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

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#### **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, *Stauroidesmus*, *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.

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## 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<sup>1</sup>. Agarkar et al. have recorded desmids from Bandhagarh<sup>2</sup>, Bharati and Hedge have studied desmids from Karnataka State and Goa<sup>3</sup>. Prasad and Misra have reported a new species of *Closterium* Nitzsch and 9 taxa of *Cosmarium* Corda ex Ralfs from India<sup>4,5</sup>. Hedge and Bharati also have noted *Staurastrumagum beyense* and *S. biwaensis* Hirano var. *sorabnum* from Karnataka<sup>6</sup>. Kant and Gupta have studied 166 taxa from Leh Kashmir<sup>7</sup>. Habib et al. have described some desmids flora from Kumaon Himalaya, U.P<sup>8</sup>. Habib and Chaturvedi contributed to the knowledge of desmids of Kumaon Himalaya<sup>9</sup>. Misra et al. have studied some desmids from Gorakhpur, Uttar Pradesh and further reported some desmids from district Mau, U.P<sup>10,11</sup>. Shukla et al. studied desmids of foothills of Western Himalaya<sup>12</sup>. Furthermore, members of desmids from Garhwal region of Uttarkhand were also reported by Misra et al.<sup>13</sup>. Also Das and Keshri investigated desmid biodiversity from Manmencho Lake, Eastern Himalayas and Southern parts of Sikkim respectively<sup>14,15</sup>.

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

Kolhapur District is located in the grids of Western Ghats and has a unique topography. It lies between 15<sup>o</sup>43' to 17<sup>o</sup>17' N latitude to 73<sup>o</sup>40' to 78<sup>o</sup>42' E longitude. Kolhapur has an area of 7685 Sq.km with 12 tehsils. Most of the regions in the district receive up to 400 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 (200 ml 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
	<b>Genus: Actinotaenium</b>	18	<i>Cosmarium cuneatum</i> Josh
1	<i>Actinotaenium capas</i>	19	<i>Cosmarium Depressum</i> (Nag.) Lund.
2	<i>Actinotaenium cucurbitinum</i> Teilfa minus (West & West) Teil.	20	<i>Cosmarium furcatospermum</i> W. et G.S. West
3	<i>Actinotaenium Curtum</i> (Brébisson ex Ralfs) Teiling	21	<i>Cosmarium Holmiencie</i> Lundell
	<b>Genus: Closterium</b>	22	<i>Cosmarium impressulum</i> Elfving
4	<i>Closteriumacutum</i> Brebisson	23	<i>Cosmariumlundelli</i> Delponte
5	<i>Closteriumaciculare</i> T. West	24	<i>Cosmarium Mansanganese</i> West and West
6	<i>Closterium Ehrenbergii</i> Meneghinii	25	<i>Cosmarium Margaritatum</i> (Lund) Roy & Biss et varquadrum
7	<i>Closterium Lineatum</i> Ehrenberg ex Ralfs	26	<i>Cosmarium Margaritifera</i> Um Meneghini
8	<i>Closterium Lunula</i> Ehrb & Hemp. ex Ralfs	27	<i>Cosmarium Medio Scrobiculatum</i> West & West
9	<i>Closterium Moniliferum</i> Ehrb. ex Ralfs	28	<i>Cosmarium Minimum</i> West et G. S. West
10	<i>Closterium Navicula</i> (Brebisson) Lutkemuller	29	<i>Cosmarium Moniliforme</i> (Turpin) Ralfs

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

55	<i>Euastrum Flammeum</i> Varkalimonatum	71	<i>Staurastrum Cerastes</i> Lund.
56	<i>Euastrum Incavatum</i> Josh & Nordst	72	<i>Staurastrum Crenulatum</i> (Nag) Delp
57	<i>Euastrum Incavatum</i> Var <i>Platycephalus</i> Prescott	73	<i>Staurastrum for ficulatum</i> Lund
58	<i>Euastrum irregular</i> Maskell	74	<i>Staurastrum Iotatum</i> Wolle
59	<i>Euastrum sinuosum</i> Lenorm.	75	<i>Staurastrum Leptocladum</i> Nordst.
<b>Sr. No.</b>	<b>Name of Organism</b>	<b>Sr. No.</b>	<b>Name of Organism</b>
76	<i>Staurastrum Manfeldtii</i> Delponte		<b>Genus: Triploceras</b>
77	<i>Staurastru Morbicularare</i> (Ehr.) Ralfs	83	<i>Triplocera Sgracile</i> Bail
78	<i>Staurastrum orbicularare</i> Var <i>Depressum</i>		<b>Genus: Xanthidium</b>
79	<i>Staurastrumpinnatum</i> Turner	84	<i>Xanthidium Cristatum</i> Breb. ex Ralfs
80	<i>Staurastrum Sebaldi</i> Reinsch	85	<i>Xanthidium Spinosum</i> (Josh) West & West
81	<i>Staurastrum Sub Gracillimum</i> West	86	<i>Xanthidium Tetracanthum</i> Turner
82	<i>Staurastrum Subsuecium</i> 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<sup>12</sup>. 12 taxa each were reported from Manmecho Lakes, Eastern Himalaya and South Sikkim regions by Das and Keshri respectively<sup>14</sup>. Mishra et. al. reported 42 taxa belonging to 7 genera of desmids from two districts of Uttarkhand, India<sup>13</sup>. 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<sup>18</sup>. Supriya Gaikwad et. al. recorded 24 species of desmids from Rajaram reservoir, Kolhapur<sup>19</sup>. Bhosale and coworkers reported 23 members under desmids from lakes in and around Kolhapur City<sup>20</sup>. Patil and Kumavat reported 36 species of desmids from Abhora Dam of Raver tehsil of Jalgaon district<sup>21</sup>. While studying desmid diversity from Mangrul Dam, Jalgaon, Patil and Jawale also reported 36 species<sup>22</sup>. 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<sup>23</sup>. 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 limnological analysis and seasonal investigations will illustrate much information about the biological diversification of this district.

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