



RESEARCH PAPER

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Exploring of fish fauna in the River Indus, Hazara Region, Khyber Pakhtunkhwa, Pakistan

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Abstract

The present survey was conducted to investigate Ichthyofauna in River Indus at Hazara region Khyber Pakhtunkhwa, Pakistan. Duration of the current study was 4 years, i.e. March 2013 to February 2017. Five sites were selected from River Indus for fish sampling. These fish sampling sites were Dasu, Pattan, Thakot, Jubda and Biliani respectively. Collection of fishes was carried out by local fisherman and fish gars. From the Biliani maximum collection (10) of fish species was carried out while minimum collection (12) was done from Thakot site. Collectively 26 species of fishes were recorded from all the 5 selected sites. These 26 fish species belongs to 4 Orders, 8 Families and 19 Genera respectively. From the current study, it can be concluded that family Cyprinidae is the dominant family among all the 8 recorded families of the fishes.

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Introduction

Ichthyofauna diversity is more visible as compare to their morphological point of view. The size of some fishes is very small while some are large like adult gobies which are about 8 mm in the range while the large size of the whale shark, *Rhincodon typus* is about 12 m in range respectively (Nelson, 1994).

For the observation of factors affecting on the makeup of Ichthyofauna population, knowledge is required about spatial and temporal way of diversity, sharing and species composition of freshwater fishes (Galactos *et al.* (2004). According to Hora and Pillay, 1962; Jhingran, 1982 Economic point of view Ichthyofauna having a unique value among the animal population. Furthermore, fishes are also essential because of their medicinal and nutritional value. According to Helfrich and Neves (2009) more than 22000 species of fishes existed among the entire vertebrates. Among these Ichthyofauna 58% living in the marine environment, 41% living in the freshwater habitat while only 1% survive in between the two environment i.e. salt and fresh water environment.

According to Peter (1999) from the freshwater reservoirs of Pakistan, more than 186 freshwater Ichthyofauna has been recorded. There are about 30 fish species which are a commercially point of view having a unique position in the fish industry like: *Labeo rohita*, *Gibelion catla*, *Cirrhinus mrigala*, *Cirrhinus reba*, *Channa straita*, *Channa marulius*, *Sperata sarwari*, *Wallago attu*, *Rita rita*, *Bagarius bagarius*, *Tenualosa ilisha*, *Notopterus notopterus*, *Nemacheilus spp.*, *Tor macrolepis*, *Schizothorax spp* and *Clupisoma naziri*. According to Prusty *et al.* (2007) nutritional point of view, Ichthyofauna plays main position. There are 40,000 species of vertebrates existed. Among these vertebrate species numbers of fishes are 21, 723 (Jayaram, 1998).

In Pakistan more than 186 Ichthyofauna existed (Mirza and Sandhu (2007). According to Nagabhushan and Hosetti, 2010 fish industry plays a vital role in a business point of view because a lot of peoples concern with fisheries business.

According to Ullah *et al.* (2014) furthermore, Ichthyofauna play a vital role because it provided the second trophic level to the aquatic life. According to Shaikh *et al.* (2011) there is a lot of variation in the Ichthyofauna distribution due to various geographical and geological land conditions. Fish play a very important role to stabilize the worldwide economy and also one of the chief elements in the aquatic environment (Essetchi *et al.*, 2003). According to Premium Microsoft Encarta (2009) Fishes are various groups of animals that inhabits and breathe in aquatic habitat. According to Leveque *et al.* (2008) the worldwide ratio of fishes are 28,900 (fresh and salt-waters) species are existed. The aim of the research work was to find out the ichthyofauna in River Indus at Hazara region Khyber Pakhtunkhwa, Pakistan.

Materials and methods

Study Area

The Indus originates in Mansorawar Lake in Tibet, is approximately 3,058 km long and drains an area of 963,480 km² before discharging into the Arabian Sea. The study area of River Indus is about 200 Km which starts from downstream of the Dasu Dam (Kohistan) and ends at Tarbela reservoir.

The river is mainly fed by melting of mountain snow; flow is higher during summer and the contribution from rainfall is very small. The mean annual flow and annual runoff at Dasu amounts to 2,100 m³/s respectively, but differences between summer and winter are large: 80 percent of the water flows between June and October.

Physico-chemical conditions of river water changes between the summer and winter seasons. During summer, river water is very turbid and carries a high sediment load. All streams pass along steep gradients through rocky areas of high mountains, exhibiting variable cascades. At confluences with other tributaries and the Indus River they discharge gravel and sand from river bed erosion. The banks of some tributaries show patches of vegetation (DHP, 2014). Major sites selected for sampling were Daso, Pattan, Thakot, Jubda and Bilani.

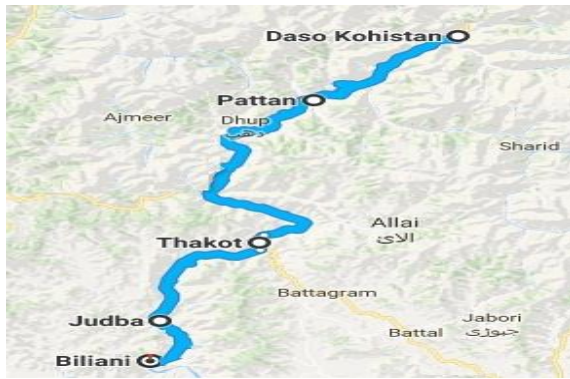


Fig. 1. Map of River Indus Khyber Pakhtunkhwa, Pakistan (Usman *et al.*, 2017a).

Fish Collection

Fishes were collected from the various sites of river River Indus with the help of a local fisherman's using various types of catch-up instrument like hand nets, cast nets and hooks from March 2013-February, 2017. After collection proper photographs were taken from different angles for proper identification and then preservation with 10% formalin, since formalin decolorizes the fish color on long preservation.

Fish Preservation and Identification

Collected fishes were preserved and after the preservation these fishes were brought to the Research laboratory for proper identification. Fishes were properly identified in the laboratory by using keys of fish's identification (Jayaram, 1999; Mirza and Sadhu, 2007; Mirza, 1990). All the fishes were preserved for longer time off period in a kettle jar by using 10% of formalin solution.

Results and discussion

The present investigation was designed to explore Ichthyofauna in River Dor Khyber Pakhtunkhwa, Pakistan during March 2013 to February 2017. For this purpose 5 sites were selected from River Indus for Ichthyofauna sampling. The selected Ichthyofauna sites were Dasu, Pattan, Thakot, Jubda and Biliyani respectively. With the help of a local fisherman's collection of Ichthyofauna was carried out time to time by fish gars. At Biliyani sampling station dominant maximum collection (10) of fish species was carried out while minimum collection (12) was done from Thakot site.

As a whole 26 species of fishes were identified from all the 5 selected sites. The recorded Ichthyofauna comprising 4 Orders, 8 Families and 19 Genera respectively. The present survey revealed that family Cyprinidae was the most dominant family among all the recorded families of the Ichthyofauna. An another examination completed by Usman *et al.* (2017b) on River Kunhar Mansehra to discover ichthyofauna. For a gathering of Ichthyofauna 5 site were chosen which were (Jalkhand, Naran, Kaghan, Balakot and Rara). The recorded fishes were recognized by different keys. The recorded Ichthyofauna including 3 Orders, 4 Families, 7 Genera's and 9 Species independently. In this examination, family Cyprinidae was the biggest one comprising 4 Species; Nemacheilidae and Salmonidae comprising just two species each, while Sisoridae was involved one specie as it were. Besides, Water of this site was severely influenced by artificial contamination, sightseers exercises and unlawful angling. Another examination was directed by Usman *et al.* (2017c) to investigate the fish fauna of River Dor at Dobandi site Khyber Pakhtunkhwa, Pakistan. Gathering of fish fauna was done by different fish gars like cast net, gill net and drag net.

The recorded Ichthyofauna containing 1 one class Actinopterygii, 3 Orders Cypriniformes, Synbranchiformes and Suliriformes, 4 Families Cyprinidae, Siluridae, Bagridae and Mastacembelidae, 5 Genera and 5 Species. The recognized fish fauna was *Hypophthalmichthys molitrix*, *Schizothorax plagiostomus*, *Wallago attu*, *rita* and *Mastacembelus armatus*. In this investigation Cyprinidae was the biggest one Family which involving by 2 Species while Siluridae, Bagridae and Mastacembelidae containing single specie each. From this investigation it can be inferred that River Dor condition id appropriate for the survival of Ichthyofauna. Rehman *et al.* (2015) recorded 7 species from Darwazai dam. Another examination was led by Yousaf *et al.* (2016) on Chambai dam arranged in District Karak Khyber Pakhtunkhwa, Pakistan. Fish of the Chambai dam were assembled from the particular areas of Chambai Dam. The recorded fish species were *Labeo rohita*, *Hypophthalmichthys molitrix* and *Catla catla* has a place with Order Cypriniforms and family Cyprinidae.

Another examination was done on Khurum and Muhabbat Khel dams arranged in Karak, Khyber Pakhtunkhwa Province of Pakistan. Fishes of the two dams incorporate *Cyprinus carpio*, *Crossocheilus diplocheilus*, *Ctenopharyngodon idella*, *Salmophasia bacaila*, *Aspidoparia morar*, *Ompok pabda*, *Labeo rohita*, *Cirrhinus cirrhosus* and *Hypophthalmichthys molitrix*. The family Cyprinidae was discovered overwhelming in the two dams (Younas *et al.*, 2017).

In the present study 26 species of fishes were recorded from all the 5 selected sites. These 26 fish species belongs to 4 Orders, 8 Families and 19 Genera respectively. There was a great variation in the current results and previous results. Because in the current results lot of fish species (26) were recorded while in the previous studies conducted in various areas and in various times having land variations. Both study areas having variation in the climatic factors.

Table 1. Exploring of Ichthyofauna in river Indus at Dasu site KP, Pakistan.

S.No	Order	Family	Genus	Species
1	Cypriniformes	Cyprinidae	<i>Cyprinus</i>	<i>carpio</i>
2	Cypriniformes	Cyprinidae	<i>Catla</i>	<i>catla</i>
3	Cypriniformes	Cyprinidae	<i>Cirrhinus</i>	<i>mrigala</i>
4	Cypriniformes	Cyprinidae	<i>Hypophthalmichthys</i>	<i>nobilis</i>
5	Cypriniformes	Cyprinidae	<i>Schizothorax</i>	<i>plagiostomus</i>
6	Cypriniformes	Cyprinidae	<i>Schizothorax</i>	<i>esocinus</i>
7	Cypriniformes	Cyprinidae	<i>Puntius</i>	<i>sophore</i>
8	Cypriniformes	Cyprinidae	<i>Puntius</i>	<i>ticto</i>
9	Cypriniformes	Cyprinidae	<i>Barilius</i>	<i>vagra</i>
10	Siluriformes	Siluridae	<i>Wallago</i>	<i>attu</i>
11	Siluriformes	Sisoridae	<i>Glyptothorax</i>	<i>punjabensis</i>
12	Siluriformes	Bagridae	<i>Mystus</i>	<i>bleekeri</i>
13	Siluriformes	Bagridae	<i>Sperata</i>	<i>sarwari</i>
14	Siluriformes	Schilbeidae	<i>Clupisoma</i>	<i>naziri</i>
15	Siluriformes	Schilbeidae	<i>Clupisoma</i>	<i>garua</i>
16	Perciformes	Cichlidae	<i>Oreochromis</i>	<i>Mossambicus</i>
17	Synbranchiformes	Mastacembelidae	<i>Mastacembelus</i>	<i>armatus</i>
Orders 04		Families 07	Genera 14	Species 17

Table 2. Exploring of Ichthyofauna in river Indus at Pattan site KP, Pakistan.

S.No	Order	family	Genus	Species
1	Cypriniformes	Cyprinidae	<i>Labeo</i>	<i>rohita</i>
2	Cypriniformes	Cyprinidae	<i>Labeo</i>	<i>caeruleus</i>
3	Cypriniformes	Cyprinidae	<i>Hypophthalmichthys</i>	<i>molitrix</i>
4	Cypriniformes	Cyprinidae	<i>Schizothorax</i>	<i>labiatus</i>
5	Cypriniformes	Cyprinidae	<i>Tor</i>	<i>macrolepis</i>
6	Cypriniformes	Cyprinidae	<i>Gara</i>	<i>gotyla</i>
7	Cypriniformes	Cyprinidae	<i>Barilius</i>	<i>Pakistanicus</i>
8	Siluriformes	Siluridae	<i>Wallago</i>	<i>attu</i>
9	Siluriformes	Sisoridae	<i>Glyptothorax</i>	<i>punjabensis</i>
10	Siluriformes	Bagridae	<i>Rita</i>	<i>rita</i>
11	Siluriformes	Bagridae	<i>Mystus</i>	<i>bleekeri</i>
12	Siluriformes	Bagridae	<i>Sperata</i>	<i>sarwari</i>
13	Siluriformes	Schilbeidae	<i>Clupisoma</i>	<i>naziri</i>
14	Perciformes	Channidae	<i>Channa</i>	<i>gachua</i>
15	Perciformes	Cichlidae	<i>Oreochromis</i>	<i>Mossambicus</i>
16	Synbranchiformes	Mastacembelidae	<i>Mastacembelus</i>	<i>armatus</i>
Orders 04		Families 08	Genera 15	Species 16

Table 3. Exploring of Ichthyofauna in river Indus at Thakot site KP, Pakistan.

S.No	Order	family	Genus	Species
1	Cypriniformes	Cyprinidae	<i>Cirrhinus</i>	<i>mrigala</i>
2	Cypriniformes	Cyprinidae	<i>Labeo</i>	<i>rohita</i>
3	Cypriniformes	Cyprinidae	<i>Hypophthalmichthys</i>	<i>nobilis</i>
4	Cypriniformes	Cyprinidae	<i>Schizothorax</i>	<i>plagiostomus</i>
5	Cypriniformes	Cyprinidae	<i>Tor</i>	<i>macrolepis</i>
6	Cypriniformes	Cyprinidae	<i>Gara</i>	<i>gotyla</i>

7	Cypriniformes	Cyprinidae	<i>Barilius</i>	<i>vagra</i>
8	Cypriniformes	Cyprinidae	<i>Barilius</i>	<i>Pakistanicus</i>
9	Siluriformes	Bagridae	<i>Rita</i>	<i>Rita</i>
10	Siluriformes	Bagridae	<i>Mystus</i>	<i>bleekeri</i>
11	Siluriformes	Schilbeidae	<i>Clupisoma</i>	<i>naziri</i>
12	Siluriformes	Schilbeidae	<i>Clupisoma</i>	<i>garua</i>
13	Perciformes	Channidae	<i>Channa</i>	<i>gachua</i>
14	Perciformes	Cichlidae	<i>Oreochromis</i>	<i>Mossambicus</i>
15	Synbranchiformes	Mastacembelidae	<i>Mastacembelus</i>	<i>armatus</i>
	Orders 04	Families 06	Genera 13	Species 15

Table 4. Exploring of Ichthyofauna in river Indus at Jubda site KP, Pakistan.

S.No	Order	Family	Genus	Species
1	Cypriniformes	Cyprinidae	<i>Cirrhinus</i>	<i>mrigala</i>
2	Cypriniformes	Cyprinidae	<i>Labeo</i>	<i>rohita</i>
3	Cypriniformes	Cyprinidae	<i>Hypophthalmichthys</i>	<i>nobilis</i>
4	Cypriniformes	Cyprinidae	<i>Schizothorax</i>	<i>plagiostomus</i>
5	Cypriniformes	Cyprinidae	<i>Barilius</i>	<i>vagra</i>
6	Cypriniformes	Cyprinidae	<i>Barilius</i>	<i>Pakistanicus</i>
7	Siluriformes	Bagridae	<i>Rita</i>	<i>rita</i>
8	Siluriformes	Bagridae	<i>Mystus</i>	<i>bleekeri</i>
9	Siluriformes	Schilbeidae	<i>Clupisoma</i>	<i>garua</i>
10	Perciformes	Channidae	<i>Channa</i>	<i>gachua</i>
11	Perciformes	Cichlidae	<i>Oreochromis</i>	<i>Mossambicus</i>
12	Synbranchiformes	Mastacembelidae	<i>Mastacembelus</i>	<i>armatus</i>
	Orders 04	Families 06	Genera 11	Species 12

Table 5. Exploring of Ichthyofauna in river Indus at Bilaini site KP, Pakistan.

S.No	Order	family	Genus	Species
1	Cypriniformes	Cyprinidae	<i>Cyprinus</i>	<i>carpio</i>
2	Cypriniformes	Cyprinidae	<i>Catla</i>	<i>catla</i>
3	Cypriniformes	Cyprinidae	<i>Cirrhinus</i>	<i>mrigala</i>
4	Cypriniformes	Cyprinidae	<i>Labeo</i>	<i>rohita</i>
5	Cypriniformes	Cyprinidae	<i>Hypophthalmichthys</i>	<i>molitrix</i>
6	Cypriniformes	Cyprinidae	<i>Hypophthalmichthys</i>	<i>nobilis</i>
7	Cypriniformes	Cyprinidae	<i>Schizothorax</i>	<i>plagiostomus</i>
8	Cypriniformes	Cyprinidae	<i>Schizothorax</i>	<i>esocinus</i>
09	Cypriniformes	Cyprinidae	<i>Tor</i>	<i>macrolepis</i>
10	Cypriniformes	Cyprinidae	<i>Gara</i>	<i>gotyla</i>
11	Cypriniformes	Cyprinidae	<i>Puntius</i>	<i>ticto</i>
12	Cypriniformes	Cyprinidae	<i>Barilius</i>	<i>vagra</i>
13	Siluriformes	Siluridae	<i>Wallago</i>	<i>attu</i>
14	Siluriformes	Sisoridae	<i>Glyptothorax</i>	<i>punjabensis</i>
15	Siluriformes	Bagridae	<i>Rita</i>	<i>rita</i>
16	Siluriformes	Bagridae	<i>Mystus</i>	<i>bleekeri</i>
17	Siluriformes	Bagridae	<i>Sperata</i>	<i>sarwari</i>
18	Siluriformes	Schilbeidae	<i>Clupisoma</i>	<i>garua</i>
19	Perciformes	Cichlidae	<i>Oreochromis</i>	<i>Mossambicus</i>
20	Synbranchiformes	Mastacembelidae	<i>Mastacembelus</i>	<i>armatus</i>
	Orders 04	Families 07	Genera 18	Species 20

Conclusion

The present research revealed that River Indus plays a vital role for to provide habitat for the warm water fishes. A huge amount of fishes collected from River Indus annually, which fell full the protein requirement of the peoples. Besides all these facts, this River is also useful for the irrigation purpose. This River is also badly affected by the tourism activities by using boats. If the necessary fish conservation steps are not taken to save the fish

fauna, it will result in the endangering of fish fauna in the river Indus.

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References

- DHP.** 2014. Downstream fishing communities: Baseline and impacts assessment **Vol-11**.
- Essetchi BL, Hocutt CH, Wiley EO.** 2003. Zoogeography of North American fresh water fish. New York, America **67(2)**, 56-66.
- Galactos K, Barriga-Salazar R, Stewart DJ.** 2004. Seasonal and habitat influences on fish communities within the lower Yasuni River basin of the Ecuadorian Amazon, *Environmental Biology of Fishes* **71**, 33-51.
- Helfrich LA, Neves RJ.** 2009. Sustaining America's Aquatic Biodiversity Freshwater Fish Biodiversity and Conservation. Virginia Cooperative Extension, Publication. 420-525.
- Hora SL, Pillay TVR.** 1962. In Hand Book on Fish culture in India pacific Region. FAO, Fish, Bio. Tech. Paper **14**, 204.
- Jayaram KC.** 1999. Freshwater Fishes of the Indian Region. Narendra Publishing House, Delhi, India.
- Jayaram KC.** 1999. The fresh water fishes of India Region. Narendra Publication House, Dheli 110006 (India).
- Jhingran VG.** 1982. Fish and Fisheries of India. Hindustan Pub.Corporation India.
- Leveque C, Oberdorff T, Paugy D, Stiassy MLJ, Tedesco PA.** 2008. Global diversity of fish in freshwater. *Hydrobiology* **595**, 545-567.
- Mirza MR, Sandhu IA.** 2007. Fishes of the Punjab. Polymer Publications Lahore.
- Mirza MR, Sandhu AA.** 2007. Fishes of the Punjab Pakistan. Polymer Publications, Lahore, Pakistan.
- Mirza MR.** 1990. Pakistan ki Taazapaniki Machlia, (in Urdu), Urdu Science Board 32-35.
- Nagabhushan CM, Hosetti BB.** 2010. Diversity of Ichthyo-Fauna in Relation to Physico-Chemical characters of Tungabhadra Reservoir, Hospet. Wetlands, biodiversity and climate change pp. 1-9.
- Nelson JS.** 1994. Fishes of the world, 3rd edition. New York: John Wiley, Sons, Inc.
- Peter T.** 1999. Coldwater fish and fisheries in Pakistan. FAO Fisheries, Rome.
- Premium Microsoft Encarta.** 2009. Characteristics of fish 1-40.
- Prusty BAK, Chandra R, Azeez PA, Sharma LL.** 2007. New Additions to the Ichthyofauna of Keolodeo National Park, A World Heritage Site In India. *Zoos' Print J* **22(10)**, 2848-2852.
- Rehman HU, Khan IU, Ahmad S, Awais, Rehman AU.** 2015c. Ichthyological survey of darwazai Dam Tehsil Lachi District Kohat, KPK, Pakistan. *World Applied Sci. J* **33**, 1764-1766.
- Shaikh HM, Kamble SM, Renge AB.** 2011. The study of Ichthyofauna diversity in Upper Dudha Project water reservoir near Somthana in Jalna District (MS) India. *J. Fish. Aqua* **2(1)**, 8-10. Technical Paper **385**, 122-137.
- Ullah S, Hasan Z, Rashid B.** 2014. Ichthyofaunal Diversity of River Panjkora, District Dir Lower, Khyber Pakhtunkhwa. *Sindh Uni. Res. J.* Reviewed submitted back.
- Usman K, Khan H, Shah W, Rehman HU, Achakzai WM, Saddozai S, Pervaiz K.** 2017b. Identification of fish fauna in River Kunhar, Mansehra, Khyber Pakhtunkhwa, Pakistan. *Journal of Entomology and Zoology Studies* **5(2)**, 122-124.
- Usman K, Pervaiz K, Khan H, Shah NA, Rehman HU, Ullah W, Imran M.** 2017a. Exploring of fish fauna in the River Indus Hazara region Khyber Pakhtunkhwa, Pakistan. *Journal of Entomology and Zoology Studies* **5(2)**, 336-338.
- Usman K, Rehman HU, Pervaiz K, Khan H, Aslam S.** 2017c. Identification of Fish fauna in River Dor at Dobandi Khyber Pakhtunkhwa, Pakistan. *Journal of Entomology and Zoology Studies* **5(3)**, 965-967.

Younas S, Gul S, Rehman HU, Junaid F, Achakzai WM, Saddozai S, Usman K, Ahmad Z. 2017. Zoological fauna of Khurum Dam and Muhabbat Khel Dam of district Karak, Khyber Pakhtunkhwa, Pakistan. *Journal of Entomology and Zoology Studies* **5(1)**, 380-387.

Yousaf MA, Zaryab M, Gul SU, Rehman HU, Ahmad W, Khan BU, Usman K, Saeed K. 2016. Chambai dam fish fauna of district Karak, Khyber Pakhtunkhwa, Pakistan. *Journal of Entomology and Zoology Studies* **4(6)**, 24-25.