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BACILLARIOPHYCEAE FROM EASTERN PART OF SATARA DISTRICT, MAHARASHTRA[#]

Manjusha Ingawale

Abstract

Present communication deals with the diversity of bacillariophyceae from dry region of Satara district. Eastern part of Satara district lies within drought prone area. Numbers of temporary as well as permanent water bodies are present in this region. Some impoundments are constructed for irrigation purpose. All these water bodies harbor algal growth. Thorough survey of twenty six water bodies was made to screen the diatom biodiversity. Ninety eight species belonging to twenty one genera from eleven families are being reported in this communication.

Keywords: Diatoms, biodiversity, dry region, Satara

[#]Short Communication

Department of Botany, Kisan Veer Mahavidyalaya, Wai.
E-mail: ingawalemanjusha7@gmail.com

Introduction

Diatoms are important group of algae and are one of the most common phytoplanktonin majority of water bodies. They are most common producers of organic matter in aquatic ecosystems.These unicellular organisms belong to class Bacillariophyceae. Diatoms form a characteristic group by presence of silicified cell wall.A systematic account on diatoms in India was initiated early in the twentieth century by Venkataraman (1939). In Maharashtra studies on diatoms were undertaken by various workers viz. Gonzalves (1947), Gonzalves and Gandhi (1952, 1954), Gandhi (1956, 1957, 1958, 1959, 1960, 1962), Kamat (1965), Sarode and Kamat (1980a, 1984) Nandan and Mahajan (2006), Mahajan et al (2008) and Kumawat (2008). These workers made collections from different localities of the state. Earlier workers concentrated mainly on the taxonomy of the diatoms. Since dry region of Satara district is unexplored regarding taxonomy of diatoms. An attempt has been made to explore the diversity of Bacillariophyceae member occurring in this region.

Study Area

Satara district is located in south western part of Maharashtra state and lies between 17.50^0 to 18.11^0 North latitude and 73.33^0 to 74.54^0 east longitude along the Sahayadri ranges of Western Ghat. There are eleven tahsils in Satara district. Western part of Satara district includes tahsils viz., Mahabaleshwer, wai, Patan, Jawali and Satara. These tahsils receive heavy rainfall and with basaltic, black cotton or lataratic fertile soils. However eastern part of Satara district includes tahsil viz., Khandala, Man, Koregaon, Khatv, Phaltan and some part of Karad are dry regions receive scanty rainfall and thus come under drought prone zone.

The average rainfall ranges between 500 to 700 mm. Soil is light called malran or murummal and is brown in colour. The soils are well drained, sandy loam intexture and calcareous, thus less fertile soil. These conditions may favours the presence of Bacillariophyceae member in the study region. Thus this region has remained unexplored for diatom studies. Therefore to know the Bacillariophyceae flora and to explore this part of Satara district present study was undertaken. The following localities screened for the occurrence of diatoms were Ruinavi,Yeralwadi,Pawarwadi,Divad, Ukirade,Bombale, Devapurpati, Dhamner,Varud,Aundh, Pingali,Veerdam,Lonand,Salpe, Naygaon, Palashi .

Material and Methods

The study area selected was the eastern part of Satara district. Thorough survey was made through the five tahsils (See map) Koregaon, Khatv, Man, Phaltan and Khandala throughout the year. Screening of these water bodies was carried out after monsoon throughout the year. For the survey of fresh water diatoms the samples were collected from all possible localities wherever the growth of diatoms was noted. Samples were digested with acid and cleaned diatoms were preserved in 4% formaldehyde solution. Permanent specimens for the observation of diatom were made with DPX mounting media. Further study *viz.* measurement, identification and microphotography were carried out at PG Department of Botany, YCIS, Satara. Microphotographs were taken on Olympus CH20i microscope. Identification of taxa was done with the help of monograph and standard literature. (Sarode and Kamat 1984, Gandhi.H.P. 1998,Karthick B.2013).

Observation

During present investigations observed diatoms are listed in Table no 1-

S.N.	BACILLARIOPHYCEAE	LOCALITY	TALUKA
1	*Cyclotellameneghiniana*Kützing	Dhamner Aundh Devapurpati	Koregaon Khatav Man
2	*C. meneghiniana**f. binotata*Grunow	Aundh, Varud Ukirade	Khatav Man
3	*C. meneghiniana*f.*unipunctata*Cleve	Divad Salpe	Man Khandala
4	*C.striata*Grunow	Dhamaner, Yeralwadi, Devapurpati	Koregaon Khatav Man
5	*C. glomerata*Bachman	Yeralwadi, Bombale	Khatav
6	C. stelligera Cleve &Grunow	Pawarwadi Divad	Khatav Man
7	*Fragilariaintermedia*Grunow	Dhamner, Aundh,Devapurpati, Divad,Ukirade,Pingali	Koregaon Khatav Man
8	*F. brevistriata*var*vidarbhensis*Sarode and Kamat	Yeralwadi, Varud, Bombale Devapurpati, Divad, Pingali	Khatav Man
9	*Ulnariaacus*Kützing	Aundh,Pawarwadi	Khatav
10	*U. ulna* (Nitzsch) Ehrenberg	Dhamner Aundh,Ruinavi,Yeralwadi, Bombale Divad, Ukirade, Pingali	Koregaon Khatav Man
11	*Cocconeisplacentula*Ehrenberg	Dhamaner	Koregaon
12	*Cocconeisplacentula.*var*lineata*(Ehrenberg) Cleve	Dhamaner Veer dam	Koregaon Khandala
13	*Achnanthescoarctata*var*parallela*Venkat	Aundh Veer dam	Khatav Khandala
14	*A. exigua*var.*indica*Skv	Ruinavi, Yeralwadi,Varud	Khatav
15	*Gyrosigmamaharashtrensis*Sarode&Kamat	Dhamner	Koregaon
16	*G. khandeshensis*Sarode&Kamat	Dhamner	Koregaon

S.N.	BACILLARIOPHYCEAE	LOCALITY	TALUKA
17	*G. bhusavalensis*Sarode&Kamat	Dhamner	Koregaon
18	*Pleurosigmasalinarum*Grunow	Dhamner Devapurpati	Koregaon Man
19	*P. indica*Grunow	Dhamner	Koregaon
20	*Caloneispermagna*(Bail) Cleve	Dhamner,Pingali Lonand	Koregaon Khandala
21	*C. bacillum*Grunow	Ruinavi,Yeralwadi,PawarwadiDivad, Ukirade	Khatav Man
22	*C. siliculaintermedia*Mayer	Bombale, Pawarwadi Divad	Khatav Man
23	*C.silicula*var. *truncatula*Grunow	Divade Salpe	Man Khandala
24	*C. acquatorialisvartugelae*Cholnoky	Devapurpati,Ruinavi	Man
25	*C. beccariana*Grunow	Ukirade, Pingali	Man
26	*Nedium oblique-striatum* Gonzalves& Gandhi	Aundh Salpe	Khatav Khandala
27	*N. capitellata*Gandhi	Dhamner	Koregaon
28	*N. amphirhynchus*var. *median*Cleve-Euler	Dhamner	Koregaon
29	*Diploneiselliptica*(Kützing) Cleve	Pawarwadi Lonand	Khatav Khandala
30	*D. pulella*(Kützing)	Pawarwadi	Khatav
31	*D. subovalis*Cleve	Pawarwadi	Khatav
32	*Stauroneispartabgarhensis*Gandhi	Aundh,Ruinavi,Bombale Devapurpati	Khatav Man
33	*S. obtusa*largerst	Aundh	Khatav
34	*S. phoenicenteron* var.*producta* Gandhi.	Yeralwadi	Khatav
35	*S. anceps*Ehrenberg	Devapurpati,Bombale	Khatav
36	*S.anceps*var.*amphicephala* Ehrenberg	Pingali	Man
37	*S. phanicenteron*Ehrenberg.	Devapurpati	Man
38	*Anomoeoneissphaerophora*(Kützing) Pfitzer	Dhamner, Ruinavi,Varud	KoregaonKhatav
39	*Naviculacuspidata*var. *heribaudi*Peragallo	Devapurpati	Man
40	*N. cuspidata*var *major* f.*robusta* Meister	Aundh	Khatav
41	*N. cuspidata*var*ambigua*Ehrenberg	Dhamner Aundh	KoregaonKhatav
42	*N..rhynochocephala*Kützing	Dhamner Aundh, Ruinavi Divad,Ukirade,	KoregaonKhatav Man
43	*N. viridulacalcis*Gandhi	Dhamner	Koregaon
44	*N. viridula*var.*capitala*Mayer	Dhamner Pawarwadi	KoregaonKhatav
45	*N. cuspidata*Kützing	Dhamner Devapurpati	Koregaon Man
46	*N. rhynochocephala*var. *tenua*skv	Ruinavi, Varud Devapurpati, Ukirade	Khatav Man
47	*N. mutica* var. *goeppertiana*Kützing	Yeralwadi Naygaon	Khatav Khandala

S.N.	BACILLARIOPHYCEAE	LOCALITY	TALUKA
48	*N. lucidula*Grunow	Yeralwadi Lonand	Khatav Khandala
49	*N. mutka*Kützing	Bombale	Khatav
50	*N. radiosa*var.*acuta*Kützing	Pawarwadi Naygaon	Khatav Khandala
51	*N. rhynchocephala*var. *elongate*Van Heurck	Pawarwadi	Khatav
52	*N. pseudocuspidata*var.*rostrata* Gandhi	Devapurpati	Man
53	*Pinnulariabraunii* var.*amphicephala*(Grunow)Cleve	Dhamner Naygaon,Palashi, Veer dam	Koregaon Khandala
54	*Amphora ovalis*Kützing	Aundh Devapurpati,Ukirade	Khatav Man
55	*Amphora normani*Robh	Dhamner Yeralwadi,Pawarwadi Devapurpati,	KoregaonK hatav Man
56	*Cymbellaventricosa*Kützing	Aundh, Pawarwadi Ukirade	Khatav Man
57	*C. gracilis*(Robh) Cleve	Aundh Naygaon,Palashi,	Khatav Khandala
58	*C. hungarica*Grunow	Aundh, Ruinavi	Khatav
59	*C. kerkevarensis*A. Cleve.	Aundh, Ruinavi Devapurpati	Khatav Man
60	*C. tumida*(Berb) V. H.	Dhamner	Koregaon
61	*C.osmanabadensis*Sarode&Kamat	Bombale Divade,Pingali	Khatav Man
62	*C. cymbiformis*var. *caldostagnensis*Kützing	Ruinavi Ukirade Naygaon	Khatav Man Khandala
63	*C. cistula*var.*woosangensis*Voigt	Ruinavi,Yeralwadi Pingali	Khatav Man
64	*C. leptoceros*var.*rostrata*Grunow (Cleve)	Yeralwadi Naygaon,Palashi	Khatav Khandala
65	*C. aspera*(Ehr) Cleve	Pawarwadi Pingali	Khatav Man
66	*C. bengalensis*Grunow	Pawarwadi	Khatav
67	*C. ventricosa*var*arcuata*Skv	Pawarwadi Veer dam	Khatav Khandala
68	*C. bharatensis*Gandhi	Pawarwadi	Khatav
69	*C. cymbiformis* var.*jimboi*Grunow	Pawarwadi Lonand	Khatav Khandala
70	*Gomphonemalanceolatum*Ehrenberg	Aundh, Ruinavi	Khatav
71	*G. constrictum* var.*indica*Gandhi	Aundh, Ruinavi	Khatav
72	*G. clavatoides*(Gandhi)	Ukirade	Man
73	*G.intricatum*var.*fossile*Pant	Ruinavi Veer dam	Khatav Khandala
74	*G. intricatum*Kützing	Ruinavi,Bombale Devapurpati	Khatav Man

S.N.	BACILLARIOPHYCEAE	LOCALITY	TALUKA
75	*G. hebridense (*Greg) Her	Ruinavi	Khatav
76	*G. gracile*var *intricatiforms*Mayer	Yeralwadi,Varud,Pawarwadi	Khatav
77	*G. sphaerophorma*Ehrenberg	Yeralwadi	Khatav
78	*G. gracile* var. *laceolata* Cleve	Yeralwadi,Varud	Khatav
79	*G. gracile*var. *major* Grunow	Yeralwadi,Pawarwadi	Khatav
80	*Rhopalodiagibba*(Ehrenberg) OMuell	Pawarwadi	Khatav
81	*R. gibba*var.*ventricosa*	Pawarwadi	Khatav
82	*Hantzschiavoigtii*Gandhi	Aundh, Varud Devapurpati	Khatav Man
83	*H. amphioxys*Grunow	Aundh,Yeralwadi Ukirade	Khatav Man
84	*H. amphioxys*var.*densestriata*Grunow	Ruinavi	Khatav
85	*H. amphioxys*var. *compacta*Hustedt	Yeralwadi, PawarwadiDevapurpati,Pingali,	Khatav Man
86	*H. virgata*(Roper) Grunow	Devapurpati	Man
87	*H. virgata* var.*mugadensis*Gandhi	Bombale	Khatav
88	*Nitzschiaobtusa* W. Smith	Aundh, Varud,Bombale, Pawarwadi Devapurpati,	Khatav Man
89	*N. intermedia*Hantzsch	Aundh, Varud Ukirade, Divade,	Khatav Man
90	*N. tryblionella*Hantzsch	Dhamner	Koregaon
91	*N. obtusa*var. *scalpelliformis*Grunow	Dhamner Bombale	KoregaonKhatav
92	*N. paradoxa*Gmelin	Dhamner	Koregaon
93	*N. hungarica*Grunow	Dhamner	Koregaon
94	*N. denticula*var. *carta*Grunow	Yeralwadi Salpe	Khatav Khandala
95	*N. jugata*Gandhi	Bombale Pingali	Khatav Man
96	*N. gandershemiensis*Krasske	Yeralwadi,Pawarwadi Devapurpati	Khatav Man
97	*Surirellacaponioides*Gandhi	Dhamner	Koregaon
98	*S. caproni*Brebson	Dhamner Veer dam	Koregaon Khandala

Graph: 1. Showing Distribution of Species

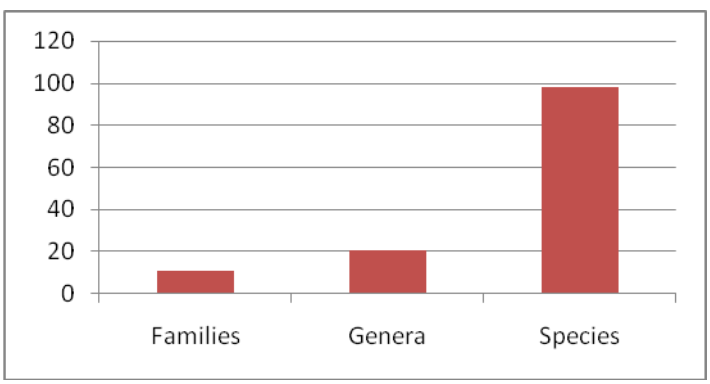
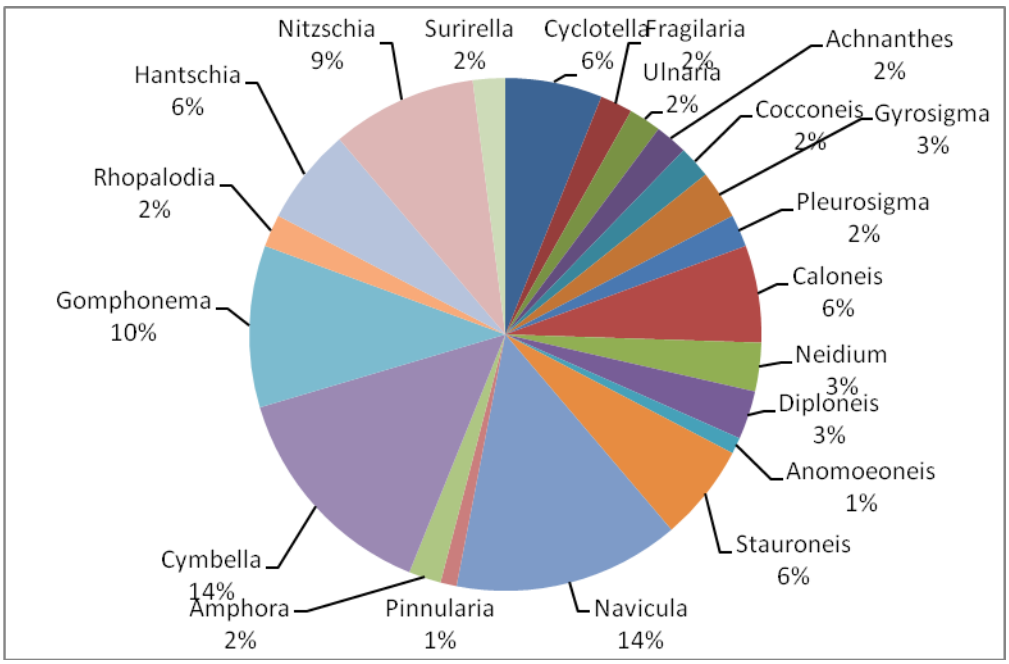


Table: 2. Showing Number of Species in Each Genera

Sr.No.	Name of genera	Number of species
1	*Cyclotella*	6
2	*Fragilaria*	2
3	*Ulnaria*	2
4	*Achnanthes*	2
5	*Cocconeis*	2
6	*Gyrosigma*	3
7	*Pleurosigma*	2
8	*Caloneis*	6
9	*Neidium*	3
10	*Diploneis*	3
11	*Anomoeoneis*	1
12	*Stauroneis*	6
13	*Navicula*	14
14	*Pinnularia*	1
15	*Amphora*	2
16	*Cymbella*	14
17	*Gomphonema*	10
18	*Rhopalodia*	2
19	*Hantschia*	6
20	*Nitzschia*	9
21	*Surirella*	2



Pie Dia: 1. Showing Species Percentage of Species from Dry Region

Results and Discussion

Satara district enjoys all extremes of climate as discussed above. The Western parts with six tahsil is hilly receiving maximum rainfall and with somewhat fertile soil while the eastern part including five tahsils receives scanty rainfall and soils are also poor in fertility. The samples collected from various localities from the eastern dry part have been recorded in table 1.Bacillariophyceae are represented by ninety eight species belonging to twenty one genera from eleven families are reported throughout the study area. (Graph no 1).Percentagewise representation of genera of Bacillariophyceae is shown in the pie-diagram. *Navicula* and*Cymbella*show dominancefollowed by *Gomphonema.*Higher number of speciesrepresented by *Navicula* and *Cymbella*while *Anomoeoneis*and *Pinnularia*showed their appearance in only one species.Though the waterbodies screened lie within the dry region, the observations show that they are rich in diatom biodiversity. Further seasonal screening of the diatom flora is needed to correlate the seasonal variations in the occurrence of these species throughout the year. This study will provide baseline data for basic and applied field of research in future.

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