat : Road side ditches near Nimbhora Railway station, July 2018, (JD118).

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Closteriumclosterioides(Ralfs.) Levis *et*Peetrs var. ***closterioides*****Pl. 1, Fig. 2**

JiřiRůžička, 1973, P. Pl.2, Fig. 22.

Cell 35.2 µm broad, 214.4µm long; straight on both sides slight notch present inthecentre, gradually tapering towards both ends, apices flatly obtuse; chloroplastlamellated, 5 pyrenoids in each semicell.

Habitat : Tapi river near Kandari, Bhusawal,October 2018 ,(JD128).

ClosteriumcynthiaDe Not.**Pl. 1, Fig. 10**

Waqar-ul-Haq, A. Zarina, Masud-ul-Hasan and Mustafa Shameel, 2009, P. 59, Fig. 4.

Cell lunate, tapering to sharp poles; wall with longitudinal striae; pyrenoids 5-6 in each semi-cell; curvature with 135-165 of arc.

Habitat : Road side ditches near Tandalwadi village , July 2018, (JD116).

ClosteriumdianaeEhr.var. ***brevius***(Wittr.) Petkoff**Pl. 1, Fig. 11**

O. O. Parra and M. Gonzalez, 1977, P. 17, Figs. 33-34; R. J. Patel and C. K. AsokaKumar, 1978, P. 114, Pl.1, Fig.9.

Cells 21.6 µm broad, 124.4µm long; strongly curved towards the apices, inner sideconcave, apex broadly acute; chloroplast lamellated with 4 - 6 pyrenoids.

Habitat : Tapi river near Kandari, Bhusawal October,2018 ,(JD128).

This alga is a new record for Maharashtra

ClosteriumdianaeEhr**.**var.***dianae*f. *dianae***Pl. 1, Fig. 13**

JiřiRůžička, 1973, P. 200, Pl.5, Figs. 3-4.

Cell 24.5 µm broad, 200.6 µm long; outer margin strongly curvedwith 112-125 degrees of arc, inner slightly tumid, cell gradually attenuated to acute orsubacute apices; cell wall smooth; chloroplast with 6-8 pyrenoids in a row.

Habitat : Road side ditches nearNimbhora Railway station, July 2018, (JD118).

This form is being reported for the first time from India.

ClosteriumdianaeEhr.var.***pseudodianae***(Roy) Krieg**Pl.1, Fig.7**

R. Groenblad, A. M. Scott and H. Croasdale, 1968, P. 9, Fig. 17.

Cell 17.1 µm broad, 231.5µm long; slightly curved, little inflated in the middletowards the inner side; pyrenoids 10 in the chloroplast in a linear series; apices acutelyrounded.

Habitat : Mangrul dam, Raver , November 2018,(JD182).

This alga is a new record for Maharashtra.

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ClosteriumkuetzingiiBreb. **Pl. 1, Fig. 15**

B. N. Prasad and P. K. Misra, 1992, PP. 107-108, Pl.16, Figs. 21-22.

Cell 4.5µm broad, 73.6 µm long; almost straight, median partfusiform, lanceolate with convex margins, cells tapering towards both extremity andending in long setaceous processes with parallel sides and rounded apices; cell-wall longitudinally striated; chloroplast with 4-5 pyrenoids, arranged in a row.

Habitat : Tapi river near KandariBhusawal, October 2018 ,(JD128).

ClosteriumlanceolatumKuetz.**Pl. 1, Fig. 5**

U. C. Pandey, I. Habib, F. C. Gangwar and H. M. Shukla, 1987, P. 91.

Cell 42.3µm broad, 219.5 µm long; lanceolate, dorsal side concave in the centrewhile ventral side slightly curved, uniformly narrowed towards the apices; apices rounded; chloroplast with 5 pyrenoids, in a row in each semicell.

Habitat : Road side ditches near Garbardi village Raver, January 2019, (JD144).

ClosteriumleibleiniiKuetz.var.***recurvatum***W. *et* G. S. West**Pl. 1, Fig. 12**

R. J. Patel and C. K. Asoka Kumar, 1978.P. 117, Pl.1, Fig. 11; B. N. Prasad and P. K.

Misra, 1992, P. 109, Pl. 17, Figs. 3,8.

Cell 22.7 µm broad, 206.3 µm long; strongly curved, outer margin with 115-120degrees of arc, inner margin deeply concave with inflated middle part, cells having slightlyrecurved apices; chloroplast with 4 ridges and 6 pyrenoids arranged in arow in each semicell.

Habitat : Road side ditches near Tandalwadi village, July 2018, (JD116).

Closteriumlunula(Muell.)Nitzsch**Pl. 1, Fig. 4**

G. S. Prescott, 1966, P. 6, Pl.2, Figs. 9, 10; JiřiRůžička, 1973, P. 201, Pl.3, Fig.13.

Cells 88.1–102 µm in diameter 494.8–607.8µm long; large, almost straight, broad abruptly but slightly attenuated near the poles which are truncatelyrounded; chloroplast with 4-5 ridges and containing 6 pyrenoidsin a row in each semicells.

Habitat : Mangrul dam, Raver, September 2017,(JD101).

Closteriummoniliferum(Bory) Ehr.var.***malinvernianiforme***(Gronble) Kossinskaja **Pl. 1, Fig. 9**

R. J. Patel and C. K. A. Kumar, 1978, P. 117, Pl.2, Fig.2.

Cell 11.1 µm broad, 112.1 µm long, moderately curved, inner margin distinctlyinflated in the middle, uniformly narrowed to the apices; apices obtusely rounded; cellwall smooth; chloroplast lamellate with 4-8 pyrenoids arranged in row in each semicell.

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Habitat : Aner river near GalangiChopda, July2018,(JD132).

This alga is a new record for Maharashtra.

ClosteriumrectimarginatumScott *et* Prescott **Pl. 1, Fig. 3**

R. J. Patel and C. K. A. Kumar, 1978, P. 119, Pl.2, Fig.7.

Cell 65.2 µm broad, 433.6µm long, straight, lanceolate, lateral margins slightlyconvex, gradually attenuated to the apices; apices truncate with rounded angles; chloroplast with about 3-4 ridges and 8 pyrenoids in a row in each semi cell.

Habitat : Aner river near GalangiChopda, July2018,(JD132).

ClosteriumsetaceumEhr.var.***minor***Kumawat**Pl., Fig. 6**

D. A. Kumawat, 2002, P. 61, Pl.11, Fig. 9.

Cell 4.5 µm broad, 73.5µm long, fusiform, lanceolate, almost straight, medianportion narrow, both margins equally convex extremities prolonged into slender,setaceous, colourless processes which are slightly incurved; apices obtuse; apical vacuoles with the base of the apical processes with few moving granules: chloroplast lamellate with 3 pyrenoids.

Habitat :: Road side ditches near MotheWaghode Raver, August 2018, (JD204).

ClosteriumtumidulumGay.**Pl. 1, Fig. 8**

JiřiRůžička, 1973, P. 202, Pl.2, Figs. 20-21.

Cells 16.5 µm broad, 131.6µm long; apex 3.6 µm wide, slightly to moderately curved,very slightly tumid in the median portion, gradually attenuated towards the apices, apicesacutely rounded; cell wall smooth; chloroplast lamellate with axially arranged 2-6 pyrenoids.

Habitat : Tapi river near NimgvhanChopda, November 2018,(JD129).

CONCLUSION

During the present investigationauthor recorded 15 of the genus*Closterium*Nitzsch belonging to 07 species , 07 varietiesand 01 forma. Of these 04 varieties *viz.Closteriumacutum*(Lyngb.)Breb.var. *linea*(Perty) West *et*West,*C.dianae*Ehr. var. *brevius*(Wittr.) Petkoff,*C.dianae*Ehr.var.*pseudodianae*(Roy) Krieg,*C. moniliferum*(Bory) Ehr. var. *malinvernianiforme*(Gronble) Kossinskaja are reported first time from Maharashtra and 01 forma*ClosteriumdianaeEhr.var. dianae*f. *dianae*is newly added to Indian desmid flora . The investigation on the algal diversity of this dam has never done before. The genus*Closterium*Nitzsch have been found dominant during rainy season.

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ACKNOWLEDGEMENTS

The author is thankful to Principal S.V.P. Arts and Science College, Ainpurfor extending laboratory facilities and also grateful to K. B. C. N. M. U. Jalgaon for financial assistance under the Vice Chancellor Research Motivation Scheme(VCRMS) head.

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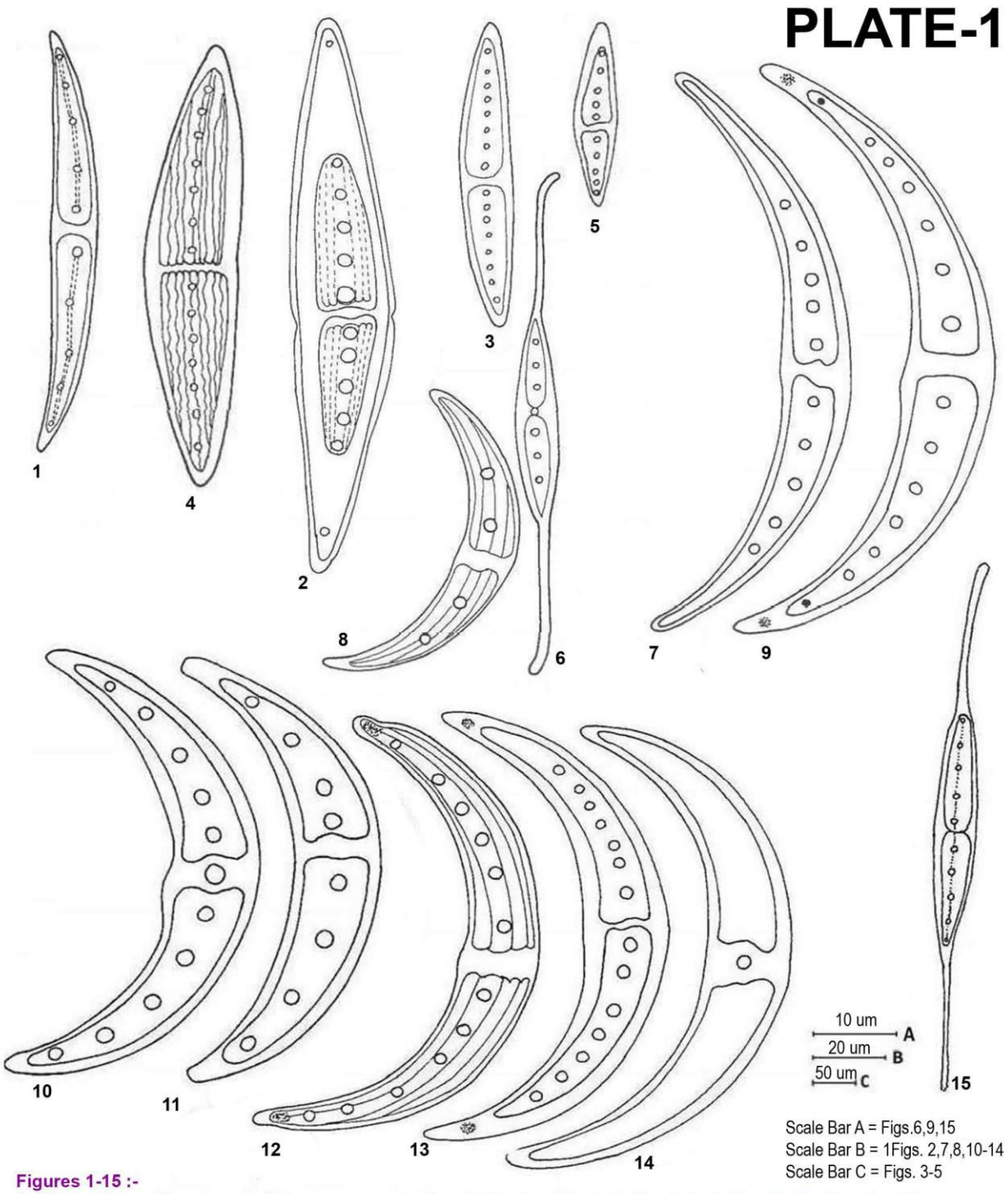

Figures 1-15 :-
1. *Closterium acutum* **(Lyngb.) Breb. var.** *linea* **(Perty) West et West, 2.** *C. closterioides* **(Ralfs.) Levis et Peetrs var.** *closterioides*, **3.** *C. rectimarginatum* **Scott et Prescott, 4.** *C. lunula* **(Muell.) Nitzsch 5.** *C. lanceolatum* **Kuetz., 6.** *C. setaceum* **Ehr. var.** *minor* **Kumawat, 7.** *C. dianae* **Ehr. var.** *pseudodianae* **(Roy) Krieg, 8.** *C. tumidulum* **Gay., 9.** *C. moniliferum* **(Bory) Ehr. var.** *malinvernianiforme* **(Gronble) Kossinskaja, 10.** *C. cynthia* **De Not., 11.** *C. dianae* **Ehr. var.** *brevius* **(Wittr.) Petkoff, 12.** *C. leibleinii* **Kuetz. var.** *recurvatum* **W. et G. S. West, 13.** *C. dianae* **Ehr. var.** *dianae* **f.** *dianae*, **14.** *C. archerianum* **Cleve , 15.** *C. kuetzingii* **Breb.**