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STUDY OF FISH BIODIVERSITY AND PHYSICO CHEMICAL PARAMETER OF WATER BODIES OF DISTRICT BOLAN RIVERS BALOCHISTAN PAKISTAN

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Abstract

The aim of the present research the in-water bodies of District Bolan to assess fish biodiversity and Physico chemical parameters of water bodies of Bolan River i.e., Gokurth, kirtha Basun deer, and Pir ghaib. In present study 12 fish species identified in which 1 fish species is noncommercial while other all fish species are commercial. These fishes belong to six orders and seven families. Largest family was Cyprinidae family. However, the water quality parameters like total dissolved solids, salinity, dissolved oxygen, pH, and transparency and noticed within the suitable ranges and no significant variation was recorded observed by Jetway Model No. 3305. Finally concluded that water of District Bolan River found to be suitable for drinking, irrigation and fisheries management purpose.

KEYWORDS: Bolan, Fish Biodiversity, river, parameters, Balochistan

1. INTRODUCTION

Fish Biodiversity

The variety and distribution of fish are very important in recognizing all the evidence that put pressure on fish culture and their heritage (Galactos *et al* .2004) The fish not only source of food but its production and export as well strengthen and enhance a Country's financial status (Khanand Hasan, 2011). Because of their geography species of fish Distribution varies. (Shaikh *et al* . 2011). Biodiversity is important for the steady protection of the water ecosystem (Ehrlich and Wilson, 1991). (Jayaram .,1999) reported 40,000 chordate species approximately and globally.21, 723 fish species have been reported. 186 fresh water of fish species have been identified from different water bodies of Pakistan. Around 30 species of freshwater fish fauna are said to be the most significant commercial freshwater fish, of particular importance were *Cirrhinus mrigala, Labeo rohita, Channa striatus, Gibelion catla, Rita rita and wallago attu* (Peter.,1999). (Nelson. 2006)

Documented .11, 952 fish species belonging to 33 orders (43% of total fish species) live in lakes and fresh water rivers entirely. The quality of water has great influence on population of aquatic organisms (Adeyemo *et al* ., 2008).

Excess utilization of artificial feed and nutrients has been reported to raise the number of total dissolved solids in ponds fish (Ehigbonare *et al* ., 2010). The layout and the geography of a particular area also effect on the quality of water. Anthropogenic actions, like erosion, geological characteristics weathering, of the environment, geochemical and ever growing population of the globe have kept fluctuations in natural water bodies (Adefemi and Awokunmi, 2010). Numerous parameters support to understand the various processes of metabolism within the ecosystem. These factors, along with the fauna and flora distribution, which can influence the abundance in the ecosystem of aquatic (Shinde *et al* ., 2009).

In result, biological, chemical and physical parameters effect on water quality. Hence regular monitoring of physicochemical parameters is essential (Arain *et al* ., 2014). These parameters are limiting factors for the survival of aquatic organisms (flora and fauna) (Lawson, 2011). *Current study is an attempt to determine* fish biodiversity and analysis of Physico chemical parameters of water of Bolan River. Therefore, in this attempt which we present detail description of fish biodiversity and analysis of Physio- chemical parameters of water to restraints the habitats of fishes in rivers of District Bolan.

2. MATERIALS AND METHOD

The aim of this study was evaluating the analysis of fish biodiversity**,** and Physico- chemical parameters of water of Bolan River. As this may be an early indicator of freshwater pollution and good health of fish in order to safeguard the quality of aquatic life to promote fish production and Ecosystem of organisms.

Study Area

For the purpose of fish biodiversity and analysis of Physico- chemical parameters of water of Bolan River the study was conducted from February to December 2018 in District

Bolan Balochistan, Pakistan, Showing in fig. (1).

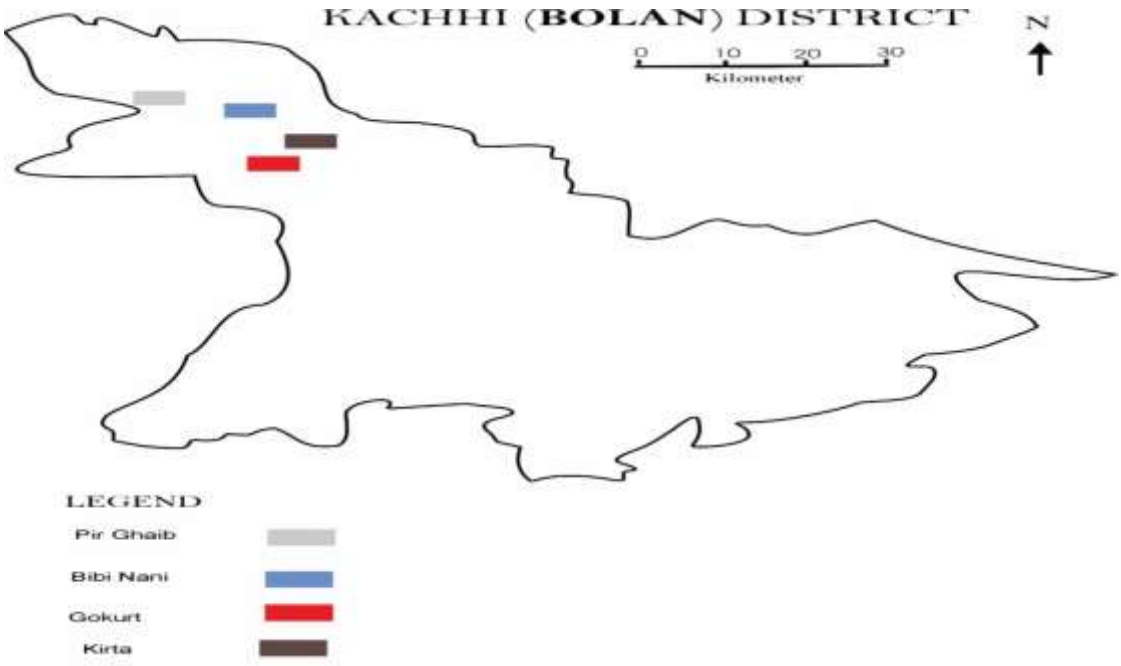

Figure. (1) Showing the field Station of Bolan River

FISH DIVERSITY (Icthyodiversity)

The field area for this study was water bodies of District Bolan, on a monthly basis the collection of fish samples carried out between January to December 2018. Fish samples preserved in formalin of 10-12%. After preservation, the fish samples carefully transported in ice boxes to Zoology Department, University of Balochistan.

Identification of fishes.

The collected sample of fishes were identified by using keys and diagrams (Talwar and Jhingaran, 1991; Jayaram, 1999).

Sampling of Water Stations and the Physico-Chemical Parameters:

Water samples were collected from water bodies of district Bolan from four stations of (Gokurth,kirtha Basun deer , and Pir ghaib) on monthly basis. After inspecting the bottles, they were taken for examination to the Department of Zoology for examining. The pH of the water pH meter (Jenway Model No. 3305) was used, Oxygen meter (Jenway) for Dissolved Oxygen (DO) Calculation. Total solid dissolve (TDS) and salinity to water (ppt). Secchi disk was used for water transparency.

Table 1 Fish species that identified during study period from Bolan River During January December 2018.

Order	Family	Species	Status
Cypriniformes	Cyprinidae	*Tor putitora*	Commercial
		Labeo calbasu (Hamilton,1822)	Commercial
		Catla catla (Hamilton, 1822)	Commercial
		Labeo gonius (Hamilton, 1822)	Commercial
		Cyprinus carpio (Linnaeus)	Commercial
		Cirrhinus reba (Hamilton, 1822)	Non Commercial
Osteoglossiformes	Notopteridae	Notopterus chitala (Hamilton, 1822)	Commercial
Clupeiformes	Clupeidae	Tenuolosa ilisha (Richardson)	Commercial
	Bagridae	*Rita rita* (Hamilton, 1822)	Commercial
Perciformes	Cichlidae	*Oreochromis mossambicus* (Peters, 1852)	Commercial
Synbranchiformes	Mastacembelidae	*Mastacembelus armatus* (Lecepede, 1800)	Commercial
Channiformes	Channidae	*Channa punctata* (Bloch, 1793)	Commercial

Determination of Air and Water Temperature:

Dissolve Oxygen: pH: Thermometer: TDS: Salinity and Transparency

Portable digital thermometer was used to determine air temperature and the amount and content of DO was discussed by Jenway Model No. 9500) Using complete solids, dissolve and salinity, of the above parameters were calculated. pH meter (Jenway Model No. 3305) of (fixed in beakers having water samples as per equipment's of APHA (1980; 2005) and Seechi Disc (Boyd1998) was used to measure water transparency fixed in beakers having water samples and readings were documented as per equipment's of APHA (1980; 2005).

3. RESULTS AND DİSCUSSİON:

Table 1 present the list of fish biodiversity in water bodies of District Bolan River. In present study 12 species of fish from the District Bolan River in which 1 fish species is noncommercial while other all fish species are commercial. These fishes belong to 6 orders and 7 families. The family Cyprinidae contained (6) species, however single species of fish were found in other families i.e. Notopteridae, Clupiedae, Bagridae, Cichlidae, Mastacembelidae and Channidae Two exotic fish species *Oreochromis mossambicus* and *Cyprinus carpio* recorded. Korai *et al.*, (2008) discussed 52 fish species from Keenjhar lake Sindh and reported 30 were commercially important and two were exotic fish species. Urooj *et al* ., (2011) documented 52 fish species among them 40 were commercially

important from Indus River Sindh. Achkazi (2014) reported 46 fish species from Manchar Lake.

Physico-Chemical Parameter of Bolan River.

The Physico chemical parameter TDS (Total Dissolved Solids), Salinity, DO (Dissolved Oxygen), pH, and Transparency of water bodies of District Bolan were studied in four seasons from January to December 2018, winter, summer, autumn, spring at four different stations of District Bolan.

Total Dissolve solids

The Total Dissolve solids was documented in four seasons at four various sectors of District Bolan given at Fig.2. Maximum TDS (91.4) was reported during analysis in sector 1 during summer (June) however, minimum (54) was recorded in sector 4 during autumn (September). The mean concentration analysis of total dissolve solids (TDS) were ranged between 68.25-87.17 mg/L. Comparison in four different Sectors of Bolan River. Comparable findings were supported by several researchers (Islam *et al.*, 2004; Mishra *et al.*, 2008; Lashari *et al* ., 2009 and Sipaúba- Tavares *et al* ., 2016). In hotter months the higher values of (TDS) were observed.

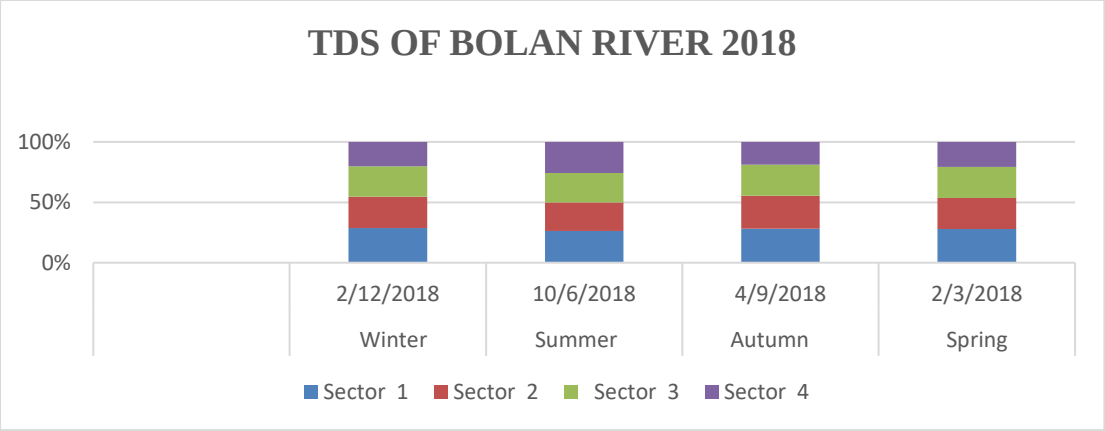

Figure 2. Showing Total Dissolved Solids from Bolan Rivers.

salinity

Fig.3 reported that the salinity was documented in four seasons the maximum salinity (0.7) was reported during analysis in sector 2and 3 during summer (June) however, minimum (3) was recorded in sector 3 sector 4 during winter. The analysis of mean concentration salinity was fluctuated between 0.5-0.35 mg / L. The mean salinity concentration ranged

from 0.28- 0.61 ppt. same results also reported by Bera *et al.*, (2014). During winter salinity was low but slowly increased with temperature. The decrease in salinity was connected to low evaporation and running water dilution factor. Effendy *et al.*, (2016) reported contradictory results.

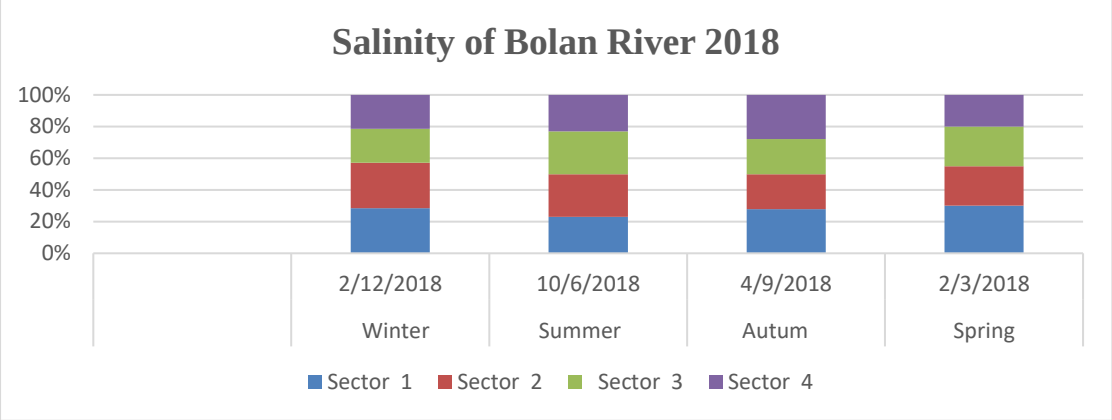

Figure 3. Showing salinity from Bolan Rivers.

Dissolve oxygen

The mean concentration of Dissolve oxygen was reported in four seasons at four various sectors of Bolan River given at Fig 4. Maximum DO (8.02) was reported during analysis in 3 during winter (December) however, minimum (4.3) was observed in sector 2 summer season (June). Mean concentration of DO ranged between 4.55-07.55 mg/L. Similar results were reported by (Dulic *et al* . 2010. Nonetheless Effendy *et al* . (2016) published contrary findings. The higher absorption of DO, however, was due to increased oxygen solubility in water during winter, and low solubility through summer.

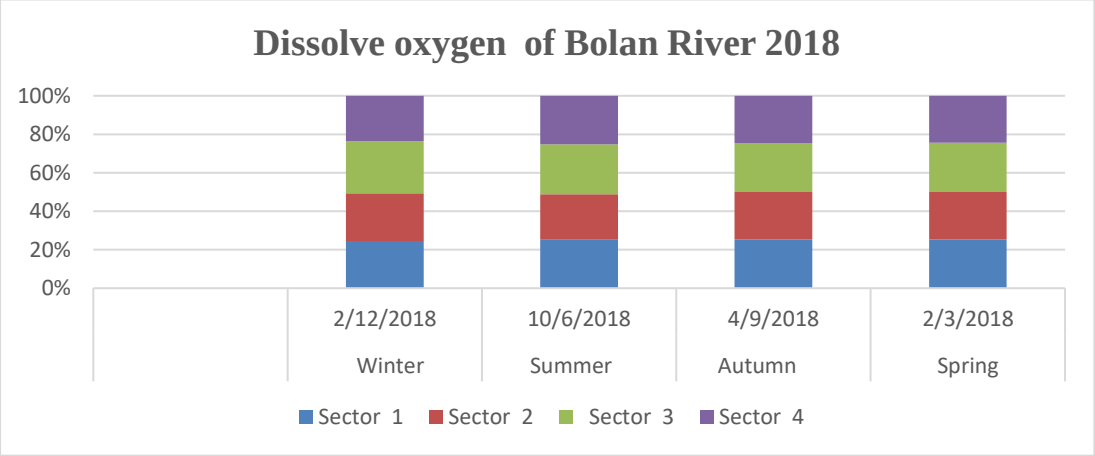

Figure 4. Showing Dissolved oxygen from Bolan Rivers.

pH

During the study quality of water pH was recorded in four seasons at four sectors of Bolan River that is presenting in Fig 5. Maximum pH (9.1) was reported during analysis in sector 2 summer season. However, minimum (6.01) was observed in sector 4 during winter (December). However, pH mean concentration ranged between 6.27-8.52 mg/L. However, pH level started increase from March to June then dropped in September and December. Araoye (2009) published similar findings; Shi *et al* . (2013). However, Chughtai & Mahmood (2012) reported higher pH in the semi intensive carp cultivation system.

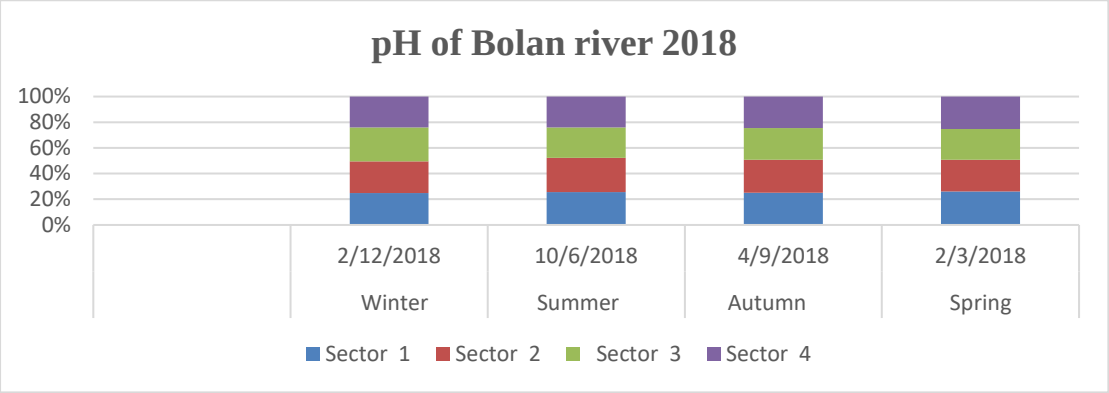

Figure 5. Showing pH from Bolan Rivers

Transparency

Transparency mean was documented in four seasons at four various sectors of Bolan River that is presenting in Fig 6. Transparency (66.5) was reported during analysis in sector 2 during spring season. However, minimum ((14.1)) was observed in sector 3 during winter. The ranged of mean transparency was 16.2. 28,65cm. Similar, results are published by Nazi and Mateen (2011) mean 12.9-19.9 cm. Contrary findings however published in Gupta and Dey (2013). Published the low transparency of the consequences of the rainy season through slit and organic matter runoff.

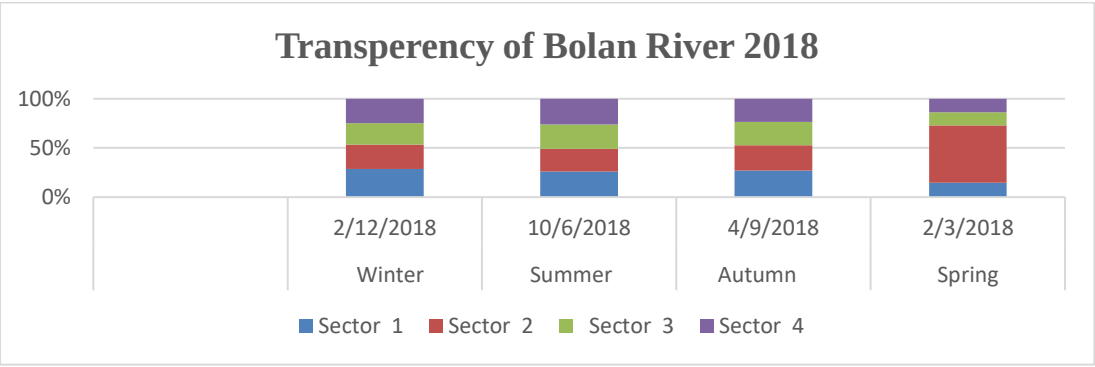

Figure 6. Showing Transparency from Bolan Rivers.

4. CONCLUSİON:

The present research concluded at District Bolan to assess fish biodiversity and Physico chemical parameters of water bodies of Bolan river i.e. Gokurth,kirtha Basun deer , and Pir ghaib . In present study 12 fish species identified these fishes belong to six orders and seven families. However, through water parameters no significant variation was observed only few essential nutrients are present which indicates abundantly primary producers, which turn to the favorable for fish growth. Finally, it was concluded that water bodies of District Bolan are suitable for drinking, irrigation and fisheries management.

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