ORIGINAL RESEARCH PAPER
Volume-6 | Issue-9 | September-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PROTOZOA DIVERSITY OF GORJA LAKE OF BHADRAWATI, DISTRICT CHANDRAPUR (M.S.), INDIA

Zoology

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ABSTRACT

The Gorja Lake is principal fresh water body located in Gorja village of Bhadrawati tahsil in Chandrapur district of Maharashtra state. Bhadrawati is a tahsil place and it is 25 km north side of Chandrapur and 125 km south east side from Nagpur. It is situated at about 211 m above the mean sea level. Present Protozoa in the Gorja Lake near Bhadrawati town was studied from June 2014 to May 2016 during total 32 species of Protozoa were recorded in three sites of Gorja Lake.

KEYWORDS

Gorja lake, Protozoa diversity.

INTRODUCTION :

Protozoa are the smallest planktons in size and essentialy an important food sources food chain in an aquatic micro-invertebrate.

Gorja lake is 10 km south side from Bhadrawati Tahsil at about 198 m above mean sea level and is at 79°05'48"E longitude and 20°05'59" N latitude.Gorja Lake receives the water from the surrounding catchment areas during the monsoon period. The area of Gorja Lake is spread over 300 acres. The depth of water is 35 feet during the monsoon and 12 feet during the summer season. The water of this lake is primary used for washing, bathing, fishing activities, agriculture and other domestic purpose but now it is at a transitional state with respect to degradation.

MATERIAL AND METHOD :

Sample for planktonic study were collected monthly from three sites of lake. The samples were collected in the morning hours between 8.30 a.m. to 10.30 a.m. 50 Lt. of water sample was filtrated through the plankton net made of bolting silk number 25 with mesh size 64 lime the collected samples were allowed to settle down by adding Lugol's Iodine. Normally sedimentation requires 24 hrs. after which supernatant was removed and concentrate was made up to 50 ml. depending the number of plankton and preserved in 5% formalin for further studies.

For the quantitative study the concentrated sample was shaken and immediately one drop of sample was taken on a clear micro side with the help of standard dropper the whole drop was then carefully covered with the cover glass and observed. Plankton identification up to genera and whenever possible upto species level was classified according to keys given by Prescott (1954), Edmonsonic (1959), Sehgal (1983), Adoni (1985), and APHA (1985) and standard analysis was undertaken as per Zar (2005).

Quantitative study of plankton was done by Sedgwick – Rafter Cell method.

Sedgwick – Rafter Cell Method

The Sedgwick – Rafter Cell is a special kind of slide similar to the Haemocytometer. The cell has a 50 mm x 20 mm × 10 mm rectangular cavity that holds 1 ml. sample. The cell is moved in horizontal direction on the stage of an inverted microscope and plankton species encountered in the field are enumerated. A number of replicate samples are enumerated to calculate plankton/lit.

Plankton (units/lit) = n x c/v

Where,
n = number of plankton in 1ml
c = Volume of Concentrate
v = Volume of sample in lit.

RESULT AND DISCUSSION:

According to Kedar, (2002) observed 34 species of Protozoas in Rishi lake of Karanja (Lad) of Maharashtra. Kamble and Meshram, (2005) reported only two species belong to Protozoa in Khatijapur tank of Achalpur, Maharashtra. Sharma, *et.al.,*(2007) observed 4 species in Pichhola lake of Jaipur, Rajasthan. Patil, *et.al.,* (2008) founded 10 species of Protozoa in Rishi lake and two species in Yedshi lake in Washim District of Maharashtra. Bhagat, *et.al.,* (2010) recorded 7 species of Protozoa in Ambadi irrigation dam of District Akola. Shashikant Sitre and Mahendra Thakare, (2013) observed the five species of protozoa in Balaji temple tank of Chimur city of Chandrapur District (M.S.), Gunwant Gadekar, (2014) noted the 6 species of protozoa in Pangdi lake of Gondia, District Gondia, Maharashtra. Shashikant Sitre, (2014) reported 6 different species of protozoa in Naik lake of Nagpur city (M.S.)

In the present investigation, Protozoa species shows little variations as per sampling sites of A the lake In site, Protozoa is represented by 32 species in 2014-15 and 30 species in 2015-16, in site B, Protozoa is represented by 30 species in 2014-15 and 29 species in 2015-16 and in site C, Protozoa is represented by 31 species in 2014-15 and 30 species in 2015-16.

In site A, during 2014-15, 32 species were recorded among which *Amoeba proteus* (51 no./lit) is dominant followed by *Actinophrys sol* (39 no./lit), *Difflugia lobostoma* (37 no./lit), *Difflugia lebes* (31 no./lit), *Amphileptus cloparedei* (21 no./lit), *Chrysamoeba radians* (21 no./lit), *Difflugia alveolata* (21 no./lit), *Arcella vulgaris* (20 no./lit), *Pelomyxa polustris* (20 no./lit), *Chilodonella sp.* (18 no./lit), *Nassula ornate* (18 no./lit), *Paramecium caudatum* (17 no./lit), *Spathidium spathula* (17 no./lit), *Urocentrum turbo* (16 no./lit), *Centropyxis arecelloides* (15 no./lit), *Difflugia, corona* (15 no./lit), *Arcella discoindes* (14 no./lit), *Bryometopus sphagni* (14 no./lit), *Campanella umbellaria* (14 no./lit), *Homalozoon vermiculare* (14 no./lit), *Difflugia pyriformis* (13 no./lit), *Actinospherium sp.* (12 no./lit), *Lionotus fasciola* (12 no./lit), *Pseudoblepharisma crassum* (11 no./lit), *Epistylis plicatilis* (10 no./lit), *Euplotes sp.* (10 no./lit), *Centropyxis hemisphaerica* (9 no./lit), *Centropyxis aculeata* (7 no./lit), *Holophrya similex* (7 no./lit), *Paramecium bursaria* (6 no./lit), *Stentor roeseli* (3 no./lit) and *Vorticella campanula* (2 no./lit).

In site A, during 2015 -16, 30 species were recorded among which *Amoeba proteus* (45 no./lit) is dominant followed by *Actinophrys sol* (36 no./lit), *Difflugia lebes* (32 no./lit), *Difflugia lobostoma* (32 no./lit), *Amphileptus cloparedei* (20 no./lit), *Chrysamoeba radians* (20 no./lit), *Aarcella vulgaris* (19 no./lit), *Difflugia alveolata* (19 no./lit), *Pelomyxa palustris* (18 no./lit), *Homalozoon vermiculare* (17 no./lit), *Nassula ornata* (17 no./lit), *Chilodonella sp.* (16 no./lit), *Paramecium caudatum* (16 no./lit), *Spathidium spathula* (16 no./lit), *Arcella discoides* (15 no./lit), *Campanella umbellaria* (15 no./lit), *Difflugia corona* (14 no./lit), *Difflugia pyriformis* (14 no./lit), *Actinospherium sp.* (12 no./lit), *Trachelophyllum apiculatum* (12 no./lit), *Bryometopus sphagni* (11 no./lit), *Centropyxis arcelloides* (11 no./lit), *Pseudoblepharisma crassum* (10 no./lit), *Centropyxis hemisphaerica* (8 no./lit), *Epistylis plicatilis* (8 no./lit), *Euplotes* sp. (7 no./lit), *Holopharya simples* (6 no./lit), *Paramecium bursaria* (5 no./lit),

Centropyxis aculeate (3 no./lit) and *Vorticella campanula* (2 no./lit).

In site B, during 2014-15, 30 species were recorded among which *Amoeba proteus* (47 no./lit) was dominant followed by *Actinophrys sol* (37 no./lit), *Difflugia lobostoma* (37 no./lit), *Difflugia lebes* (30 no./lit), *Amphileptus claparedei* (21 no./lit), *Difflugia alveolata* (21 no./lit), *Chrysamoeba radians* (20 no./lit), *Arcella vulgaris* (18 no./lit), *Chilodonella sp*. (17 no./lit), *Nassula ornata* (17 no./lit), *Paramecium caudatum* (17 no./lit), *Homalozoon vermiculare* (14 no./lit), *Spathidium spathula* (14 no./lit), *Arcella discoides* (13 no./lit), *Centropyxis arcelloides* (13 no./lit), *Difflugia corona* (13 no./lit), *Urocentrum turbo* (13 no./lit), *Bryometopus sphagni* (12 no./lit), *Companella umbellaria (*12 no./lit), *Difflugia pyriformis* (12 no./lit), *Actinosphaerium sp.* (11 no./lit), *Epistylis plicatilis* (11 no./lit), *pseudoblepharisma crassum* (10 no./lit), *Euplotes sp.* (9 no./lit), *Centropyxis hemisphaerica* (8 no./lit), *Centropyxis aculeate* (6 no./lit), *Holophrya simplx* (5 no./lit), *Paramecium bursaria* (5 no./lit), *Stentor roeseli* (2 no./lit), and *Vorticella companula* (2 no./lit).

In site B, during 2015-16, 29 species were recorded among which *Amoeba proteus* (44 no./lit) is dominant followed by *Difflugia lobostoma* (37./lit), *Actinophrys sol* (35 no./lit), *Difflugia lebes* (29 no./lit), *Difflugia alveolata* (23 no./lit), *Chrysamoeba radians* (21 no./lit), *Pelomyxa palustris* (18 no./lit), *Amphileptus claparedei* (17 no./lit), *Arcella vulgaris* (17 no./lit), *Nassula ornata* (17 no./lit), *Paramecium caudatum* (15 no./lit), *Homalozoon vermiculare* (12 no./lit), *Spathidium spathula* (12 no./lit), *Arcella discoides* (11 no./lit), *Campanella umbellaria* (11 no./lit), *Centropyxis arcelloides* (11 no./lit), *Difflugia pyriformes* (11 no./lit), *Bryometopus sphagni* (10 no./lit), *Difflugia corona* (10 no./lit), *Epistylis plicatilis* (10 no./lit), *Trachelophyllum apiculatum* (10 no./lit), *Actionsphaerium epichhornii* (9 no./lit), *Euplotes sp*. (9 no./lit), *Pesudoblepharisma crassum* (8 no./lit), *Centropyxis hemisphaerica* (7 no./lit), *Holophrya simplx* (6 no./lit), *Centropyxis aculeata* (5 no./lit), *Paramecium bursaria* (4 no./lit) and *Vorticella campanula* (2 no./lit).

In site C, during 2014-15, 31 species were recorded among which *Amoeba proteusc* (44 no./lit) is dominant followed by *Difflugia lobostoma* (36 no./lit), *Actinophrys sol* (34 no./lit), *Difflugia lebes* (29 no./lit), *Amphileptus claparedei* (21 no./lit), *Chrysamoeba radians* (19 no./lit), *Difflugia alveolata* (19 no./lit), *Arcella vulgaris* (18 no./lit), *Nassula ornata* (17 no./lit), *Chilodonella sp.* (15 no./lit), *Pelomyxa palustris* (14 no./lit), *Spathidium spathula* (14 no./lit), *Difflugia corona* (13 no./lit), *Campanella umbellaria* (12 no./lit), *Homalozoon vermiculare* (12 no./lit), *Paramecium caudatum* (12 no./lit), *Urocentrum turbo* (12 no./lit), *Arcella discoides* (11 no./lit), *Centopyxis arcelloides* (11 no./lit), *Difflugia pyriformis* (11 no./lit), *Actinosphaerium sp.* (10 no./lit), *Epistylis plicatilis* (10 no./lit), *Euplotes sp.* (8 no./lit), *Bryometopus sphagni* (7 no./lit), *Holophrya simplex* (7 no./lit), *Pseudoblepharisma crassum* (7 no./lit), *Centropyxis aculeata* (6 no./lit), *Centropyxis hemisphaerica* (6 no./lit), *Paramecium bursaria* (5 no./lit), *Stentor roeseli* (2 no./lit) and *Vorticella campanula* (1 no./lit).

In site C, during 2015-16, 30 species were recorded among which *Amoeba proteus* (41 no./lit) was dominant followed by *Actinophrys sol* (31 no./lit), *Difflugia lobostoma* (31 no./lit), *Difflugia lebes* (29 no./lit), *Amphileptus claparedei* (20 no./lit), *Chrysamoeba radians* (20 no./lit), *Arcella vulgaris* (17 no./lit), *Chilodonella sp*. (17 no./lit), *Difflugia corona* (15 no./lit), *Nassula ornata* (15 no./lit), *Difflugia alveolata* (14 no./lit), *Centropyxis arcelloides* (13 no./lit), *Campanella umbellaria* (12 no./lit), *Spathidium spathula* (12 no./lit), *Arcella discoides* (11 no./lit), *Homalozoon vermiculare* (11 no./lit), *Paramecium caudatum* (11 no./lit), *Pelomyxa palustris* (11 no./lit), *Actinosphaerium sp.*(9 no./lit), *Difflugia pyriformis* (9 no./lit), *Epistylis plicatilis* (9 no./lit), *Centropyxis aculeata* (7 no./lit), *Pseudoblepharisma crassum* (7 no./lit), *Trachelophyllum apiculatum* (7 no./lit), *Bryometopus sphagni* (6 no./lit), *Centropyxis hemisphaerica* (6 no./lit), *Holophrya simplex* (6 no./lit), *Paramecium bursaria* (5 no./lit), *Euplotes sp.* (2 no./lit) and *Trachelophyllum apiculatum* (2 no./lit).

Among the different species of protozoa in site A of lake Amoeba proteus was dominant followed by *Actinophrys sol, Difflugia lobostoma, Difflugia lebes, Amphileptus claparedei chrysamoeba radians* and *Difflugia alveolata* in site B, *Amoeba proteus* was dominant followed by *Brachionus plicatilis, Actinophrys sol, Difflugia lobostoma, Difflugia lebes, Difflugia alveolata* and *Chrysamoeba radians* in site C, *Amoeba protues* was dominant followed by *Actinosphaerium sp., Difflugia lobostoma, Actinophrys sol, Difflugia lebes, Amphileptus claparedei* and *Chrysamoeba radians*.

In the present investigation, seasonally maximum Protozoa was recorded in the summer season and minimum during the monsoon season. Kedar, (2002) observed minimum population of Protozoa during the rainy season at Rishi lake in Karanja (Lad) of Maharashtra. Patil, (2008) reported peak of Protozoa population during the summer season and low count during the rainy season. Bhagat, *et.al.,* (2010) observred maximum Protozoa in the winter season and minimum during the monsoon season in Ambadi irrigation dam of District Akola. Gunwant Gadekar, (2014) recorded the maximum density of protozoa in winter season that is in December month while it was the minimum in monsoon in June month in Pangdi lake of Gondia of District Gondia, Maharashtra. Shashikant Sitre, (2014) reported that the peak of Protozoa population of in summer months and their count remains low during monsoon period in Naik lake of Nagpur city (M.S.).

In the present study, the dilution of water caused by rain water which results in minimum population of Protozoan in monsoon season. The maximum population of protozoa during in summer season indicates a positive relation with temperature and also may be due to lower DO contents in this season and abundance of sulphates and phosphates to this site.

CONCLUSION:

In the present investigation, the maximum Protozoa during the summer season is probably due to availability of suitable food and favorable temperature and minimum density in monsoon season which could be due to dilution of water resulting in fewer nutrients and due to reduction of transparency and dissolved oxygen.

Table 1:Yearly variation of Protozoa from sites of Gorja Lake during year 2014-15

S.N.	Parameters	A	B	C	Total
1	Protozoa	44.58 ± 25.68	38.92 ± 22.98	36.92 ± 22.87	40.14± 1.30

Table 2:Yearly variation of Protozoa from sites of Gorja Lake during year 2015-16

S.N.	Parameters	A	B	C	Total
2	Protozoa	39.67 ± 22.45	35.92 ± 22.71	33.83 ± 20.56	36.47 ± 0.96

Table 3:Yearly variation of Protozoa from sites of Gorja Lake during year 2014-16

S.N.	Parameters	A	B	C	Total
3	Protozoa	42.13 ± 24.00	37.42 ± 22.71	35.38 ± 21.69	38.31 ± 0.95

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