

DIVERSITY OF GENUS *COSMARIUM* FROM BODALKASA DAM, GONDIA DISTRICT, MAHARASHTRA, INDIA.

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Abstract:

This work deals with the 12 taxa of *Cosmarium* collected from Bodalkasa dam, Gondia district, Maharashtra for four years (2014-2018). All taxa were first time reported from this waterbody. *Cosmarium auriculatum* Reinsch, *Cosmarium divergens* Krieger, *Cosmarium ralfsii*, Brebison ex Ralfs. *Cosmarium perforatum*, P. Lundell et al., *Cosmarium phaseolus* Breb. ex Ralfs, var. *phaseolus* f. *minus* Boldt, *Cosmarium portianum* Arch., *Cosmarium granatum* Brebisson ex Ralfs, *Cosmarium regnelli* Wille var. *regnelli*, *Cosmarium reniforme* (Ralfs) Arch., *Cosmarium biretum* Brebisson ex Ralfs,, *Cosmarium holmiense* Lundell var. *integrum* and *Cosmarium quadrum* Lundell var. *minus* are found in this water body.

Index terms: *Cosmarium*, Bodalkasa, Gondia, Diversity.

1. Introduction:

According to F.E.Fritsch 1935, *Cosmarium* placed under Sub order *Desmidioidae* of Order *Conjugales* belonging to Class *Chlorophyceae*. Distribution of *Cosmarium* found throughout India and Maharashtra. Word *Cosmarium* derived from Greek *Cosm*=ornament; *arium*=place means ornamented place or cell. According to Guiry and Guiry (2013), 1050 out of 2294 species are accepted taxonomically.

These are single celled algae with central groove which divide cell into two half cells. Frontal view gives cells oval or rounded appearance, but when view from sides it seems to be flatted or rounded. Cell wall may be smooth or ornamented. Semicell contain atleast one chloroplast at centre.

Found in freshwater ecosystem have slightly acidic nature, but sometimes it found in basic or eutrophic water.

2. Study area:

Bodalkasa dam is located on Bhagdeogoti river at village Bodalkasa, taluka Tirora, district Gondia, it is earth fill type dam. The main purpose of this dam is irrigation. Its construction was completed in year 1917. The length of dam is 510-meter, gross storage capacity 17.392 MCM and live storage capacity 16.454 MCM.

3. Material and methods:

Material and methods for the study is divided into broadly four headings, they are

3.1 Sample collection: Season wise collection of samples was done from the different sites of dam in early morning period of 10 AM to 12 AM.

3.2 Preservation of sample: 4 % formalin is use to preserve sample at a spot. To maintain moisture few drops of glycerine is added to the formalin solution.

3.3 Identification of form: Temporary microscopic slide was made with dilute glycerine and observed under microscope at different magnification. Selected slides were used for micrometry and digital photography.

3.4 Digital photography and micrometry: Focused form of algae under microscope is used for instant photography by using digital camera. Size and dimension of form were drawn using Camera lucida and micrometre (Stage and ocular).

4. Result and discussion:

1. *Cosmarium auriculatum* Reinsch (Plate I, Fig.1)

Prasad and Misra-1992; 153: Pl. - 22, F.-14

Dimension:**Length** : 53.504 μ long**Width**: 49.856 μ in dia.,**Isthmus**: 24.32 μ wide.**Habitat**- Dam water (BDW52-2015, BDW125-2016) and spillage of dam (BS-26-2014, BS-86-2017)**Occurrence**-Bengal (Turner, 1892), Manipur (Bruhl and Biswas, 1926), Delhi (Singh, 1966a), Andhra Pradesh (Suxena and Venkateswarulu, 1968a), Gujarat (Patel, 1969; Ashoka Kumar and Patel, 1988), Madhya Pradesh (Agarkar, 1969; Patel and Satyanarayan, 1976; Misra, 2007), Maharashtra (Kamat, 1975; Frietas and Kamat, 1979), Rajasthan (Patel and Rao, 1975), Uttar Pradesh (Prasad and Mehrotra, 1977d; Pandey and Pandey, 1980b), Karnataka (Somashekhhar, 1984a), Kerala (Shaji et. al., 1988).**2. *Cosmarium divergens* Krieger, 1932: (Plate I, Fig.2)**

Hirano Minoru-1992; 29: Pl.-51, F.-20.

Krieger1932, 175,plate 11, Fig. 20.

Dimension:**Length** : 23.1 μ long**Width**: 21.4 μ in dia.,**Isthmus**: 16.5 μ wide.**Distinct features**: Cell deeply constricted and isthmus wide.**Habitat**-Dam water (BDW152-2018) and spillage (BS-97-2016)**Occurrence**: Gujarat (Ashoka Kumar and Patel, 1988), Maharashtra (Dhande and Jawale, 2009)**3. *Cosmarium ralfsii* ,Brebison ex Ralfs. 1848. (Plate I, Fig.3)**

Wolle Francis 1892:93 Plate 18; Fig. 1

Pleurotaeniopsis ralfsii (Ralfs) Detoni 1889**Dimension: -****Length**: 53.956 μ **Width**: 55.272 μ **Distinct feature**: - Cell medium sized, sub-orbiculate, very rare.**Habit**: - Dam water (BDW29-2015)**Occurance**: Maharashtra (Patil, Kiran P., et al. 2017); Kerala (Shaji et al. 1988)**4. *Cosmarium perforatum*, P. Lundell et al. 1871:40, Plate II: Fig. 16. (Plate I, Fig.4)****Habit**: Dam Water**Dimension:****Length**: 60.8 μ **Width**: 54.72 μ **Distinct features**: Large sized, Cell sinus shows Acute angle, Cell wall shows distinct pores.**Habit**: Water of dam (BDW158-2018)**Occurance**: Madhyapradesh (Bhatt et al. 2015). It is first reported from Maharashtra, and rare in India.**5. *Cosmarium phaseolus* Breb. ex Ralfs, var. *phaseolus* f. *minus* Boldt 1848(Plate I, Fig.5)**

Prescott et al., p.222, plate 171, figure 4 and 5; Boldt, 1887, p. 102

Dimension:**Length**:24.32 μ **Width**:23.104 μ **Isthmus**: 3.684 μ **Distinct feature**: Small, width and length are slightly equal in size, sinus very narrow and with deep constriction. Semi cells somehow looks reniform in structure.**Habit**: Almost maximum collected sample from dam (BDW2-2014, BDW12-2015, BDW59-2016, BDW92-2017, BDW158-2018.)**Occurrence**: Maharashtra (Dixit , 1937; Dhande and Jawale,2009); Madhyapradesh (Agarkar et al. 1979); Eastern and Sikkim Himalaya (Das and Keshri , 2012)**6. *Cosmarium portianum* Arch. (Plate I, Fig.6)**

Scott and Prescott, 1961. Page 65, Plate 28, fig. 8.

Dimension:**Length**: 25.536 μ **Width**: 18.25 μ **Isthmus**: 4.864 μ **Distinct Feature**: Medium sized , Semicells are reniform , elongated isthmus

Habit: Dam water (BDW85-2017, BDW110-2018, BDW113-2018).

Occurance: Maharashtra (Kamat, 1975a and b; Freitas and Kamat, 1979), Madhyapradesh (Agarkar et al. , 1983), Gujarat (Ashokkumar and Patel, 1988), Kerala (Shaji and Patel , 1991), Tamilnadu (Perumal and Anand, 2008), East India (Turner, 1892).

7. *Cosmarium granatum* Brebisson ex Ralfs, 1848(Plate I, Fig.7)

Dimension

Length : 40.128 μ

Width: 27.968 μ

Isthmus : 6.08 μ

Distinct feature: Medium sized, Cell slightly pyramidate with round angle, isthmus closed and sinus narrow, cell wall punctate.

Habit: Dam water (BDW42-2016, BDW86-2016, BDW103-2017, BDW187-2018) and spillage (BS14-2014, BS58-2016, BS114-2018).

Occurance: Maharashtra (Gonzalvales and Joshi, 1946; Kamat, 1963c; Asthekar and Kamat 1979; Patil and Kumavat, 2014, Patil and Deore,2017), Asam (Carter, 1926; Biswas, 1934), Andhra Pradesh (Suxena and Venkateswarulu, 1968a) Gujarat (Kamat, 1962; Ashoka kumar and Patel, 1988), Karnataka(Jayangoudar, 1964, Bharati, 1966; Somashekar,1984a), Madhyapradesh (Agarkar,1969) Panjab (Singh 1966a,b) , Tamilnadu (Mahendraperulam and Anand , 2009; Mayakkannam,2010), Uttar Pradesh (Suxena, 1960; Laxminarayana, 1963;)

8. *Cosmarium regnelli* Wille var. regnelli (Plate I, Fig.8)

Dimension:

Length: 12.16 μ

Width: 10.944 μ

Isthmus: 4.864 μ

Distinct features: cell small, deep constriction is present in middle of cell, apical indentation is absent, each half of cell is somehow rectangular in shape, corners of cells seem rounded, sinus open and linear.(illustration of the Japanese Freshwater Algae, 1977)

Habit: Dam water (BDW32-2015, BDW122-2018) and spillage (BS14-2014 , BS74-2016)

Occurance:Maharashtra (Patil and Kumavat , 2014), this is first time report from Vidarbha region.

9. *Cosmarium reniforme* (Ralfs) Arch. (Plate I, Fig.9)

Dimension:

Length: 37.696 μ

Width: 34.048 μ

Isthmus: 12.16 μ

West and West,1908; 3, plate 79, fig. 1 and 2, p157.

Habit: Dam water (BDW32-2016, BDW27-2015)

Occurance: Maharashtra (Kamat, 1975a; Dhande and Jawale, 2009), Uttar Pradesh (Tiwari and Chauhan, 2007).

10. *Cosmarium biretum* Brebisson ex Ralfs, 1848 (Plate I, Fig.10)

Wolle Francis 1892 , Plate 20, Fig 1 and 2.

Dimension

Length: 51.072 μ

Width: 46.208 μ

Isthmus: 12.16 μ

Distinct features: Rare in occurrence. It may be first time from Maharashtra and Vidharbha.

Habit:- Water of dam

Occurance :- No any evidence found from Maharashtra for this. Gujarat (Patel, 1969), Andhra Pradesh (Pandey and Pandey , 1980a), Tamilnadu (Mayakkannam, 2010).

11. *Cosmarium holmiense* Lundell var. *integrum* (Plate I, Fig.11)

Dimension:

Length: 49.856 μ

Width: 35.264 μ

Isthmus: 17.024 μ

Distinct features: Broad isthmus, constriction just below the apex

Habit: Dam Water (BDW57-2016)

Occurance: It may be first report from Maharashtra and Vidarbha.

12. *Cosmarium quadrum* Lundell var. *minus* Nordst., 1873 (Plate I, Fig. 12)**Lund. Uni. Arssskr. 9(10):11.1873.***Aquino et al. 2016. Hoehnea 43(4): plate 3, fig. 32***Dimension:****Length:** 36.48 μ **Width:** 35.264 μ **Isthmus:** 13.376 μ **Habit:** Dam Water (BDW13-2015, BDW47-2016, BDW108-2018)**Occurance:** Not specified

- 5. Conclusion:** Total twelve (12) taxa of *Cosmarium* are found during investigation. These all are first time reported from this waterbody. Collection of samples was done from Lotic and Lentic water of Dam and spillers of dam. These are *Cosmarium auriculatum* Reinsch, *Cosmarium divergens* Krieger, *Cosmarium ralfsii*, Brebison ex Ralfs, *Cosmarium perforatum*, P. Lundell et al., *Cosmarium phaseolus* Breb. ex Ralfs, var. *phaseolus* f. *minus* Boldt, *Cosmarium portianum* Arch., *Cosmarium granatum* Brebisson ex Ralfs, *Cosmarium regnelli* Wille var. *regnelli*, *Cosmarium reniforme* (Ralfs) Arch., *Cosmarium biretum* Brebisson ex Ralfs, *Cosmarium holmiense* Lundell var. *integrum* and *Cosmarium quadrum* Lundell var. *minus*.

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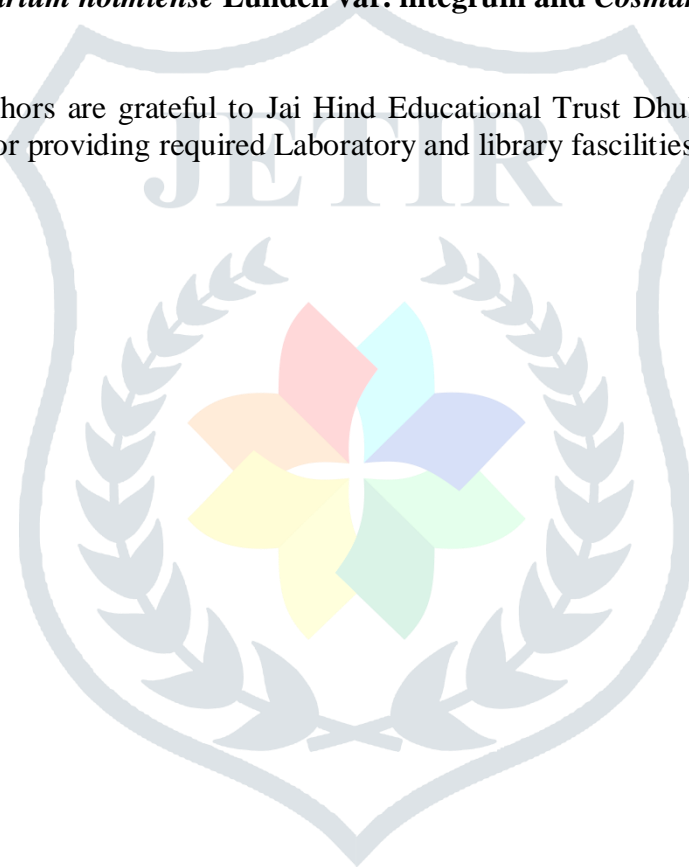
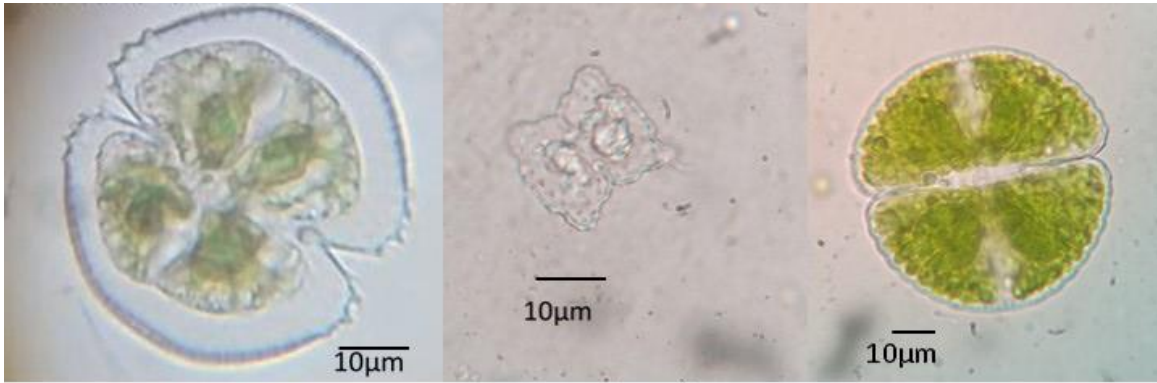
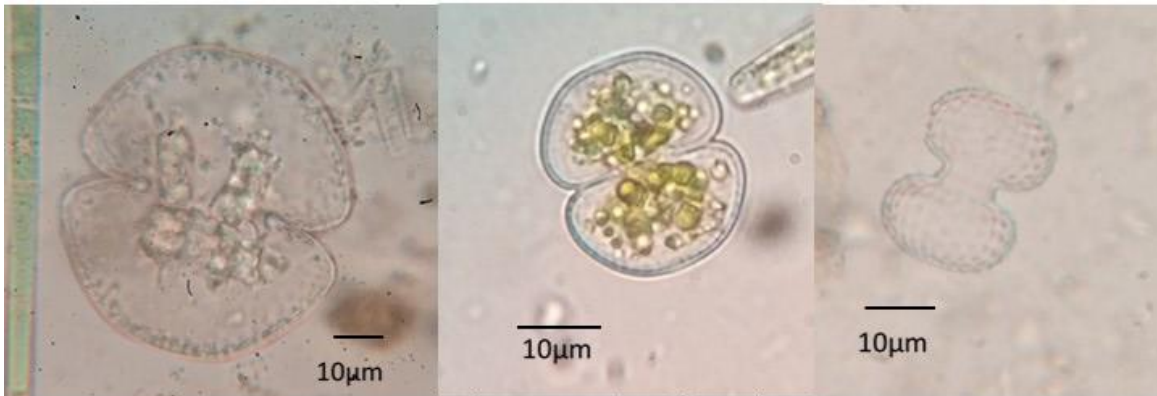
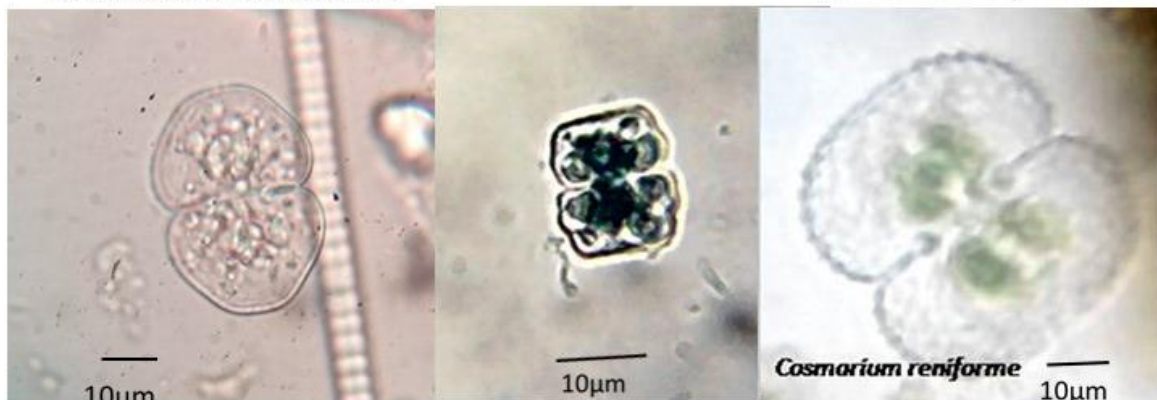
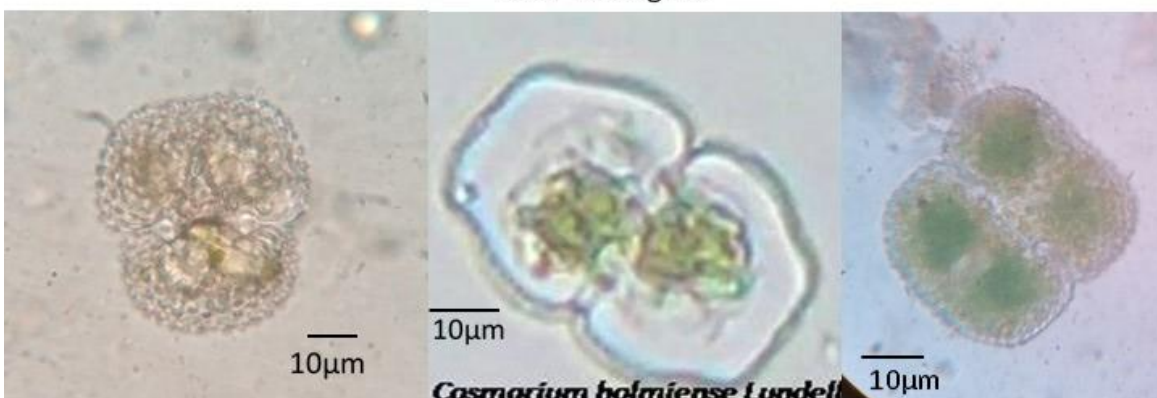


PLATE-I

Fig.1 *Cosmarium auriculatum*Fig.2 *Cosmarium divergens*Fig.3 *Cosmarium raifsii*Fig.4 *Cosmarium perforatum*Fig.5 *Cosmarium Phaseolus*Fig.6 *Cosmarium portianum*Fig.7 *Cosmarium granatum*Fig.8 *Cosmarium regnelli*
Wille var. *regnelli*Fig.9 *Cosmarium reniforme*Fig.10 *Cosmarium biretum*Fig.11 *Cosmarium holmiense*
Lundell var. *integrum*Fig.12 *Cosmarium quadrum*
Lundell var. *minus*

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