Research article Available online www.ijsrr.org ISSN: 2279–0543

International Journal of Scientific Research and Reviews

# An Account of Desmid Diversity from Kolhapur Distric(Maharashtra), India.

**Joshi Hemant[1], Khade S. K.[2] and Karande C. T. [3]***

[1,3]Department of Botany, Miraj Mahavidyalaya, Miraj, Maharashtra, INDIA
Email: principal.mmmiraj@gmail.com, Mobile No. 9422600166
[2]Department of Botany, Dattajirao Kadam Arts, Science and Commerce College, Ichalkaranji, Maharashtra, INDIA

## ABSTRACT:

Desmids are the most beautiful conjugal members of Chlorophyceae as they represent the unicellular conjugales among the green algae. Desmids have played an important role in the phytoplankton biodiversity of major and minor water bodies. Present survey is the outcome of thorough screening of water bodies from Kolhapur district. During the systematic investigations on the desmid biodiversity of Kolhapur district, Maharashtra, authors recorded 86 taxa belonging to 13 genera viz., *Actinotaenium* (Nageli) Teiling, *Closterium* Nitzsch ex Ralfs, *Cosmarium* Ralfs, *Desmidium* C. Agardh, *Euastrum* C.G. Ehrenberg ex Ralfs, *Micrasterias* C. Agardh, *Netrium* (Nageli) Itzigsohn & Rothe, *Pleurotaenium* Nageli, *Spondylosium* Brebisson ex Kutzing, *Staurastrum* (Meyen) Ralfs, *Staurodesmus*, *Triploceras* J.W. Bailey, *Xanthidium* C.G. Ehrenberg ex Ralfs. The survey revealed the dominance of *Cosmarium* in the study area.

**KEYWORDS**: Desmids, Kolhapur, Conjugales, diversity.

***Corresponding author**

**C. T. Karande**

Department of Botany,

Miraj Mahavidyalaya, Miraj, Maharashtra

Email: principal.mmmiraj@gmail.com, Mobile No. 9422600166

## INTRODUCTION

Desmids are the unicellular members of Conjugales which resemble to the other members of this group in the mode of reproduction. Primarily desmids exhibit two symmetrical halves, each containing one or two chloroplasts and may or may not be separated by a median constriction. Desmids being beautiful entities several workers were fascinated to work on them. Iyengar and Baihave studied desmids flora from Kodai Canal, South India[1]. Agarkar et al. have recorded desmids from Bandhagarh[2], Bharati and Hedge have studied desmids from Karnataka State and Goa[3]. Prasad and Misra have reported a new species of *Closterium* Nitzsch and 9 taxa of *Cosmarium* Corda ex Ralfs from India[4,5]. Hedge and Bharati also have noted *Staurastrumagum beyense* and *S. biwaensis* Hirano var. *sorabnum* from Karnataka[6]. Kant and Gupta have studied 166 taxa from Leh Kashmir[7]. Habib et al. have described some desmids flora from Kumaon Himalaya, U.P[8]. Habib and Chaturvedi contributed to the knowledge of desmids of Kumaon Himalaya[9]. Misra et al. have studied some desmids from Gorakhpur, Uttar Pradesh and further reported some desmids from district Mau, U.P[10,11]. Shukla et al. studied desmids of foothills of Western Himalaya[12]. Furthermore, members of desmids from Garhwal region of Uttarkhand were also reported by Misraet. al.[13].Also Das and Keshri investigated desmid biodiversity from Manmencho Lake, Eastern Himalayas and Southern parts of Sikkim respectively[14,15].

Patil and Jawale reported desmids from Mangrul Dam, Jalgaon District, Maharashtra[16]. Also during the limnological study of Venna Lake, Mahableshwar few members of desmids have been reported by Patilet. al[17]. Members of *Cosmarium*, *Closterium* and few other desmids were observed by Anekar from the lakes of Shivaji University, Kolhapur[18].Few other workers have also reported about desmids from Maharashtra.

Kolhapur District is located in the grids of Western Ghats and has anuniquetopography. It lies between $15^0$43’ to $17^0$17’ N latitude to $73^0$40’ to $78^0$42’ E longitude. Kolhapur has an area of 7685 Sq.km with 12 tehsils. Most of the regions in the district receiveup to400 mm rainfall. Geographically Kolhapur district can be distinctly divided into three regions i.e. Western Ghats, Panhala (hilly central area) and the plateau region on the eastern parts of district. Importantly, seven rivers along with dams built on them have led to high percolation of water. Due to such geographical features of the district, this area has been considered for the survey.

## MATERIAL AND METHODS

Water samples and algal samples from different localities of Kolhapur district were collected during 2015-2017. Habitats like ponds, rivers, dams, tanks, paddy fields were monitored during

different seasons. Samples were collected and stored in glass bottles (200ml capacity). Samples were preserved in 4% Formalin. The algal specimens were identified by using standard literature and microphotographs were taken with the help of Dewinter Optical microscope.

## RESULT

Present exploration has indicated the desmid diversity in Kolhapur District. The collections were made throughout the year and in all the 12 tehsils from Kolhapur. Habitats including lentic and lotic water systems were screened for collections. The results are shown in **Tables 1** which record the occurrence of desmid diversity in Kolhapur district. A total of 86 taxa under 13 genera have been recorded from different localities in the district. The details about the distribution of these taxa can be enumerated as follows:

*Actinotaenium*- 3 members; *Closterium*-10 members, *Cosmarium*- 34 members, *Desmidium*- 2 members, *Euastrum*- 12 members, *Micrasterias*- 1 member. *Netrium*- 2 members, *Pleurotaenium*- 2 members, *Spondylosium*- 1 member, *Staurodesmus*- 2 members, *Staurastrum*- 13 members, *Triploceras*- 1 member, *Xanthidium*- 3 members

**Table 1 Occurrence of Desmid Diversity in Kolhapur District**

| Sr. No. | Name of Organism | Sr. No. | Name of Organism |
|---|---|---|---|
| | **Genus: *Actinotaenium*** | 18 | *Cosmarium Cuneatum* Josh |
| 1 | *Actinotaeniumcapas* | 19 | *Cosmarium Depressum* (Nag,) Lund. |
| 2 | *Actinotaenium Cucurbitinum* Teil*fa minus* (West & West) Teil. | 20 | *Cosmarium Furcatospermum* W. et G.S. West |
| 3 | *Actinotaenium Curtum* (Brébisson ex Ralfs) Teiling | 21 | *Cosmarium Holmience* Lundell |
| | **Genus: *Closterium*** | 22 | *Cosmariumimpressulum* Elfving |
| 4 | *Closteriumacutum* Brebisson | 23 | *Cosmariumlundelli* Delponte |
| 5 | *Closteriumaciculare* T. West | 24 | *Cosmarium Mansanganese* West and West |
| 6 | *Closterium Ehrenbergii* Meneghinii | 25 | *Cosmarium Margaritatum* (Lund) Roy & Biss et var*quadrum* |
| 7 | *Closterium Lineatum* Ehrenberg ex Ralfs | 26 | *Cosmarium Margaritifer Um* Meneghini |
| 8 | *Closterium Lunula* Ehrb & Hemp. ex Ralfs | 27 | *Cosmarium Medio Scrobiculatum* West & West |
| 9 | *Closterium Moniliferum* Ehrb. ex Ralfs | 28 | *Cosmarium Minimum* West et G. S. West |
| 10 | *Closterium Navicula* (Brebisson) Lutkemuller | 29 | *Cosmarium Moniliforme* (Turpin) Ralfs |

| | | | |
|---|---|---|---|
| 11 | *Closterium Parvulum* Naegeli | 30 | *Cosmarium Nitidulum* De Notaris |
| 12 | *Closterium Toxon* W. West | 31 | *Cosmarium Obsoletum* (Hantzsch) Reinsch |
| 13 | *Closterium Venus* Kuetz | 32 | *Cosmarium Ocellatum* Eichl. And Gutw. |
| | **Genus: *Cosmarium*** | 33 | *Cosmarium Parvulum* Var *Cornutum* |
| 14 | *Cosmarium Abbreviatum* Raciborski | 34 | *Cosmarium Perfissum* G. S. West |
| 15 | *Cosmarium Anceps* Lund | 35 | *Cosmarium Pseudoconnatum* Nordst |
| 16 | *Cosmarium Contractum* Kirchner Var*pachydermum* Scott & Prescott | 36 | *Cosmarium Pseudogranatum* Nord. |
| 17 | *Cosmarium Connatum* Brebisson ex Ralfs | 37 | *Cosmarium Pseudo Pyramidatum* Lundel |
| **Sr. No.** | **Name of Organism** | **Sr. No.** | **Name of Organism** |
| 38 | *Cosmarium Quadrifarium* Lund | 60 | *Euastrums pinulosum* Delp. |
| 39 | *Cosmarium Quadrum* Lund | 61 | *Euastrum Spinulosum* var. *inermius* (Nordstedt) C. Bernard |
| 40 | *Cosmarium Quadrum* Lund Var*minus* Nordst | | **Genus: *Micrasterias*** |
| 41 | *Cosmarium Raniforme* (Ralf's) W. Archer | 62 | *Micrasterias Zeylanica* Fritsch |
| 42 | *Cosmarium Retusiforme* (Wille) Gutw. | | **Genus: *Netrium*** |
| 43 | *Cosmarium Subalatum* West et G.S. West | 63 | *Netriumdigitus* (Ehrbg.) Itzigs&Rothe |
| 44 | *Cosmarium Subtimidum* Nordst | 64 | *Netriumoblongum* (De Bary) Lutkemuller |
| 45 | *Cosmarium Tagmasterion* Prescott | | **Genus: *Pleurotaenium*** |
| 46 | *Cosmarium tinctum* Ralfs | 65 | *Pleurotaenium Baculoides* Playf. |
| 47 | *Cosmarium Undulatum* Corda ex Ralfs | 66 | *Pleurotaenium Ehrenbergii* De bry |
| 48 | *Desmidium Aptogonum* Brebisson ex Kutzing | | **Genus: *Spondylosium*** |
| 49 | *Desmidium Swartzii* Agardh | 67 | *Spondylosium Moniliforme* Lund. |
| | **Genus: *Euastrum*** | | **Genus: *Staurodesmus*** |
| 50 | *Euastrum Acanthophorum* Turn. | 68 | *Staurodesmus Convergens* (Ehrb. ex Ralfs) Lilleroth |
| 51 | *Euastrum Ansatum* Ehrbg | | |
| 52 | *Euastrum Bombayense* P. E. Brandham | 69 | *Staurodesmus Glaber* (Ralfs) Teiling |
| 53 | *Euastrum bombayense*var*gokakense* Bongale et Kaulapur | | **Genus: *Staurastrum*** |
| 54 | *Euastrum Dubium* Naegeli | 70 | *Staurastum Brevispinum* Breb. |

| | | | |
|---|---|---|---|
| 55 | *Euastrum Flammeum* Var*kalimonatum* | 71 | *Staurastrum Cerastes* Lund. |
| 56 | *Euastrum Incavatum* Josh & Nordst | 72 | *Staurastrum Crenulatum* (Nag) Delp |
| 57 | *Euastrum Incavatum* War *Platycephalus* Prescott | 73 | *Staurastrum for ficulatum* Lund |
| 58 | *Euastrum irregular* Maskell | 74 | *Staurastrum Iotanum* Wolle |
| 59 | *Euastrum sinuosum* Lenorm. | 75 | *Staurastrum Leptocladum* Nordst. |
| **Sr. No.** | **Name of Organism** | **Sr. No.** | **Name of Organism** |
| 76 | *Staurastrum Manfeldtii* Delponte | | **Genus: *Triploceras*** |
| 77 | *Staurastru Morbiculare* (Ehr.) Ralfs | 83 | *Triplocera Sgracile* Bail |
| 78 | *Staurastrum orbiculare* Var *Depressum* | | **Genus: *Xanthidium*** |
| 79 | *Staurastrumpinnatum* Turner | 84 | *Xanthidium Cristatum* Breb. ex Ralfs |
| 80 | *Staurastrum Sebaldi* Reinsch | 85 | *Xanthidium Spinosum* (Josh) West & West |
| 81 | *Staurastrum Sub Gracillimum* West | 86 | *Xanthidium Tetracanthum* Turner |
| 82 | *Staurastrum Subsuecium* Scott & Prescott | | |

## DISCUSSION:

In the present investigation the phytoplankton abundance was dominated by *Cosmarium*. Shukla et. al. collected 48 taxa of desmids from different aquatic habitats from foothills of Western Himalaya, India[12]. 12 taxa each were reported from Manmecho Lakes, Eastern Himalaya and South Sikkim regions by Das and Keshri respectively[14]. Mishra et. al. reported 42 taxa belonging to 7 genera of desmids from two districts of Uttarkhand, India[13]. The diversity of desmids from the above communications is reasonably low to the present communication.

Smita Anekar et. al. during her investigations of algal diversity of lakes in Shivaji University, Kolhapur reported 19 members of desmids[18]. Supriya Gaikwad et. al. recorded 24 species of desmids from Rajaram reservoir, Kolhapur[19]. Bhosale and coworkers reported 23 members under desmids from lakes in and around Kolhapur City[20]. Patil and Kumavat reported 36 species of desmids from Abhora Dam of Raver tehsil of Jalgaon district[21]. While studying desmid diversity from Mangrul Dam, Jalgaon, Patil and Jawale also reported 36 species[22]. In both the investigations, Genus *Cosmarium* shows highest diversity as same in the present investigation.

This change in the diversity may be due to lack of compilation of data and also due to previously unexplored areas in and around Kolhapur. Basavraj et al. during their phytoplanktonic

studies in Anjanapura reservoir, Western Ghat region revealed 33 taxa belonging to 28 genera of desmids[23]. In comparison with the data above, 28 genera is comparatively high. This may be due to inaccessible areas in Kolhapur district which makes very difficult for algal exploration.

The desmids are usually indicators of relatively unpolluted water, low in calcium and magnesium, with a slightly acidic pH. Normally a large number of species are present in such waters, without a single species comprising most of the population. Many of the water bodies are popular for fishing to the villagers. The abundance of prey (phytoplankton) & predator (fish and other aquatic animals) reveals the ecological stability of this lake. The present examinations will give a base for further work in these regions. Further limn logical analysis and seasonal investigations will illustrate much information about the biological diversification of this district.

## ACKNOWLEDGEMENT

Authors are thankful to Secretary, Y. S. Sanstha Sangli, Kupwad for the encouragement and support.

## REFERENCES

1. Iyengar M, Vimala B. Desmids from Kodaikanal, South India. J. Indian Bot. Soc. 1941; 20: 73-103.
2. Agarkar D. Agarkar M, Dikshit R. Desmids from Bandhavgarh, Madhya Pradesh, India. Hydrobiologia. 1979; 65: 213-223.
3. Bharati S, Hedge G. Desmids of Karnataka state and Goa. Part 1. Phykos. 1982; 21: 143-149.
4. Prasad B, Misra P. Some taxa of genus *Closterium* Nitzs. New to Indian flora. J. Indian Bot. Soc. 1984; 63: 451-452.
5. Prasad B, Misra P. Some taxa of *Cosmarium* Corda ex Ralfs new to Indian Desmid flora. J. Indian Bot. Soc. 1985; 64: 343-347.
6. Hedge G, Bharati S. *Staurastrum Agumbeyense* sp. nov. and *Staurasturm biwaensis* Hirano. var. *sorabanum* var. nov. from Karnataka state India. J. Indian Bot. Soc. 1985; 64: 189- 190.
7. Kant S, Gupta P. Algal flora of Ladakh. Additional Series, J. Eco. Taxon. Bot. 1998; 15: 341.
8. Habib I, Ansari A, Mehrotra D, Chaturvedi U. Some desmids from foot hills zone of Kumaon Himalaya. Nature Biosphere. 1998; 3: 36-40.
9. Habib I, Chaturvedi U. Contribution to the knowledge of desmid of Kumaon in Himalaya. J. Indian. Bot. Soc. 2011; 80: 177-182.
10. Misra P, Shukla M, Misra P, PrakashJ. Some desmids from Chilwa Lake, Gorakhpur, Uttar Pradesh. J. Appl. Bioscience. 2007; 33: 80-83.

11. Misra P, Shukla M, PrakashJ. Some fresh water algae from Eastern Uttar Pradesh. Indian Hydrobiology. 2008; 11: 121-132.
12. Shukla S, Shukla C, Misra P. Desmids (Chlorophyceae, Conjugales, Desmidiaceae) from foot hills of Western Himalaya, India. Algae. 2008; 23:1-14.
13. Misra P, Misra P, Shukla M, Prakash J. Some desmids from Garhwal region of Uttarakhand, India. Algae. 2008; 23(3): 177-186.
14. DasD, Keshri J. Desmids from Manmecho (Mamencho) Lake, Eastern Himalaya. I. NeBio. 2012; 3(2): 37-44.
15. Das D, Keshri J. Desmids from South Sikkim, India. Nelumbo. 2013; 55: 172-180.
16. Patil S; Jawale A. Desmids from Mangrul dam, Dist. Jalgaon, Maharashtra. International Journal of Geology, Earth and Environmental Sciences. 2014; 4(1): 137-146.
17. Patil S, Karande V, Karande C. Limnological study of Venna Lake, Mahableshwar, Maharashtra, India. International Research Journal of Environmental sciences. 2015; 4(8): 45-49.
18. Anekar S, PatilS, DongareM. An account of algal diversity from the lakes of Shivaji University campus Kolhapur (Maharashtra) India. Advances in Plant Sciences. 2012; 25(2): 629-632.
19. Gaikwad S, PatilS, DongareM. Impact of anthropogenic activities on the phytoplankton diversity of Rajaram Reservoir, Kolhapur, Maharashtra, India. Nature Environment and Pollution Technology. 2013; 12(2): 261-266.
20. Bhosale L, Patil S, Dhumal S, Sabale A. Occurrence of phytoplankton in the lakes in and around Kolhapur City. Indian Hydrobiology. 2010; 12(2): 133-142.
21. Patil S, Kumawat D. Desmids From Abhora Dam Of Raver Tahsil Of Jalgaon District, Maharashtra. CIB Tech Journal of Microbiology. 2015; 4(1): 28-37.
22. Patil S, Jawale A. Desmids from Mangrul dam, Dist. Jalgaon, Maharashtra. International Journal of Geology, Earth and Environmental Sciences. 2014; 4(1): 137-146.
23. Basavaraja D, Narayana J, Jogattappa, Puttaiah E, PrakashK.. Phytoplankton species diversity indices in Anjanapura reservoir, Western Ghat region, India. Journal of Environ Biol. 2013; 34: 805-10.