



STUDY ON ALGAL DIVERSITY AND PHYSICO-CHEMICAL WATER ANALYSIS OF BARAMATI AREA

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ABSTRACT

The paper gives a study of 24 species belonging to 22 genera first time reported from Baramati. Pune, Maharashtra. In the course of study on fresh water phytoplankton spread over ponds, rain water, puddles, ditches storage tanks, Karha river and irrigation canal were special interest showing asexual and sexual reproductive stages. Some observations with special interest to occurrence of algae is compared to physico-chemical (pH, EC, TDS, Temperature) analysis of different eight localities and nutrients like Ca, Mg, Na, K, HCO_3 , Cl, SO_4 . This study gives report of the classes Chlorophyta, Bacillariophyta, Euglenophyta and Cyanophyta.

KEYWORDS: Algae, Classification, Physico-chemical and nutrients analysis.

INTRODUCTION

Fresh water ecosystems vary in size and composition and contain a large variety of organism. Microalgae are vast group of prokaryotic and eukaryotic photosynthetic organisms found in many different forms viz. individual cells, colonies or extended filaments and exhibit vast diversity in the ecosystem (Chaterjee and Raziuddin, 2006). They are cosmopolitan in nature found everywhere like oceans, lakes, rivers, ponds, puddles, moist surfaces and fresh water etc. (Desikachary 1959).

Algae are highly successful and distinctive groups of cryptogams and found in almost all fresh water habitats. algal flora from different region of India has been described by a various authors like Naskar, *et.al.* 2009; Hosmani, 2013; Satpati *et.al.* 2013; Das and Adhikary, 2014; Rajeshwari and Krishnamurthy, 2015 and Patil and Deore, 2017.

There are few survey reports on the assessment of water quality based on physico-chemical and biological parameters in India (Prescott, 1951; Indira and Biswajit, 2012) but fresh water algal floristic identification and water quality monitoring in aquatic bodies of Bundel khand region of central India is absolutely neglected (Ramachandran *et al.*, 2002; Sheikh *et al.*, 2013; Srivastava *et al.*, 2014). Therefore, the present investigation has been carried out to assess fresh water algal diversity along with the Physico-chemical parameters of the water to interpret water quality.

MATERIALS AND METHODS

Collection and identification of algae samples

Algal samples were collected in specimen bottles from different water bodies in and around the city of Baramati are located in Pune district of Maharashtra. The city lies between 18°, 8' N and 75°, 7' E. at an altitude 538 m. The samples collected from different sites were washed thoroughly with running tap water for removal of any form of solid materials. Samples were then preserved using standard preservative of iodine solution and 4% formalin and were stored in glass containers for further use. Identification of the algae samples were carried out mostly through microscopically by Digital Compound Optical Microscope with HD camera and identified with standard literature i.e. Prescott, G.M. 1951; Tippawan and Yuwadee, 2012; Yadav *et.al.* 2013; Ragland *et.al.* 2014.

The physico-chemical analysis of all water bodies is done by different methods. Drosdoff and Nearpass (1948) determined the Magnesium content by Spectrophotometrical method. Mineral content Sulphate is estimated by Spectrophotometrical method (Tabatabai and Bremener, 1970) and Toth *et.al.* (1948) determined Calcium, Potassium and Sodium by Flame photometrically and Bicarbonate determined by titration method.



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RESULT AND DISCUSSION

In the presents investigation shows that 22 genus were observed along with 24 species (Table 1) from 8 samples. These microalgae belonging to three major classes Chlorophyceae (green algae), Bacillariophyceae (diatoms) Euglenophyceae and Cyanophyceae (blue green algae). Maximum algal genera belong to green algae followed by blue green algae and diatoms. Among the algae dominant forms i.e. *Chroococcus minutus*, *Chlorella vulgaris*, *Microcystis aeruginosa*, *Spirogyra fluviatilis*, *Spirogyra ternate*, *Zygnema circumcarinatum*, *Zygnema extenuae*, *Ulothrix zonata*, *Pithophora roettleri*, *Cladophora glomerata*, *Odogonium* sp., *Chara braunii*, *Navicula oblonga*, *Gyrosigma acuminatum*, *Fragilaria* sp., *Synedra ulna*, *Frustulia vulgaris*, *Tabellaria fenestrata*, *Pinnularia notata*, *Neidium affine*, *Euglena gracilis*, *Nostoc commune*, *Anabaena azollae*, *Oscillatoria limosa* species were recorded. This algal genera were also recorded by many researcher like Kumar and Sahu in (2012) from in Paddy Fields of Lalgutwa Area, Ranchi, Jharkhand; Hosmani in (2013) from Mysore district; Satpati *et.al.* (2013) from Sundarbans mangrove forest, India; Sonule and Mulani (2018) Chlorophyceae flora, from Purna River.

Physico- chemical parameters of all the water bodies (Table 2) observed that normal range such as pH from 6.08 to 7.68, Conductivity 0.10 to 0.31dS/m, TDS 93.66 to 258.4ppm, temperature 23 to 25 °c, Calcium 0.75 to

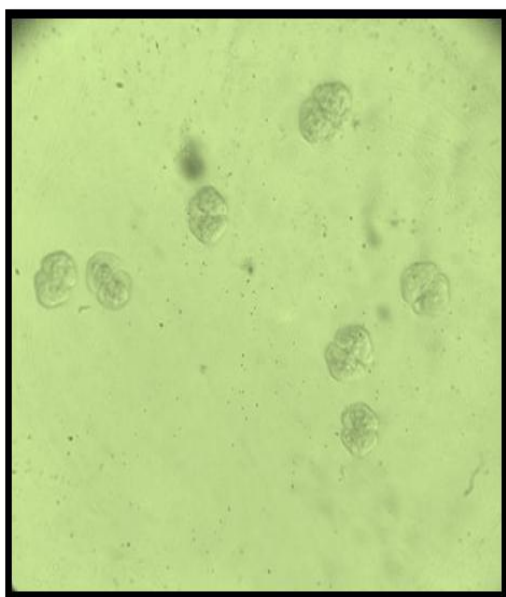
1.35 mg/L, Magnesium 10.25 to 13.40 mg/L, Sodium 13.10 to 30.35 mg/L Potassium 0.00 to 4.33 mg/L, Bicarbonate 1.40 to 3.20 mg/L, Chloride 13 to 20 mg/L, and Sulphate 0.04 to 0.19 mg/L, which is influence the occurrence and growth of algal microflora of Chlorophyta, Bacillariophyta, Euglenophyta and Cyanophyta . According to Sanap (2018) higher value of temperature, alkalinity, chlorides, free CO₂, BOD, nitrates and phosphates influence the occurrence and abundance Charophyceae, Euglenophyceae and Dinophyceae algal forms.

SUMMARY AND CONCLUSION

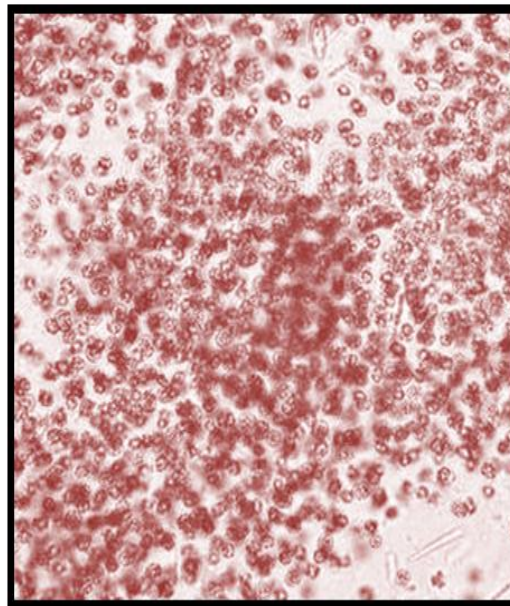
During presents investigation shows that 24 species are observed in Baramati area. The highest algae found in Bhigwan road area are from Bacillariophyceae Cyanophyceae, are observed. The diatoms are very common in all areas except Tandulwadi road area. The unicellular forms like *Chlorella* of algae are found in Indapur road area.

The phytochemical analysis of all water bodies contains high amount of calcium carbonate, which affects to the algal microflora. The other components present are Ca, Mg, Na, K, HCO₃, Cl, SO₄, TDS, EC, pH and temperature etc. the higher value of temperature, alkalinity, chlorides, sulphate, sodium and bicarbonate influence the occurrence and abundance charophyceae, euglenophyceae and dinophyceae algal forms.

Photo Plate No 1



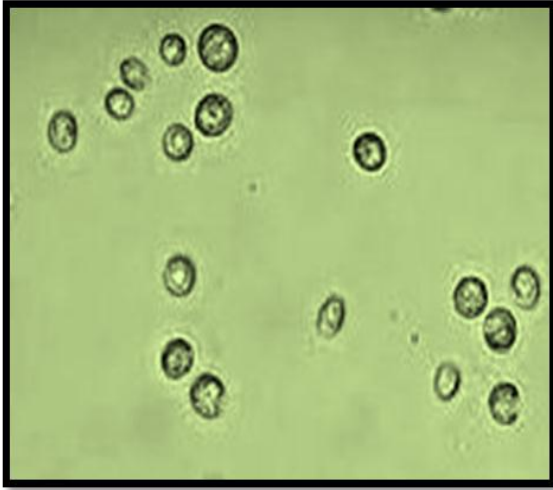
Chroococcus minutus



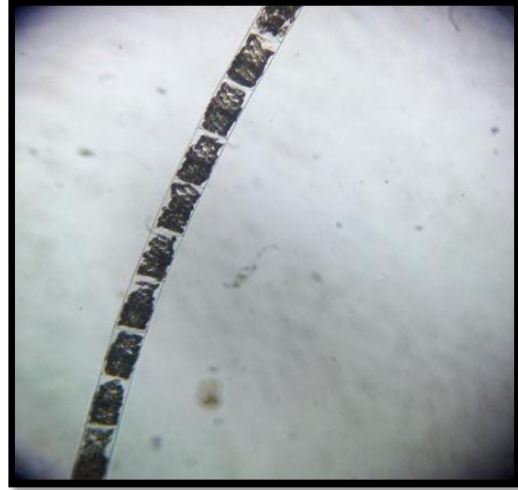
Microcystis aeruginosa



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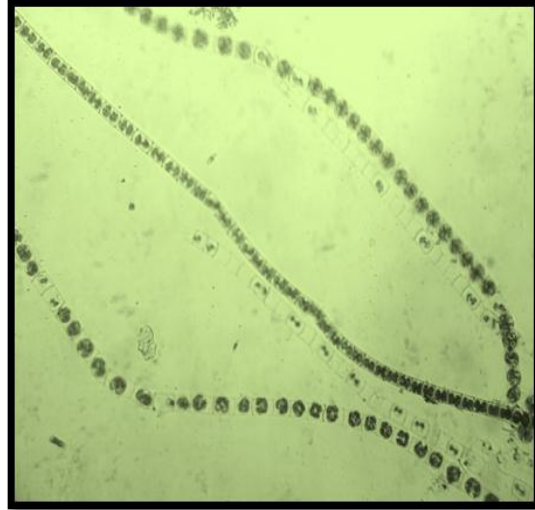
Chlorella vulgaris



Spirogyra fluviatilis.

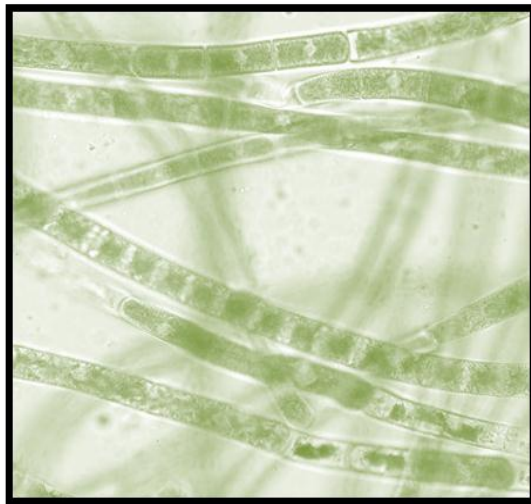


Spirogyra ternata



Zygnema extenuum

Photo Plate No- 2



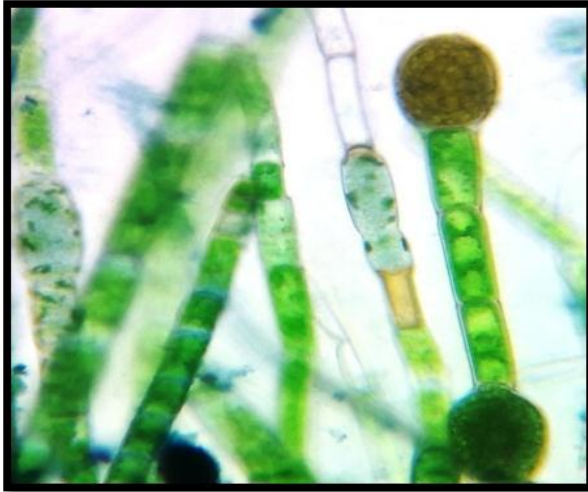
Zygnema circumcarinatum



Ulothrix zonata



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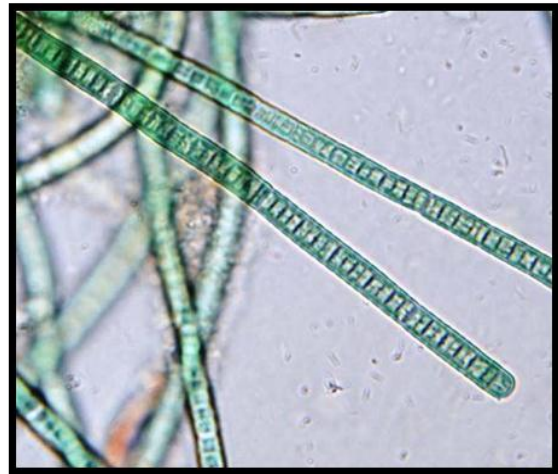
Odogonium sp.



Nostoc commune

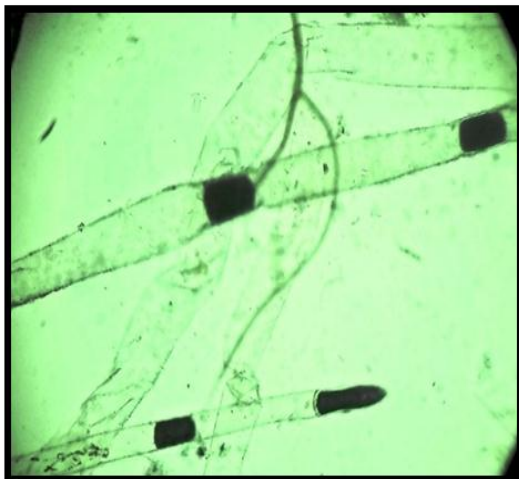


Anabaena azollae

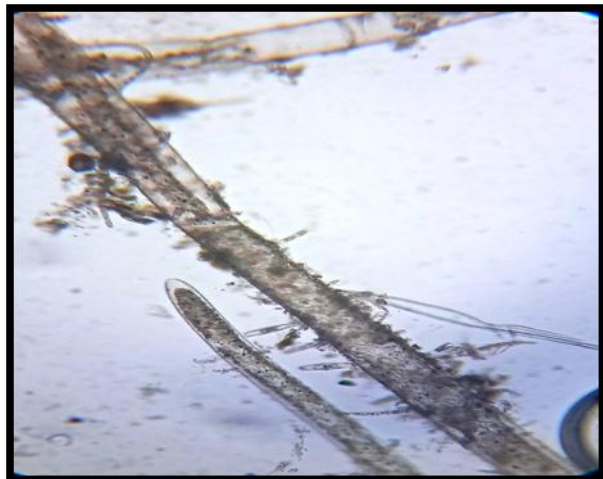


Oscillatoria limosa

Photo Plate No 3



Pithophora roettleri



Cladophora glomerata



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Chara braunii



Reproductive Structure- Nucule



Reproductive Structure- Globule



Euglena gracilis

Photo Plate No- 4



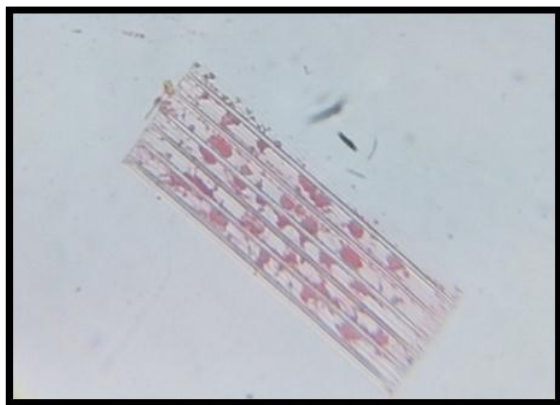
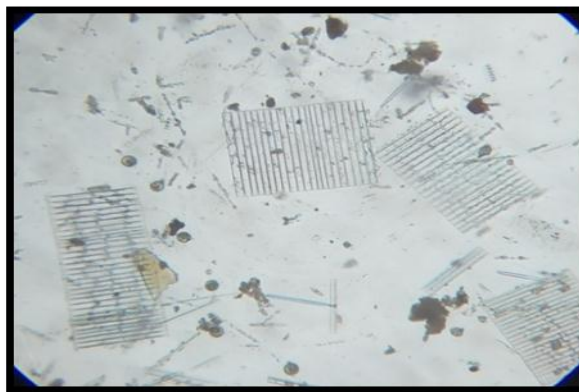
Navicula oblonga



Gyrosigma acuminatum

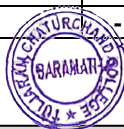


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*Tabellaria fenestrata**Fragilaria sps.**Synedra ulna**Pinnularia notata***Table 1: List of algae collected from the different localities of Baramati.**

Sr. no.	Name of species	Localities							
		S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
1.	<i>Chroococcus minutus</i> Kutzing.	-	+	-	-	+	-	-	+
2.	<i>Chlorella vulgaris</i> Beijerinck.	+	-	-	+	-	+	+	+
3.	<i>Microcystis aeruginosa</i> Kutzing.	+			+	+		+	+
4.	<i>Spirogyra fluviatilis</i> Hilse.	+	+	+	+	+	-	+	+
5.	<i>Spirogyra ternate</i> Ripart.	+		+		+	-	+	+
6.	<i>Zygnema circumcarinatum</i> Czurda	+	+	+	-	-	-	+	-
7.	<i>Zygnema extenua</i> C. Jao	+	-	-	-	-	-	-	-
8.	<i>Ulotrix zonata</i> (Weber and Mohr) Kutzing	-	-	+	-	+	-	+	+
9.	<i>Pithophora roettleri</i> (Roth) Wittrock.	-	+	-	-	+	-	-	-
10.	<i>Cladophora glomerata</i> (Linnaeus) Kutzing	-	+	-	-	+	-	-	-
11.	<i>Odogonium</i> sp.	+	+	-	-	+		-	-
12.	<i>Chara braunii</i> C.C.Gmelin	-	-	+	-	-	-	-	-
13.	<i>Navicula oblonga</i> Kutzing	+	+	+		+	+	+	-
14.	<i>Gyrosigma acuminatum</i> (Kutzing) Rabenhorst	+	+	+	-	+	+	+	-
15.	<i>Fragilaria</i> sp.	+	+	+	-	+	+	+	-
16.	<i>Synedra ulna</i> (Nitzsch) Ehrenberg.	-	-	-	-	-	+	+	+
17.	<i>Frustulia vulgaris</i> (Thwaites) De.Toni.	-	+	-	-	+	+	-	-
18.	<i>Tabellaria fenestrata</i> (Lyngbye) Kutz. var.	-	+	-	-	+	+	-	-
19.	<i>Pinnularia notate</i> (M.Peragallo & Heribaud) F.W Mills	-	+	-	-	+	+	-	-
20.	<i>Neidium affine</i> (Ehrenberg) Pfitzer.	-	+	-	-	+	+	-	-
21.	<i>Euglena gracilis</i> Klebs.	-	-	-	-	+	-	+	+
22.	<i>Nostoc commune</i> Vaucher	-	-	+	-	-	-	+	+
23.	<i>Anabaena azollae</i> Strasburger	-	-	+	-	-	-	+	+
24.	<i>Oscillatoria limosa</i> C. Agardh. ex Gomont	-	-	+	-	-	-	+	+

Present (+), Absent (-)



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Site 1. Canal road area., Site 2. Kahra river area., Site 3. Water storage tank., Site 4. Tandulwadi road area., Site 5. Bhigwan road area., Site 6. Indapur road area., Site 7. Jalochi road area., Site 8. Tunnel canal area.

Table 2: Physico-chemical analysis of water samples.

Sr. No.	Locality	Ca	Mg	Na	K	HC ₃	Cl	SO ₄	TDS	EC	pH	Temp.
1	Sample 1	1.15	11.45	25.15	1.78	2.80	13	0.12	170.9	0.23	6.67	25
2	Sample 2	1.08	10.83	26.30	0.56	2.60	18	0.11	180.7	0.22	6.12	23.3
3	Sample 3	1.03	13.18	26.55	1.71	1.60	15.50	0.05	164.5	0.27	6.08	23.2
4	Sample 4	1.35	10.25	30.35	0.71	1.40	16	0.19	258.4	0.31	6.45	23.2
5	Sample 5	1.18	11.33	29.30	4.33	2.20	17	0.07	207.1	0.30	6.40	23.1
6	Sample 6	1.20	13.40	28.10	0.97	3.20	14.50	0.13	197.3	0.22	6.30	23.1
7	Sample 7	0.95	12.45	13.10	0.00	1.60	13.50	0.04	93.75	0.10	7.68	23.1
8	Sample 8	0.75	12.65	20.13	0.20	1.40	20	0.06	93.66	0.11	6.15	23

Sample 1. Canal road area, Sample 2. Kahra river area, Sample 3. Water storage tank, Sample 4. Tandulwadi road area, Sample 5. Bhigwan road area, Sample 6. Indapur road area., Sample 7. Jalochi road area, Sample 8. Tunnel canal area.

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