



RESEARCH PAPER

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Biodiversity of an important wetland of River Satluj at Suleimanki headworks (Pakistan) with special reference to Ichthyo-fauna

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Abstract

The present work reflected the ichthyo-faunal diversity and checklist at Suleimanki Headworks, located on the River Satluj in Punjab province of Pakistan. Both direct and indirect methods were applied to gather the fish species data. From the current work it was considered that an increase in the anthropogenic activities, illegal fishing, reduced water flow and lack of inter departmental cooperation among very stakeholders; causing the fish fauna in declining. If the relevant and prompt fish conservation steps would not adopted to conserve the ichthyofaunal diversity, it will result in the endangering of fish fauna in the river Satluj at Suleimanki Headworks.

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Introduction

Pakistan's area comprising of 796,096 km² and stretches from 24° N on the Arabian Sea coast to 37° N. Geographically, most part of the country could be described as semi-desert with a subtropical climate. In the main desert area average annual rainfall is only 20-40 mm, with large areas normally receiving no rain at all in a few years (Grimmett *et al.*, 2008).

Wetlands are considered important for their services to the ecosystem covering from ecological, to economic. Wetlands performance towards sustaining environment biodiversity is so critical that they provide habitat for fauna and flora including the threatened and endangered species; balance endemic and local hydrological system, by buffering toxic pollutants, supporting in rain and flood waters and having aesthetic importance for human beings (WWF-PWP, 2011).

Biodiversity seems to play a significant role in ecosystem pliability (Elmqvist *et al.*, 2003). Both physical and limnological characters of the aquatic ecosystem shared with that interaction among organisms, are amongst the features responsible for encouraging the novel structure and composition of fish fauna (Agostinho *et al.*, 1999, Mirza *et al.*, 2011).

The Satluj ascends north side slant of the Himalaya in Lake Rakshas Tal in south and western side of Tibet, at a height over fifteen thousand feet (4.6 km.). Flowing northwestward and after that west-southwestward all the way through Himalayan canyons, it reaches and crosses Himachal Pradesh before starting its course through the Punjab land. Proceeding with southwestward in a wide waterway, it is mixed by the Beas waterway for 105000 m at border area of Indo Pakistan, before entering Pakistan and streaming an additional 350 km to touch the Chenab River west of Bahawalpur (www.santuariyasia.com).

The present study was planned as the study site had no comprehensive data till date. Although this study work was basic in a sense but it will provide the foundation for futuristic studies.

Materials and methods

Study Area: Suleimanki Headworks

Suleimanki Head-works, located on the River Satluj in Punjab province of Pakistan, is used for irrigation and flood control. It has been declared as Game Reserve with an area of 11, 559 ha (Hussain, 2012). Various industries are also situated in the region including sugar mill, oil mill, and paper mill (IPD, 2004).

Methodology

Fish Sampling

Both direct and indirect method was applied to collect the fish data. Fishes were collected from the river Satluj at Suleimanki Headworks by the help of persons from Fisheries and Wildlife Department, Punjab Government along local fisherman with various types of nets like cast net, drag net and gill net from 2015- 2017 on seasonal basis. Photographs of the specimens were taken immediately from different angles for proper identification. Fish species were identified by the available literature like Mirza (1975, 1980, 1989, 1990, 1993), Talwar and Jhingram (1991).

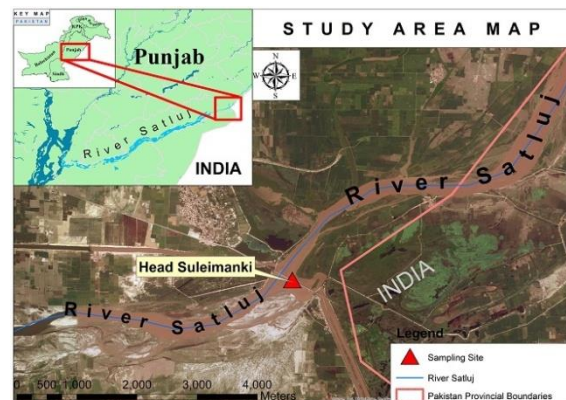


Fig. 1. Study area map.

Results and discussion

The present study was useful in providing baseline information on species distribution and diversity. The work was initiated to make the checklist of fish fauna of River Satluj at Suleimanki Headworks.

A total of 28 species of the fish were captured from the Suleimanki Headworks while total of 330 fish specimens were caught from the selected sites of the river both upstream and downstream.

The fish species of commercial importance collected at Suleimanki Barrage of Satluj River include *Cirrhunus mrigala*, *Cirrhinus reba*, *Gibelion catla*, *Labeo rohita*, *Ctenopharyngodon idella* and *Hypophthalmichthys molitrix*. *Cirrhinus mrigala*, *Labeo rohita*, *Gibelion catla*, *Cyprinus carpio* and *Rita rita* were found to be the most abundant species with relative abundance 0.289037, 0.129568, 0.112957, 0.079734 and 0.07309.

Fish diversity and population has been reduced in recent past due to reduced water discharge, increased anthropogenic activities and habitat degradation. Local men, fishermen and other concerned people confirmed that the fish diversity has been reduced. If the relevant and prompt fish conservation steps would not adopted to conserve the ichthyofaunal diversity, it will result in the endangering of fish fauna of the study area.

Table 1. Ichthyofauna diversity with relative abundance at study site.

| Sr. No. | Scientific Name | Common Name | S. A | R A |
|---------------|------------------------------------|--------------|------|--------|
| 1 | <i>Sperata sarwari</i> | Singhari | 18 | 0.0545 |
| 2 | <i>Rita rita</i> | Khagga | 31 | 0.0939 |
| 3 | <i>Channa marulius</i> | Saul | 29 | 0.0879 |
| 4 | <i>Channa punctatus</i> | Daula | 2 | 0.0061 |
| 5 | <i>Acanthocobitis botia</i> | Botia | 1 | 0.003 |
| 6 | <i>Barilius bendelisis</i> | PathaChilwa | 2 | 0.0061 |
| 7 | <i>Danio rerio</i> | Zebra Machli | 4 | 0.0121 |
| 8 | <i>Gibelion catla</i> | Theila | 54 | 0.1636 |
| 9 | <i>Cirrhinus mrigala</i> | Mori | 28 | 0.0848 |
| 10 | <i>Barilius modestus</i> | Chilwa | 3 | 0.0091 |
| 11 | <i>Lebeo bata</i> | Bata Machhli | 4 | 0.0121 |
| 12 | <i>Crossocheilus diplocheilus</i> | DograMachhli | 2 | 0.0061 |
| 13 | <i>Ctenopharyngodon idella</i> | Grass carp | 7 | 0.0212 |
| 14 | <i>Cyprinus carpio</i> | Gulfam | 19 | 0.0576 |
| 15 | <i>Labeo boga</i> | Bhangan | 1 | 0.003 |
| 16 | <i>Labeo calbasu</i> | Kalbans | 16 | 0.0485 |
| 17 | <i>Labeo rohita</i> | Rohu | 43 | 0.1303 |
| 18 | <i>Salmophasia baccaila</i> | ChotiChal | 3 | 0.0091 |
| 19 | <i>Hypophthalmichthys molitrix</i> | Silver carp | 1 | 0.003 |
| 20 | <i>Mastacembelus armatus</i> | Baam | 13 | 0.0394 |
| 21 | <i>Gudusia chapra</i> | Palli | 3 | 0.0091 |
| 22 | <i>Colisa fasciata</i> | Bari Khanghi | 1 | 0.003 |
| 23 | <i>Oreochromis mossambica</i> | Tilapia | 8 | 0.0242 |
| 24 | <i>Clupisoma naziri</i> | Aahi | 3 | 0.0091 |
| 25 | <i>Heteropneustes fossilis</i> | Singhi | 3 | 0.0091 |
| 26 | <i>Wallago attu</i> | Mallee | 26 | 0.0788 |
| 27 | <i>Bagarius bagarius</i> | FoujiKhaga | 4 | 0.0121 |
| 28 | <i>Monopterusuchia</i> | Cuchia | 1 | 0.003 |
| Total Counts | | | 330 | |
| Total Species | | | 28 | |

Aquaculture and fisheries play an important role in the economy of many countries as they have been a constant item in the diet of many people. Fish biodiversity of fresh water essentially correspond to the fish faunal diversity and their relation trophic level and water body dimensions (Hayes FR, 1957; Bashir *et al.*, 2017). Biodiversity in any form is essential for maintaining ecosystem, protection of overall environmental quality

for understanding inherent worth all living organisms on the earth (Ehri, 1991).

Many workers have been working on the diversity of fish fauna found in various parts of the world, furthermore, some work had also made their contribution to the study of fish fauna found in fresh water resources of Pakistan.

In Pakistan, 104 fish species from fresh water resources were reported by Mirza and Sharif (2003). In 2004 this list was modified and 171 fish species were reported by Mirza (2004) but again it was relisted and considered that there were not less than 193 fresh water fish species in Pakistan (Rafique and Khan 2012).

The threats observed at the study site were:

- a) More use of agrochemicals in the form of fertilizers and pesticides in agricultural land
- b) Illegal fishing both over and in banned season

Conclusion

Satluj being an important river and supports a large number of biodiversity of the country. From the current work it was considered that an increase in the anthropogenic activities, illegal fishing and lack inter-governmental department cooperation and reduced water flow at study site, causing the fish fauna in declining state. Relevant authorities should take efficient conservation steps to protect the biodiversity especially fish fauna of this river.

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