ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 5(D), pp. 26708-26714, May, 2018

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

MONITORING AND ASSESSMENT OF WATER HEALTH IN RELATION TO FISH PERCEPTION IN THEROOR WETLAND ECOSYSTEM, TAMIL NADU, INDIA

Priyatharsini P[1]., Dhanalakshmi B*[1] and Veeramani T[2]

[1]Department of Zoology, Nirmala College for Women, Coimbatore-641018, Tamil Nadu, India
[2]Department of Marine Science, School of Marine Sciences, Bharathidasan University, Trichy-24, Tamil Nadu, India

DOI: http://dx.doi.org/10.24327/ijrsr.2018.0905.2109

ARTICLE INFO

Article History:
Received 16th February, 2018
Received in revised form 25th March, 2018
Accepted 23rd April, 2018
Published online 28th May, 2018

Key Words:

Wetland, Water quality, Fish diversity, Fish density, Seasonal variations.

ABSTRACT

Southern India is well distributed with wetlands. In these wetlands the water quality parameters play key role in fish's microhabitat predilection and can be used as index of biological productivity in freshwater ecosystem. The present work was, mainly, intended to create information on physicochemical parameters along with fish diversity indices in the Theroor wetland ecosystem at Kanyakumari districts, for four seasons i.e. one year period from 2014-2015 to have a vivid idea of the ecological status of the selected wetland surrounded by agricultural lands, small scale industries and macrophyte infested water body situated at Kanniyakumari district of Tamilnadu comprising 80 Sqkm of area. Hence, proper scientific management of parameters like temperature, pH, dissolved gases (DO2), hardness, BOD etc., seems to be essential prerequisite for maintaining and monitoring wetlands health. All the analyzed parameters showed significant seasonal fluctuation in the water quality. The studies revealed that the certain physicochemical parameters were satisfactory with few exceptions like hardness and BOD. Similarly in the study area fish diversity analysis showed six order of fishery diversity and density were recorded with that percentage viz., Perciformes (38%)>Cypriniformes (31%) >Siluriformes (13%) >Ophiocephaliformes (8%) >Anguilliformes (7%) >Cyprinodotiformes (3%) and among the 6 order the range of fish density *viz*., Perciformes (38%) >Cypriniformes (31%) >Siluriformes (13%) >Ophiocephaliformes (8%) >Anguilliformes (7%) >Cyprinodotiformes (3%) were recorded respectively.

INTRODUCTION

India is interspersed with fresh water bodies which exist in lentic and lotic habitats which are termed as wetlands. All the lentic habitat wetlands such as ponds, lakes, reservoirs are extremely the planet most important fresh water resources as they are endowed with abundance of natural resources and also provide innumerable benefits. Besides acting as a source of fresh water they lower the ambient temperature, raise the water table, increase the diversity of flora and fauna and provide aesthetic ambience. So it is undoubtedly the most precious, absolutely essential natural resources that exist on our planet that is available and accessible for all the important activities like domestic use, industrialization, irrigation etc., and also plays an important role in economic development and the general well- being of the country (Aboues and George, 2009). However escalating industrialization, urbanization, development and agricultural activities have brought irreversible changes in these wetland systems.

As a result many wetlands in and around globe are highly polluted and brought veritable water crises. In India studies on the water quality of the lakes were reported by several liminologists, environmental managers and researchers like MohamedAbdo,2005, Sachidanandamurthy and Yajurvedi, 2008, Jyoti and Jyoti Sharma (2009), Patra *etal.,*(2010), Chinnaiah, (2011), PatilShilpa *et al*., (2012), Alexander *etal.,* (2013). The consequences of such degradation of environment has resulted in ecological imbalance in all the species and on mother earth therefore it has become very importance to judiciously manage and protect the ecology of environment in the present context of the prevailing condition while industrial pollution is causing a variety of problems discharges of untreated sewage (33milione^3/day) and sludge from towns and cities also causes more server problem of biological pollution which to a large extent is responsible for the water borne disease. A relatively homeostatic environment is essential for the survival of organisms in any given ecosystem. Knowing the

*Corresponding author: **Priyatharsini P**
Department of Zoology, Nirmala College for Women, Coimbatore-641018, Tamil Nadu, India

importance of water and its quality for the sustenance of life, the need for conservation of fresh water bodies is being realized everywhere in the world.

Agastheswaram, a periurban town in situated nearby Nagarcoil district of Tamilnadu has a very large wetland called Theroor lake which is a prime land mark surrounded by majestic hills, fringed with coconut trees and paddy fields located in Kannayakumari district at the southern tip of Tamilnadu. One such most important vast fresh water body with good scope of fisheries is Theroor wetland which covers 80Sqkm encompassing 12 villages, which falls between the coordinate of 33°10'N 77°10"E in Agastheeswaram Taluk of Kaniyakumari district. From biodiversity point of view this wetland which is highly productive among the aquatic ecosystem are considered as one of the hot spots of fresh water fish diversity. Several ichthyologists have made qualitative faunistic inventories of fish faunain relatively recent past elsewhere (Ricciardi and Kipp, 2008; Ajithkumar *et al.,* 2006; BalakrishananNair, 2000; Bijukumar and Sushama,2001;Kurup and Ranjeet 2002; Ziliukas, 2005). The most often cited causes for declines in fish abundance and distribution in theses wetland areas are habitat destruction or land modification, introduction of alien species, overfishing, mixing of urban, rural run off from adjacent areas and from agricultural lands in the selected geographical part. Theroor wetland has rendered as very important from faunistic point of view. And from the existing information on the distribution and abundance of freshwater fish from the several workers significant contribution on wetland ecology like (Baliarsingh *et al*. 2013; Elegbe Isa Olalekan*etal*.2015) and essential step in the conservation and sound management of wetland with reference to sustenance of biodiversity distribution and value of healthy fisheries thus in the present study a step has been taken to investigate the water quality variables as descriptors of fish diversity in Theroor wetland to develop freshwater fish diversity information for future generation.

MATERIALS AND METHODS

During the study period survey of the wetland was made to fix the sampling locations. Based on the survey and certain selection criteria like nature of place, mixing of pollutants, usage of water, agricultural activities and other industrial wastes three sampling station (Stn.1, Stn.2 and Stn.3) were fixed. First week of every month from the selected sites water samples were collected in the early hours at the surface of the lake at (6 a.m to 8 a.m) in the labeled poly ethylene bottles were placed in icebox to maintain the quality of parameters and within 24 hrsthey were transported to laboratory for analyzing various physicochemical parameters using standard method of APHA (2005) and WHO (2010).During in-situ water sampling at each sampling stations the temperature was recorded using thermometer in centigrade, a secchi disc of 20cm diameter was used to measure the water column transparency. Fish sampling was also carried out in the selected wetland Theroor from during the study period (Mar 2014- Feb 2015) *viz*., by used gill nets, cast nets, and drag-nets with the help of local fishermen. 10% of total catch from each sampling stations were used for laboratory analysis. Collected fishes were labeled in polythene ice bags and preserved in 10 % formalin solution for further study. Collected fishes are identified by using standard methodology described by (Jayaram, 1999: Qureshi and Qureshi, 1983:Talwar and Jhingran,1983:Day Francis 1994; and Shrivastava, 1998). Fish diversity and fish spices data's focused on taxa, individual, diversity Indices, Shannon-wiener diversity index (H), dominance, richness, evenness were analyzed using standard methods (Legendre and Legendre,1998) and Paleontological Statistics PAST 3.13 version was used for fish diversity.

RESULTS

During the present investigation the average values of the selected physical parameters like the atmospheric temperature (35.40°C), water temperature (34.10°C) and transparency (117Cm) were noted to be maximum during summer at Stn.1and minimum (25.47°C) atmospheric temperature, (24.60°C) water temperature and (56.67Cm) transparency were recorded during monsoon at Stn.3respectively showed in Fig.1. Chemical parameters range *viz*., pH 4.93 and 7.79 (Stn.1 summer and Stn.3 Post-monsoon), Total hardness78.80mg/land 209.20mg/l (Stn.2 monsoon and Stn.1summer), Dissolved oxygen 4.40 mg/l and 9.93mg/l (Stn.3 summer and Stn.1 monsoon), Biological oxygen demand 1.05mg/land 2.31mg/l (Stn.3 monsoon and Stn.1 summer) respectively in Fig.1 and Fig.2.

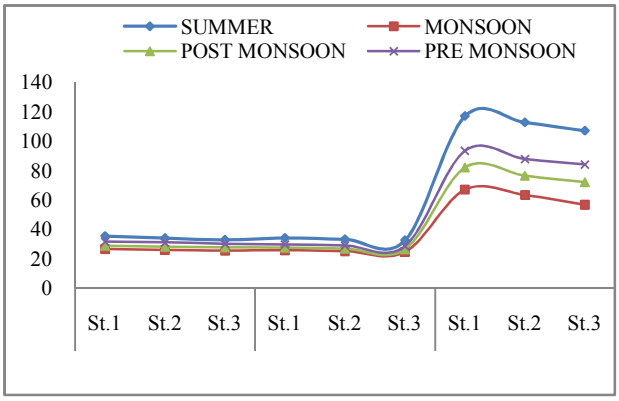

Fig 1 Physical parameters (average) in Stn.1, Stn.2& Stn.3

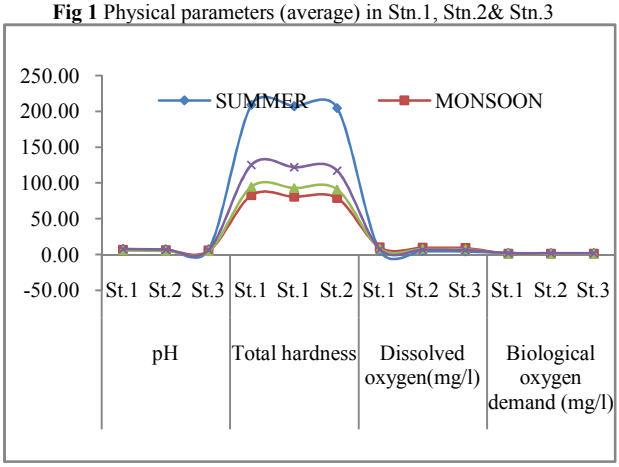

Fig 2 Chemical Parameters (Average) in Stn.1, Stn.2& Stn.3

Fishery data were collected form fishermen during fishing days. During the present study totally 25 various fish species were recorded belonging to 6 different orders and 10 different families (Table.1).This data varied based on the seasons, the group of fish *viz*., Cypriniformes> Siluriformes>Perciformes> Anguilliformes>Ophiocephaliformes>Cyprinodontiformes.
Among this order the dominant fish recorded in the family of Cyprinidae found 7 species and cotritidae contain 2 species.

Under Cyprinidaethe following species were recorded *Catlacatla, Cirrihinusmrigala, Cyprinuscarpio, Ctenopharyngdonidella, Cyprinuscarpiocarpio, Labeorohita, Labeofimbriatus* and under family cotritidaeonly one species *Anguillicaudatus* was recorded during the fishing days there are 6 order the range of fish density *viz*., Perciformes (38%) >Cypriniformes (31%) >Siluriformes (13%) >Ophiocephaliformes (8%) >Anguilliformes (7%) >Cyprinodotiformes (3%) were recorded respectively in Fig.4. During one year period the maximum species are *Oreochromisniloticus* (233kg) and *Oreochromismossambicus* (201kg) were recorded. Lower quantity of *Mystusseenghala* (10 kg) was recorded respectively maximum average quantity of tilapia fish are *Oreochromisniloticus* and *Oreochromismossambicus* 233kg and 201 kg were recorded respectively detailed results were expressed in Fig.3. Species richness and evenness were calculated with that the minimum and maximum range of the Dominance (D) 0.054 (January) and 0.120 (July) respectively. Species richness (D') 0.883 (September) and 0.946 (January), species diversity (H') 2.552 (June) and 3.066 (January), species evenness (J') 0.814 (July) and 0.953 (January) respectively were showed in Table.2.

Table 1 Checklist of fish species in Theroor wetland

S.no	Order	Family	Species	Author	Status
1.	Cypriniformes	Cyprinidae	*Catlacatla*	Hamilton, 1822	++
2.			*Cirrihinusmrigala*	Hamilton, 1822	++++
3.			*Cyprinuscarpio*	Linnaeus, 1758	+++
4.			*Ctenopharyngdonidella*	Valenciennes, 1844	++
5.			*Cyprinuscarpiocarpio*	Valenciennes,1844	++
6.			*Labeorohita*	Hamilton, 1822	+++
7.			*Labeofimbratus*	Bloch	+
8.		Cotritidae	*Anguillicaudatus*	Cantor 1842	
9.	Ophiocephaliformes	Ophiocephalidae	*Channamarulius*	Hamilton,1822	+
10.			*Channapunctatus*	Bloch,1793	+
11.			*Channastriatus*	Bloch,1794	+
12.	Perciformes	Cichlidae	*Oreochromismossambicus*	Peters, 1852	++++
13.			*Oreochromisniloticus*	Linnaeus, 1758	++++
14		Anabantidae	*Anabastestudineus*	Bloch,1792	+++
15	Siluriformes	Heteropneustidae	*Heteropneuteusfossilis*	Bloch,1974	++
16.			*Mystusvittatus*	Bloch,1794	++
17.			*Clariasbatrachus*	Linnaeus,1754	+
18		Clariidae	*Plotosidae*	Bleeker, 1858	+
19.			*Clariasgariepinus*	Burchell,1822	+
20.			*Pterygoplichthys*	Gill, 1858	+
21.			*Mystusseenghala*	Holly,1938	+
22.	Cyprinodontiformes	Poecilidae	*Gambasiaaffinis*	Baird& Girard,1853	+
23.	Anguilliformes	Anguillidae	*Japonica*	Temminc& legal, 1846	+
24.			*Congridae*	Kaup, 1856	+
25.			*Anguilla australis*	Richardson, *1841*	+

*++++-Most abundant; +++- Abundant; ++- Less abundant; +- Normal

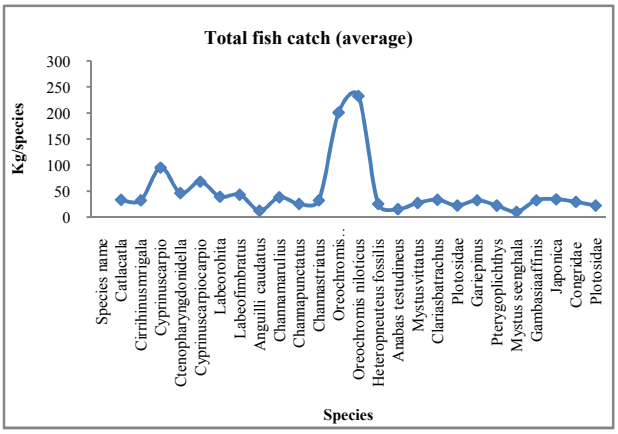

Figure 3 Average fish catch /kg/year in Theroor Wetland

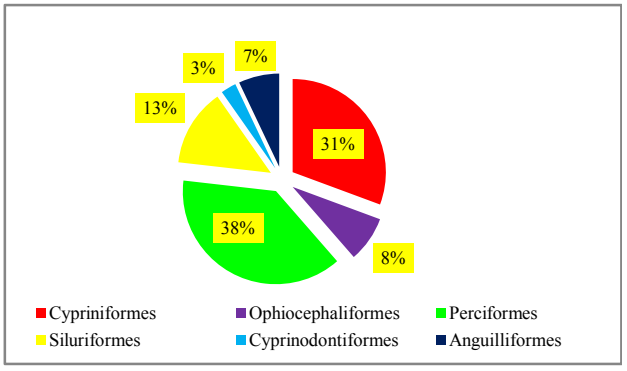

Figure 4 Percentage of fish diversity

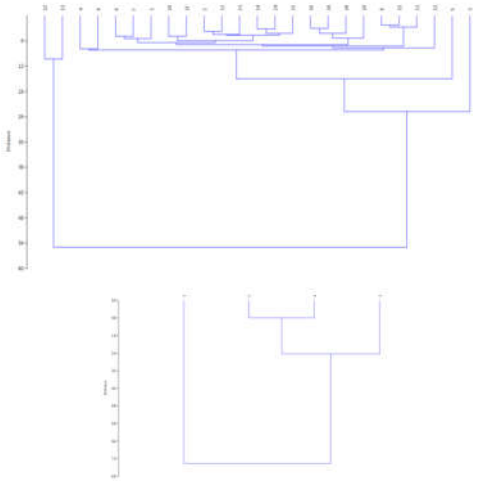

Figure 5 Dendrogram of the species assemblage for the Theroor wetland fish survey from Mar 2014- Feb 2015

Table 2 Fish diversity Index and species richness, evenness in Theroor Wetland

Fish diversity index/month	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Taxa S	23.00	24.00	24.00	20.00	24.00	25.00	23.00	24.00	25.00	24.00	25.00	23.00
Individuals	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Dominance D	0.107	0.097	0.106	0.115	0.120	0.106	0.117	0.093	0.087	0.082	0.054	0.067
Species richness (D')	0.893	0.903	0.894	0.885	0.880	0.894	0.883	0.907	0.913	0.918	0.946	0.933
Species diversity (H')	2.639	2.733	2.656	2.552	2.588	2.705	2.589	2.756	2.792	2.823	3.066	2.904
Species evenness (J')	0.842	0.860	0.836	0.852	0.814	0.840	0.826	0.867	0.867	0.888	0.953	0.926

DISCUSSION

A regulatory factor for various physicochemical as well as biological activities in all the ecosystems is temperature, the most important physical factors which influences the aquatic

life. During the present analysis according to the water parameters conspicuousseason's variations in the air and water temperature were noted. It was noted to be maximum in summer because of bright and long duration of solar radiation, low water level, high temperature and clear atmosphere which was in accordance to the report of Govindswamy *et al*., 2007 while minimum value observed in monsoon which could due to the cloudy sky and rainfall which could have brought down the temperature to the minimum level (Kannan and Kannan,1996).Similar kind of observation with similar trends while working on different water bodies was reported by Simpi *et al*.(2011); ShindeRaullah Khan *etal*.(2012); El Badaoui *et al*. (2015).

Transparency is stated to be inversely proportional to the turbidity of water which on investigation recorded maximum transparency (121 cm) during summer due to greater amount of sunshine, better penetration of light, moderate velocity of wind, stillness of water and less proportion of dissolved oxygen attributed and to the sedimentation of suspended matter (Chaurasia and Adoni, 1985; Sinha *et al*.2002; Kadam *et al.*2007; Shah and Pandit 2012) and minimum (54cm) in monsoon which could be attributed to cloudy conditions, poor sunshine and influx of surface runoff laden with silt and different kinds of organic material causing turbidity in water due to increase of suspended particles on account of organic debris's decomposition with higher water temperature and reduced flow. During the monsoon season the rain water brought large amounts total inorganic and organic materials from upper catchment areas as well as from lower floodplain zone that made water turbid and cause lower transparency (Mustafa and Ahmed, 1979)in all the three selected stations. Siltation from the influx waters, discharge of organic debris from human settlements around the wetland and run-offs from agricultural fields primarily resulted in reduction of depth of many lakes in India.

pH is an important parameter that determines the suitability of water and biotic communities because most of the plant and animal species can survive only in a narrow range of pH from slightly acidic to slightly alkaline condition. During the present study maximum pH was recorded in summer which indicates presence of high level of carbonates and bicarbonates, presence of alkaline earth metals (Rana and Palria 1998: Bohra,1976), decreased decomposition rate owing to reduced microbial activity, overfeeding to fishes and increased decomposition rate leading to acidification. Low pH value observed in monsoon may be attributed to influence of fresh water influx, dilution of lake water, organic matte decomposing, decaying aquatic weeds (Zingde *et al*. 1987).The fluctuation of pH remains in the range of 4.93 to 7.79 in order to support the optimum fish growth in the present study site which was in support to the Das, 1996 statement on water quality.

Hardness of water is due to the presence of certain salts of calcium, magnesium and some heavy metals (Jain, 1998). Total hardness value recorded high during summer may be due to leaching of rocks in catchment area, can be attributed to decrease in water volume and increase of rate of evaporation of water. Less level of hardness was due to low level of rain fall and less discharge of sewage and may be attributed to dilution of calcium in the wetland water by rain Jingaran, 1975 and Riedand Wood, 1976. Ozterk*etal*.2008, Hujare, 2008have reported that total hardness was lower in monsoon and higher in summer which was similar to several reported total hardness was high during summer followed by rainy season and minimum during winter season (Hujare,2008; Hulyal and Kaliwal,2011; PatilShilpa *et al.* 2012; PriyankaYadav *et al*.2012; Alexander Singh and Bijen Meitei, 2013).

The dissolved oxygen value indicates the degree of pollution in the water bodies (Gupalkrushna, 2011). In the present investigation the Stn.3recorded minimum dissolved oxygen during summer due to high temperature and higher demand of oxygen by microbes for decomposition of suspended organic matter, flow down of sewage form the vicinity and maximum dissolved oxygen level was observed in Stn.1 during monsoon due to rise in water level and low temperature which was in accordance Achut Ram Pradhananga *et al*. 2013. Similar observation was also recorded by Patra*etal*.2010; Rumysakhaliq *et al.* 2012; Narasimha Ramuluand Benarje,2013; Alexander singh and Bijen Meitei,2013. Thus the fluctuation of dissolved oxygen seasonally and also daily with variations in water temperatures is due to consumption of dissolved oxygen owing to respiration by aquatic animals.

Biological oxygen demand (BOD), the most commonly used parameter for determining the oxygen demand in the water as it is an indirect measure of biodegradable organic compounds in water. According to Hynes 1971, BOD and other microbial activates generally get increased by the introduction of sewage. In the present investigation seasonal variation in BOD values, was observed higher during summer months followed by post monsoon, pre monsoon and monsoon seasons was recorded. Maximum BOD were recorded in the summer season due to increase in oxygen usage by aerobic decomposers for oxidation of organic matters and minimum values were recorded during monsoon season. The low BOD value in all stations during monsoon showed good water condition which means low organic contamination, low influx of nutrient, reduces sewage loading and low decomposition and mineralization of organic matter were recorded (Kumar and Sharma, 2005; Siraj *et al*., 2010; Rahashyamani Mishra *etal*., 2011; Suresh, 2015). Sakhare, (2001) who too observed minimum BOD during monsoon season in his investigation from Jawalgaon reservoir in Solapur district of Maharashtra. The difference in BOD values in selected stations shows the dynamism in aquatic life of wetland.

For the past few years much attention is being paid to aquaculture as a source of food to feed the growing population of the country as it constitute the most conspicuous component of inland aquatic fauna and rank very high as a source of proteins. Form Shendge, 2008 point of view sustained exploitation and simultaneous conservation of fisheries resources, basic scientific information on biodiversity is vital. The icthyofauna is an important aspect of fishery potential of a water body. It was observed that the distribution of icthyospecies is quite variable because of geographical and geological conditions.Database on icthyo faunal biodiversity is considered as a very essential decision making tool andwill fulfil the obligation on the part of India under conservation onbiological diversity.The earlier contribution of Ali *et al*., 2004, Salaskar and Yeragi, 2004, Meshram and Meshram, 2005, Muley and Patil,2006, and Sharma and Mehta, 2008 on estimation of fish community structure in inland water bodies

is widely considered asan integrative indicator of the ecological status and a useful barometer to assess the real state of purity of water of water bodies. During the present investigation totally 25 various fish species were recorded belongingCypriniformes>Siluriformes>Perciformes>Anguillifo rmes>Ophiocephaliformes>Cyprinodontiformes. Among this order the dominant fish species recorded belongs to the family of Cyprinidae (Table.1; Fig.4). Sharma,*et al*. (2007) reported 29 species of fishes belonging to 6 orders from Krishnapuralake, Indore and stated that Cypriniformes was dominant with 15 species. Similar icthyofaunal observation was reported by (Pisca, *etal*. (2000), Singh, (2001), Salaskarand Yeergi, (2004),Shrikanth, *etal*. (2009), Dhanalakshmi and Priyatharsisni, (2015 and 2016). Pollution of water caused by various human activities affects the physiochemical parameters of the water body which in turn affects fish species. According to Freeman *et al*., 1988, the environmental variability strongly influences the fish population. ParithBhanu and Deepak, (2015) concluded that, mainly human interference in lakes and rivers were responsible for the less distribution of fishes.

To characterize the diversity of a sample or community by a single number ichthyologist seeks biodiversity index. The characteristics of fish community that commonly contribute to the community structure are the species richness, evenness and species dominance diversity (David *et al.,* 2005). The minimum Dominance (D) 0.054, Species richness (D') 0.883, Species diversity (H') 2.552 and Species evenness (J') 0.814 recorded during the present study may be due to pollution and intense hot climatic conditions which could have affected the growth and distribution of fishes during the selected study seasons. At the same while maximum Dominance (D) 0.120, Species richness (D') 0.946, Species diversity (H') 3.066 and Species evenness (J') 0.953 has also been observed that in the winter and retreating monsoon season highest number of fish species were recorded when compared to the other season (Pre and Post monsoon) which might be due to receding water level of the river which enhance the fish breeding and fish intensity.
Since season wise structural comparisons of fish communities are indicative of the ecological state or ecological changes icthyofaunal richness in the present study was estimated by collection of varieties of fish species in three different selected sites (Stn.1, Stn.2 and Stn.3) of the selected study area and represented in Fig.5. High species richness and evenness, which occurs when species are equal or virtually equal in abundance, are equated with high diversity which was in accordance to the Ricotta and Avena, 2003 study. In the present study the low richness during inter monsoon and summer season may be due to higher water temperature coupled with high transparency which was consonance with Das and Pande, 1978; Pant and Sharma, 1978; Srivastava,1978,Nagdaliand Gupta, 2002 and Kantoussan *et al.* 2008 works. Thus according to the overall results the physicochemical and fishery assessment in the study area showed fluctuations during the study period which proves that environment and nutrients plays a major role in distribution of fish population. The seasonal variation of water quality parameters of Theroor wetland thus provides an almost intense picture of ecological status at present. On the whole the analyzed physiochemical parameters was found slightly above the permissible limit for biological components of the wetland which signifies the sewage contamination and disposal of domestic sewage along with cattle waste and excreta from nearby area could be a reason of contamination. So the present study gives a brief description of the hyodrobiological profile of Theroor wetland and also from the above results it insist that proper measures has to be taken by the NGO's, residents and agriculturist to maintain the aesthetic nature of this prime wetland which currently acts as the water source for the in and around villagers and farmers.

Acknowledgments

The Authors acknowledge the support and help form the PG and Research Department of Zoology, Nirmala college foe women, Coimbatore and Bharthidasan University for providing statistical help and library facilities.

References

Achut Ram Pradhananga Ramesh KajiShakyaPawan Raj Shakya.2013. Assessment of physico-chemical parameters of surface water quality of Taudaha lake of Kathmandu and their comparison with other global published values. *Bibechanaa Multidisciplinary Journal of Science, Technology and Mathematics*. 9(1):141-150.

Alexander singh N, SanamachaMeetei and Bijen Meitei L. 2013. Seasonal variation of some physicochemical characteristics of tree Major Rivers in Imphal, Manipur: A comparative Evaluation. *Current World Environment*. 8(1):93-102.

Ali M., Salam A,Ahmd N, Khan B and Khokhar M.Y. 2004. Monthly Variation in Physicochemical Characteristics and Metal Contents of Indus River at Ghazi Ghat, Muzaffargarh, Pakistan. *Pakistan Journal of Zoology*. 36(4):295-300.

Baliarsingh N, Mohapatra L, Parida K. 2013. Design and development of a visible light harvesting Ni–Zn/Cr–CO3 2– LDH system for hydrogen evolution. *J. Mater. Chem*. A 1, 4236.

Bohra O.P. 1976. Some aspects of limnology of PadamSagar and Rani Sagar, P.hD, Thesis, University of Jodhpur, Jodhpur.

ChaurasiaS.K, andAdoni AD. 1985. Zooplankton dynamics in a shallow Eutrophic lake Proc. Nat. Symp. *Pure Appl. Limnology Bot. Soc*. *Sagar*. 32:30-39.

Das S.Mand Pande J, 1978. Some physicochemical biological indicatorsof pollution in lakeNainitalKumaran (UP) Indian *J.Ecol*. 57-16.

Day Francis. 1994.The fishes of India. JagmanderBook Agency, New Delhi.

Elegbede Isa Olalekan Fatima KiesLawal-Are AderonkeOmolaraSalauDamilolaRashidatFashina-Bombata Hakeem AkintolaShehu LatunjiAderolu Ademola Zaid NdimeleEmeka, OnyemaIkenna Charles and FadeyiOluwaseun. 2015. Effect of Water Quality Characteristics on Fish Population of the Lake Volta, Ghana. *Environ Anal Toxicol*. pp2-5.

Gopalkrushna M.H. 2011. Determination of Physicochemical parameters of Surface Water Samples in and around Akot City, *International Journal of Research in Chemistry and Environment*.1(2):183-187.

Hujare M.S. 2008. Seasonal variation of physicochemical parameters in the perennial tank of talsandeMaharastra,

Ecotoxicology and Environmental Monitoring.18(3): 233-242.

HulyalHulyal S.B, and Kaliwal B.B. 2011. Seasonal variation in physicochemical characteristics of AlmattiResrvior of Bijapur District, Kanataka State, *IJEP*.l(1): 58-67.

Hynes H.B.N.1971.The Biology of Polluted waters Liverpool University Press.

Kadam, M.S,Pampatwar D.V, and Mali R.P. 2007. Seasonal variations in different physicochemical characteristics in Mosoli reservoir Of Parbhani district, Maharastra, *Journal of Aquatic biology*. 22(10):110-112.

Kannan R, and Kannan L.1996. Physicochemical characteristics of seaweed beds of the Palk Bay, southeast coast of India. Indian. *J. Mar. Sci*. 25:358 – 362.

Kantoussan J, Ecoutin JM, Simier M, Fontenelle G, Thiaw OT and Laë R. 2008. The relevance of species-based indicators as a tool for evaluating the structure of exploited fish assemblages: a comparative study of two tropical lakes in Mali, West Africa. *Lakes and Reservoirs: Res. and Mgmt*.11 (2):135-148.

Kumar P, and Sharma H.B.2005. Physicochemical characteristics of lentic water of Radhakund, district, Mathura. *Ind. J. Env. Sci*., 9:21-22.

Legendre P, Legendre L, 1998. Numerical Ecology, second English ed. *Elsevier*, 853.

Muley D. V. and Patil I. M.2006. A study of water quality and fish diversity of Pauna River Maharashtra. *J. Aqua. Biol*. 21(1):68-75.

Nagdali, S.S., and Gupta, P.K. 2002. Impact of mass mortality of a mosquito fish, *Gambusiaaffinis* on the ecology of a freshwater eutrophic lake (Lake Nainital, India). *Hydrobiol*. 468:45-51.

NarasimhaRamulu K, and Benarjee G, 2013. Physicochemical factors influenced plankton biodiversity and fish abundance-a case study of Nagaram tank of Warangal, Andhra pradesh. *Int. J. Lif Sc. Bt& Pharm*. 2(2)

Pant M.C, and Sharma A.P, 1978. Observations on some possible casual factors governing the mortality of winter fish in the Nainital Lake. In: *Proc. Natl. Seminar on Res. Dev. and Env. in* the Himalayan Region, DST, New Delhi. Nainital, GyanodraPrakashan. 248-254.

Parithabhanu and M. Deepak. 2015. The effect of Cadmium on antioxidant enzymes in the liver of fresh water fish *Cypriuscarpio* (Linn). 13. *Biolife*,3(1):50-53

PatilShilpa G, ChondeSonal G, JadhavAasawari S, and RautPrakas D. 2012. Impact of physicochemical characteristics of Shivaji University lakes on phytoplankton Communities, Kolhapur India. *Research Journal of Recent Sciences*. 1(2):50-60.

Patra A.P, Patra J.K, Mahapatra N.K, Das S, and Swain G.C. 2010. Seasonal variation in physico chemical parameters of Chilka Lake after opening of new mouth near Gabakunda, Orissa, India. Pradesh, India. *J Aqua Biol*. 24(2):57-60.

Pisca Ravi Shankar Saraladevi B, and DivakaracharyK. 2000. The Present status of Ibrahimbagh, a minor reservoir of Hyderabad, *Fishing chimes*. 20 (2):41-43

Priyankayadav V.K, Yadav, A.K, Yadav and P.K, Khare. 2013. Physicochemical characteristic of a fresh water pond of Orai, U.P., Central India. *Octa journal of Biosciences*.1(2): 177-184.

Qureshi TA, Qureshi NA. 1983. Indian Fisheries, BRU Brothers, Sultan Road, Bhopal.

Rahashyamani Mishra Rajesh Kumar PrajapatiVirendra Kumar Dwivedi and Arpana Mishra. 2011. Water quality assessment of Rani Lake ofRewa (M.P), India. GERF *Bulletin of Biosciences*. 2(2):11-17.

Rana B.C, and Palaria S. 1988. Assessment, Evaluation and Abatement studies on a polluted river Sandi (Raj).; "Ecology and pollution of Indian rivers". Ed. Trivedi, R.K.; Ashish Publishing House, New Delhi-110026, 345-360.

Reid GK, Wood R.D.1976. Ecology of inland waters and estuaries. Second edition. D. Van. Nostrand.Corporation, New York, USA.

Ricotta. C and G.C. Avena.2003. On parametric evenness measures. *Journal of Theoretical Biology*.222:189–197.

RumysaKhaliqSharique A, Ali Tariq Zafar, Mohd. Farooq, Bilal A. and Pinky Kaur Physicochemical Status of Wular Lake in Kashmir. *Journal of chemical Biological and Physical Sciences*.3(1):631-636.

Sakhare, V.B. 2001.Ichthyofauna of Jawalgaon Reservoir in Solapur District (M.S.). *Journal of Aquatic Biology*.16:31-33.

Salasker PB, Yeergi SG.2004. Primary productivity of Powailake, Mumbai Maharastra. *J Aqua Biol.*19(1):19-22.

Shah JA, Pandit AK. 2012.Physico-chemical characteristics of water in Wularlake-ARamsarSite in Kashmir Himalaya. *International Journal of Geology, Earth and Environmental Sciences*. 2(2):257–265.

Sinha M.P, Kumar R, Mishra S.K, and Choudhuri A.K. 2002. Eco taxonomy and biomonitoring of lake for conservation and management. Biotic Profile In: Ecology and conservation of lakes, Reservoirs and Rivers Edited. Vol-II pp248-289.

Srivastava, A.K. 1978. Some aspects of fish parasitology in Lake Nainital. *Geobios*. 5(05): 237-239.

Talwar PK, Jhingran A. 1991.Inland Fishes of India and Adjacent Countries. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi. (2):1158.

Zingde MD, Abidi SAH, Sarma P, Rokade MA.1987. Base water quality off thal in contribution in marine sciences – Dr. S.Z. Quasim Sixtieth Birthday Felicitation. 307-318.

Siraj, S.,Yousuf, A.R., Bhat.F.A., Parveen, N. 2010. *Eco. Nat. Environ.2:*84-91.

Suresh.2015.B.*Int. J.Curr.Appl. Microbiol. Sci.4*:1077- 1085.

Day, F., 1994. The fishes of India, Burma and Ceylon, Fourth Indian reprint, Vol. I & II, Jagmandar book Agency, New Delhi.

Shendge, A. N., 2008. lchthyofaunal diversity of Ujani dam. *J. Exp. Zool. India*. 11(1): 147-150.

Sharma, I. and Mehta, H. S., 2008. lchthyodiversity of Tributaries of river Yamuna (Dist. Sirmour, Himachal Pradesh). Uttar Pradesh. Zool. 28(3): 343-347.

Meshram, C. B. and Meshram, V. 2005. lchthyofauna of some wetlands in an around Amravati, Maharashtra. *J. Aqua. Bioi*. 20(2): 77-78.

Mohamed, H., Abdo. 2005. Physicochemical characteristics of ABU Za BAAL ponds, Egypt. *Egyptian J. Aquatic Res*.31(2):1-15.

APHA. 2005. Standard methods for the examination of water and waste ter. 21stEdn., Washington, D.c.

Priyatharsini.P and B. Dhanalakshmi 2016. Water Quality Characteristics of Vembanoor Wetland, Kanniyakumari District, Tamil Nadu, India. *Int.J.Curr.Microbiol.App.Sci*. 5(8): 852-861

Jayaram K.C. 1999. The fresh water fishes of Indian Region. Narendra Publishing House New Delhi.

Chinnaiah, B,V. Madhu and M. Ramesh Babu. 2011. Physicochemical characteristics of Khajana and Darmasagar lakes, in Adilabad, Andhrapradesh, India. *International Journal of Pharmacy & Life Sciences*.2(4):674-676.

Freeman, B. J. 1998. Survey of threatened and endangered fishes in the Oostanaula, Coosawattee and Etowah rivers. Report to U.S. Fish and Wildlife Service, Daphne, Alabama.

ISI, 1991. Indian Standard for Drinking Water, Bureau of Indian Standard. New Delhi, India, pp.179.

David, P. 2005. Environmental and Economic costs of the application of pesticides primarily in the United States. Environ. Develop. Sustain.7: 229-252.

Ra ulla, M., Khan, Milind, J. Jadhav and Rustad. 2012. Physico chemical analysis of Trivanilakewater of Amaravath District in MS India, *Biosci*. *Discovery*. 3(10):64-66.

Shrivastava G.1998. Fishes of U.P. and Bihar, Seventh Edition, VishwavidalayaPrakashan, Chowk, Varanasi India pub.

Dhanalakshmi B, Priyatharsini P. 2015. An Assessment of Fresh Water Piscine Diversity in Selected Wetlands in Coimbatore District, Tamilnadu, India-A Preliminary Study. *Open Access Library Journal*. 2:e2236.

APHA. . 2005. "Standard Methods for Examination of Water and Wastewater", American Public Health Association WWA, Washington, D.C.

Water Quality Standards Handbook - Chapter 3: "Water Quality Criteria" (40 CFR 131.11) EPA "Parameters of water quality" Interpretation and Standards.2010.

Jyoti .M.K., K.K. Sharma , Jyoti Sharma. 2009. Population dynamics and community structure of zooplankton inhabiting in fish pond Jammu, India. *Current World Environment* .4(1):165-169 ·

Ricciardi , A. and Kipp , R. 2008. Predicting the number of ecologically harmful exotic species in an aquatic system. Diversity and Distributions.14: 374 – 380.

Sachidanandamurthy K.L., Yajurvedi H.N.2008. A study on growth co-efficient and relative condition factor of the major carp (*Catlacatla*) in two lakes differing in water quality. *Applied Ecology and Environmental Research*.6(3):33-47.

Jain A.K. 1998. Fisheries resource management in Rajasthan: An overview of present status and future scope. *Fishing Chimes*. 17(11):9-15.

Srikanth K, Ramu G, Benarjee G. 2009. The study on Ichthyofaunal diversity of Ramappa Lake, Warangal District. A.P. India. *J Aqua Biol*. 24(2):57-60.

Jhingran VG. 1983. Fish and fisheries of India, Edn 1,Hindustan Publishing corporation, New Delhi,.

Simpi B, Hiremath S. M, Murthy K. 1N. S, Chandrashekarappa K. N, Patel A. N and E.T. Puttiah.2011. Analysis of Water Quality Using Physico-Chemical Parameters Hosahalli Tank in Shimoga District, Karnataka, India. *Global Journal of Science Frontier Research*. 1(3): 31-34.

Öztürk, M., Özözen, G., Minareci, O., and Minareci, E. 2008. Determination of heavy metals in of fishes, water and sediment from the Demirköprü Dam Lake(Turkey). *Journal of Applied Biological Sciences*.2(3): 99–104.

Ajithkumar, T. T., Thangaradjou, T., and Kannan, L. 2006. Physico-chemical and biological properties of the Muthupettai mangrove in Tamil Nadu. *Journal of Marine Biological Association of India*. 48, 131–138. Bijukumar, A. and S. Sushama. 2001. The fish fauna of Bharathapuzhariver, Kerala. *Journal of the Bombay Natural History of India*. 98(3): 464–468.

Kurup B.M. and Ranjeet. K. 2002. Invasion of exotic fish population in Periyarlake, Kerala: Ahotspot of fish biodiversity. *In* Proc. Life History Traits of Freshwater Fish Population for its Utilization in Conservation. Lucknow, India, NBFGRNATP, AC-15. pp.1-4.

ValdemarasŽiliukas. 2005. Diversity and Density of Shoreline Juvenile Fish Communities of the Šventoji River. *ActaZoologicaLituanica* .15(3):239-247 ·

Balakrishanan Nair, N.2000. Report of the Expert Committee for Fisheries Management Studies; Kerala, Directorate of Fisheries, Thiruvananthapuram, pp. 49-56.

El Badaoui, H. Abdallaoui, A. Manssouri, I. Lancelot, L. 2013. Application of the Artificial Neural Networks of MLP Type for the Prediction of the Levels of Heavy Metals in Moroccan Aquatic Sediments. *International Journal of Computational Engineering Research*.3 : 75-81

Mustafa, G. and Ahmed, A.T.A. 1979. Food of *Notopterusnotopterus* (Pallas). *Bangladesh J. Zool*. 7(1):7-14.

Sharma, A., Sharma, R.C., Anthwal, A., 2007. Monitoring phytoplankton diversity in the hill stream Chandrabhaga in Garhwal Himalayas. *Life Sci. J*. 4, 80-84.

How to cite this article:

Priyatharsini P *et al*.2018, Monitoring And Assessment of Water Health In Relation To Fish Perception In Theroor Wetland Ecosystem, Tamil Nadu, India. *Int J Recent Sci Res.* 9(5), pp. 26708-26714.
DOI: http://dx.doi.org/10.24327/ijrsr.2018.0905.2109

****