Limnological Status and Aquatic Plank tonic Biodiversity of River Tapti at District Burhanpur, Madhya Pradesh, India

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ABSTRACT
The diversity of various types of plankton like phytoplankton and zooplankton were studied for river tapti near Burhanpur in M.P. The plankton was collected by standard plankton net from three different sites of River Tapti. The phytoplankton were represented by Bacilariophyceae , Chlorophyceae , Cynophyceae and Euglenophyceae, out of which genetics diversity of Bacilariophyceae was more. The zooplankton were identified in various Phyla like Protozoa, Helminthes, Rotifera, Annelida, Arthropoda etc. Diversity of Arthropods was highest. The percentage composition of various groups was calculated for the samples taken from different sites. The composition of plankton as percentage representation was correlated for different sites with sites characteristics. On the basis of different physico-chemical and biological parameters , the status of River Tapti is eutrophic in nature and during period under study 12 fish species, 42 phytoplanktons (15 Bacilariophyceae , 18 Chlorophyceae , 09 Cynophyceae) and 32 Zooplanktons (10 Rotifera, 03 Crustacea, 11 Protozoa, 06 Copepoda, 02 Ostracoda) Genera have been recorded .

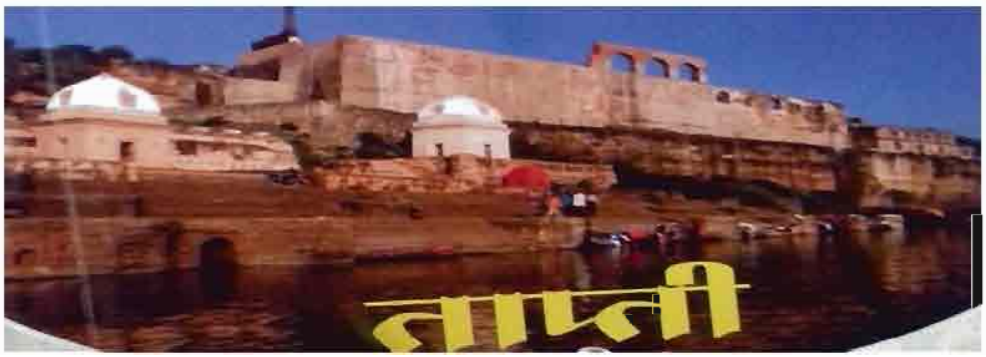
Keywords: Limnology, Phytoplanktons, Zooplanktons, Tapti River, Burhanpur M.P. , India.

I INTRODUCTION

The Tapti is also one of the sacred rivers of India. Amongst its various names tapti, payoshni, Tapti and Tapti are more commonly known. All these names can note one and the same meaning the Copler of the tap, meaning heat. The general direction of the river in nimar (East) is from north-east to south-west.it enters east Nimar at a distance of 120 mile (193km) from its sources.

The diversity of various types of plankton like phytoplankton and Zooplankton were studied for river Tapti near Burhanpur in M.P, India. Planktons are poor swimming but most drifting small organism that inhabit called the water column of ocean and fresh water bodies the name comes from the Greek term , plankton-meaning "wanderer" and drifter plankton is composed of tiny plant called Phytoplankton and animal called Zooplankton, as well as organism that are not easily classified in to those two groups (such as protozoa and bacteria), Planktonic organism are suspended in water and are also small fat even slight current move them about, the occurrence and abundance of Zooplanktons depend on its productivity, which in turn is flow by abiotic factors and the level of nutrients in the water. In a fresh water system, the Zooplanktons from and important faunal group , are most of them life on primary producer and make themselves available to be eat in by higher organism IN FOOD chains including fish and contribute significantly to the biological productivity of this ecosystem (Michael 1973). The Phytoplankton are the primary producers as they trap solar energy and produces organic molecules by consuming CO2, phytoplankton are not only primary producers but also brings out biogenic oxygenation of the water during the time Welch,Wetzel,1975,1983).

I. Map. No.01-04: Maps showing study area of River Tapti at District Burhanpur, M.P., India.



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District Burhanpur is located between 21° . 21.05 - 21°.37 N Latitude and 75°.13 - 76° E Longitude in Madhya Pradesh. Tapti is one of the major perennial rivers flowing towards west coast of india is an important sources of fresh water to this region. The 720km. Long River originates near Multai in the Betul District of Madhya Pradesh .The Selected study sites in Tapti River are Bhat khedi , Jainabad, Duriyapur kalan, looking to the importance of subject as research Topic "LIMNOLOGICAL STATUS AND AQUATIC PLANKTONIC BIODIVERSITY OF RIVER TAPTI AT DISTRICT BURHANPUR, M.P. , INDIA" has been undertaken.

Image .No.01: Burhanpur: The cultural heritage city

Image No.2: Surya patni originates (source-multai, near betul) and Burhanpur Dist. Of M.P.

II MATERIALS AND RESEARCH METHODOLOGY

Experimental Work

(a) **Sampling sites, culture, observation-** Planktonic study is carried out seasonally, for which sampling were done 3-4 times in a month and in each day 3 times sample were taken. In each study site sample taken from 3 places.(The selected study sites in Tapti river are Bhatkheda, Jainabad, Duriyapur Kalan.) sample taken from 2m. Depth below the surface water.

Sampling site 1st

Sampling site 2nd

(b) Biological Estimation

The plankton samples are collected following lind (1979,Welch 1953), Welzel (1975) by filtering 40 liters of water through plankton not having pure size 64 u. concentration plankton samples are fixed in 4%formalin.

Zooplankton are identic with the help of keys provided by pennak (1978), sehgal (1083), Needham and (1962), tonapi (1980), A.P.H.A.(1980) .

The phytoplankton will identify with the help of keys given by press cott (1962), smith (1950). Agarkar (1975), edlnondson (1959).

Sampaling site 3rd

Counting of the individual plankton will be done by "lac keys" dropping method (1935) using the formula.

$$\text{Plankton units /liter} = \frac{N \times C \times 10}{Y}$$

N =Number of phytoplankton counted 0.1 ml concentrate.

E = Total volume of concentrate in ml.

Y = total volume of water filtered for sample in liters

The phytoplankton density was expressed on units / liter and Zooplankton density will express in individuals / liter.

During the period of study the range of variation in different physico-chemical parameters is as:

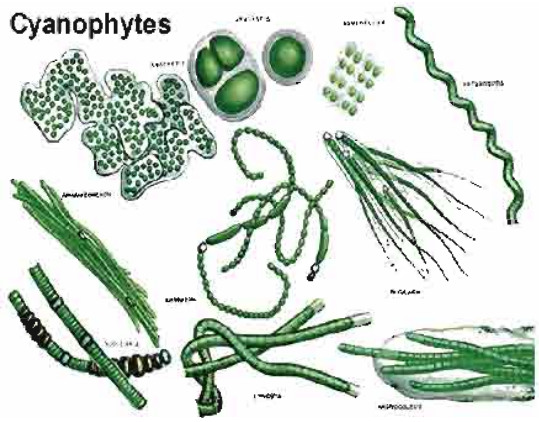
S.No	Parameter	Tapti River
1	PH	7.4-9.4
2	Water Temperature	12-226 c
3	Transparency	20-60.0 cm
4	Dissolved Oxygen	2.2-11.6 mg/Lit.
5	Free CO2	Nil-18.0 mg/Lit.
6	Alkality	120-270 mg/Lit.
7	Total Hardness	100-220 mg/Lit.
8	Chloride	28-90.4 mg/Lit.
9	B.O.D.	8.0-26.3 mg/Lit.
10	Nitrate	0.6-2.2 mg/Lit.

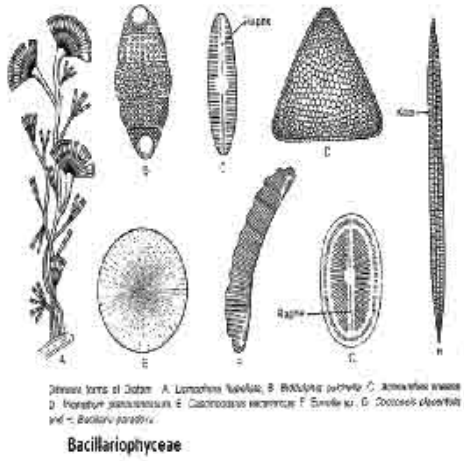
On the basis of the observations that Tapti River are entropic in nature.

III RESULT & DISCUSSION

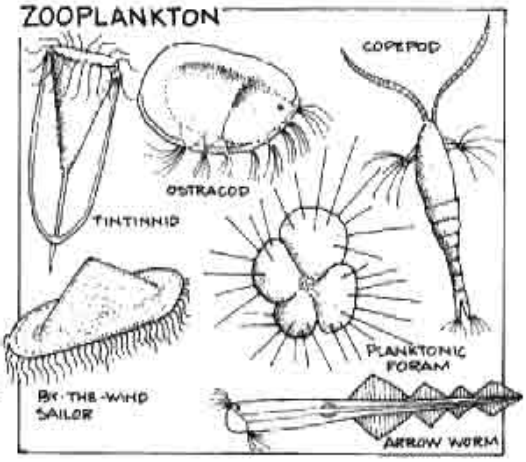
Among the phytoplankton chlorophyceae species. Cynophyceae species, bacillariophyceae species and Euglenophyceae species were recorded from the Tapti River during sep. 2015 to feb.2016. Monthly variation was recorded among phytoplankton. Half yearly average percentage composition of various groups of phytoplankton at different sites was studied.

Figure No.4: Types of Phytoplankton and Zooplanktons in sampling sites





Bacillariophyceae



At site 1st bacillariophyceae and Euglenophyceae were dominant with 30%contribution of each group, at site 2nd chlorophyceae and Euglenophyceae with 35 %of each group were recorded and planktoic from representing chlorophyceae and Cynophyceae species were 30%each recorded from site 3rd. At site 3rd, second dominant group was bacillariophyceae about 25%. Seasonal variation in the amount of Euglenophyceae may be related to the influence of biotic factors (manoj, 1993). From unpolluted sites of several rivers of India, it has been observed that bacillariophyceae was dominating followed by the dominance of chlorophyceae. Similar observation has been recorded for four sampling sites also.

Protozoa and rotifer Zooplanktons were of nearly equal composition but arthropod more in percent composition at site 2nd whereas, other groups were protozoa and rotifers in decline manner. At site 3rd protozoa and rotifers were more in number as this site has less impact as well as less turbidity.

The diversity and density of Zooplankton certainly get influenced by the physic chemical properties of water (onshore et,ak,1997)in that the density of Zooplankton remains more in the lower reaches of the rivers and very less density as well as diversity of Zooplanktons community has been reported from head water and first and second order streams. Further it is a fact that the diversity of Zooplanktons is always less in the flowing fresh water compared estuarine water or tidal influenced zone . The similar observation has been recorded for river like Narmada, Tapti, mahi and Sabarmati (Sharma, 1995. Nanda 2003).

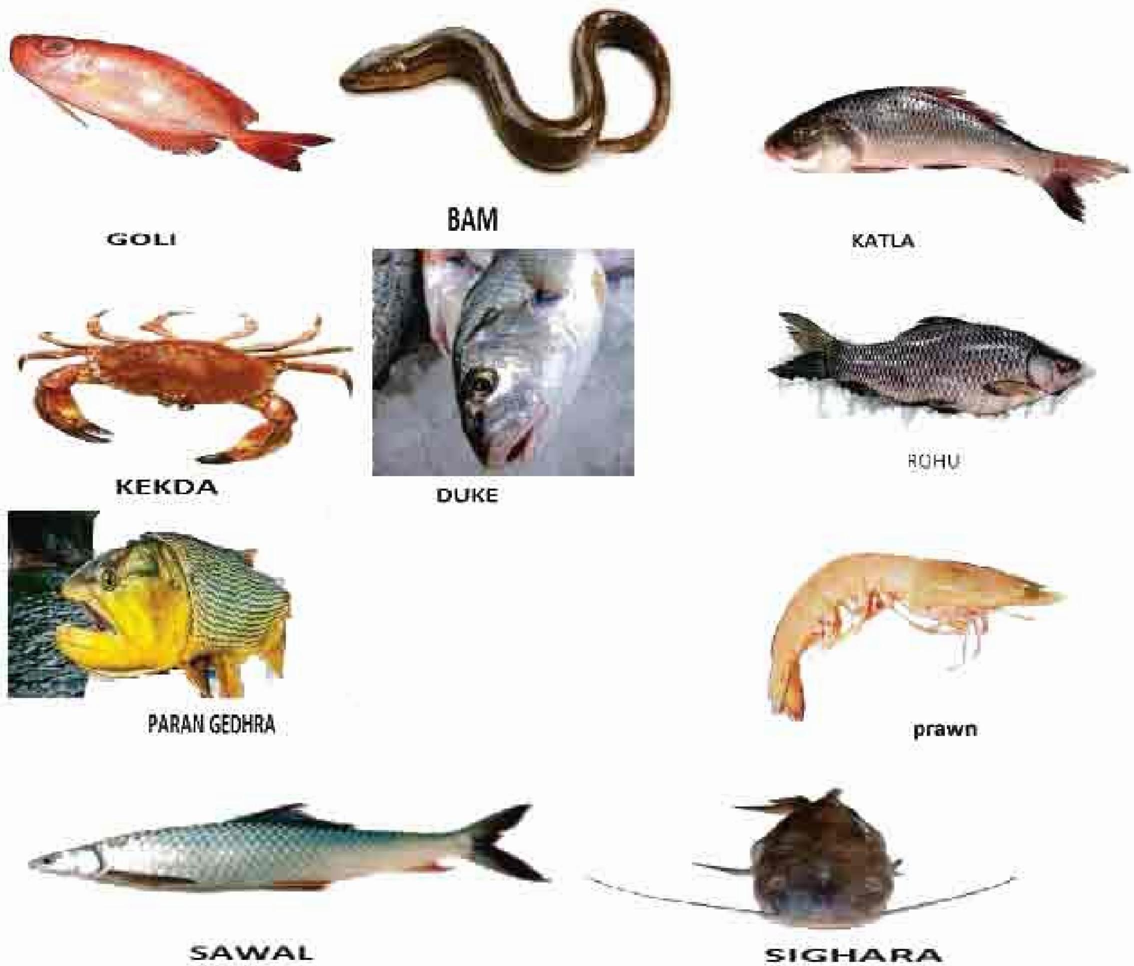
Figure No.5 Aquatic Flora(Flowering Plants) in Tapti River At Burhanpur, M.P., India


Table No.1
Biostatistical Estimation of species diversity :

S. No.	Types of Planktons	Group & Genera	Name of Genera	Total result
	Phytoplanktons	Chlorophyceae: 18	Chlorella, Cosmarium, Oedogonium, Pediastrum, Scenedesmus, Chlamydomonas, Spirogyra, Ulothrix, Hydrodictyon, Cladophora, Chlorococcum, Microspora, Desmidium, Chara, Nitella, Zygnema, Syndesmus and Volvox	42
		Bacillariophyceae; 15	Navicula, Nitzschia, Fragilaria, Ceratoneis, Amphora, Caloneis, Synedra, Diatoms, Gomphonema, Pinnularia, Melosira, Tabellaria, Denticula, Cymbella and Cyclotella	
		Myxophyceae; 09	Anabaena, Anacystis, Oscillatoria, Spirulina, Nostoc, Rivularia, Aphanizomenon, Coccochloris and Phormidium	
II	Zooplanktones	Rotifera 10	Keratella, Rotatoria, Testudinella, Asconmorpha, Polyarthra, Philodina, Asplanchna, Pompholyx, Brachionus and Trichocera	32
		Crustacea, 03	Eubrachaourus, Moina, Nauplius	
		Protozoa 11	Actinophrys, Actinosphaerium, Euglena, Paramecium, Peridinium, Campanella, Epistylis, Vorticella, Arcecella, Difflugia, Ceratium	
		Copepoda 06	Cyclops, Diaptomus, Daphnia, Bosmina, Helobdella and Nauplius stages	

		Ostracoda 02	Cypris and Stenocypris	
III	Aquatic flowering plants	Dicots 48 Monocots 33	48 33	81
IV	Types of fishes	Fishes, 12	Carcinus sp.(Crab), Catla catla (Catla), Labeo boggut (Goryo-ger), Masacembelus pancalus(pancalus), Palaemon sp (Smallprawn), Channamarulius(Marulius), Notopterus notopterus (Patola patoda), Wallago attu (Padin), Mastacembelus armatus(Mastacembilus), Labeo-rohita(Rohu/rue), Heteropneustes-fossilis(Singhari), Silonia silondia(Selondi)	12

Figure 6 Type of Fauna (Fishes) in Tapti River at Burhanpur,M.P.,India.



IV CONCLUSION

On the basis of different physico-chemical and biological parameters , the status of River Tapti is eutrophic in nature and during period under study 12 fish species, 42 phytoplanktons (15 Bacilariophyceae , 18 Chlorophyceae , 09 Cynophyceae) and 32 Zooplanktons (10 Rotifera, 03 Crustacea, 11 Protozoa, 06 Copepoda, 02 Ostracoda) Genera have been recorded . In future with increasing human interference at the same rate, it is possible that the River Tapti will further be polluted. Therefore further studies need to be undertaken to suggest restorative measures, which are of great – socio – economic importance to the region. The current prevailing condition of physico chemical parameters of River Tapti and Aquatic diversity besides acting as potential bio indicators of tropic status requires the management strategies for the conservation of River Tapti at District Burhanpur, Madhya Pradesh, India. (see Table No.1)

REFERENCES \ BIBLIOGRAPHY

[1] APHA(1991): standard methods for the examination of Water and Waste Water, American public Health association, Inc. New York. 18th Ed.

[2] C E P F., 2010-2011, Fresh water biodiversity assessments in the western ghats.

[3] Campbell,C.A. and white. B.S. 2010 U S G S(science for a changing world) leetown science center , Aaquatic biodiversity conservation:an aquatic gap analysis for the Delaware river basin.

[4] Dhanapathi M.V.S.S.S. (1959): Fresh water biology. 2nd (2003) Rotifer from Andhra Pradesh, India-III Hydrobiologia , 48 (1): 9-16.

[5] Edmondson W.T. (1959): Fresh Water biology 2nd Ed. John Wiley and sons, New York, U.S.A.

[6] Fouzia Ishaq and khan amir 2013, Aquatic biodiversity as an ecological indicators for water quality criteria of river Yamuna in Doom valley, Uttrakhand , India.(world journal of fish and marine sciences 5(3) pp. no. 322-334,2013.

[7] Govt . of western Australia, home , sustainability and Environment : 2016: Aquatic biodiversity.

[8] Hutchinson G.E.(1967): A treatise on Limnology , volume II. Introduction to lake Biology and the Limnoplankton. Wiley , New York. 1115 spp.

[9] khanna D.R. bhutani R. matta G ,singh v, and bhaduriya G ,2012 , Study of planktonic diversity of river ganga from devprayag to roorkee ,uttrakhand (india),Environment conservation jouranal 13 (1 and 2) pp no 211-217, 2012.

[10] kripal S.V, mir A.A. bhawsar A. and vyas v : 2014 : Assessmentof fish assemblage and distribution in bahra strem in narmadabasin (central, India),(international journal of advanced research (2014) vol-2, issue-1, pp. no - 888-887.

[11] Kadam S.S. and Tiwari L.R.(2012): Zooplankton composition in Dahanu creek – west coast of India, Research Genera of Recent sciences I (5) , 62-65.

[12] LOUIS A. helfrich ,Richard j . neves and james parkhurst 2009 , Sustaining America'sAquatic biodiversity , Virginia Teeh (invent the future) Virginia state . peterstong 2009.puplication pp. no 420-520:

[13] Mary alkins –koo' and sharda suru jdeo – mahajan 7, Life science West Indies ,st augusline ,trihidad :international journal , pp. no 01-15: waterresources and aquatic biodiversity conservation : A Role for Ecological assessment of rivers in trihidad and Tobago.

[14] New site currently under development combining Biotechnology and sciences 2014 , Learning Hubs with a new look and new functionality side havigation ,published , 19 march 2014: RIVER ECOSYSTEM.

[15] Praveen tamot and ashu awasthi ,2012 , An approach to evaluate fish (fauna)diversity and imnological status of sewage fed urbenlake (shahpur) ,Bhopal , India (international journal of theoretical andapplied science 4(1) : 20-22(2012) ISSN NO (print :0975-1718).

[16] Patole s.s,2014 , Ichthyo faunal diversity of nandurbar district (north west khandesh region) of Maharashtra (India) .(International journal of fishes and aquatic studies 2014 ;2 (2) :pp .no 167-172.

[17] Sharma, s.k., and s.v. sai prasad 2009 , Academic world(international) ,add –I, PP. NO 273-203.agriculturally important : microorganisms.

[18] Tewari G . and bisht 1991 , Aquatic biodiversity : threats and conservation , aquafind , responsible E & P .aquatic fish data base est. 1991.