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Studies on fresh water ichthyofauna of river Satluj at syphon Mailsi, Punjab, Pakistan

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Abstract

The present study was conducted to determine the fish fauna of Satluj River at Mailsi Syphon, situated in South Punjab Pakistan. The survey was conducted from 2012 to 2013 at selected sampling sites (both upstream and downstream) to discover fish diversity and their distribution pattern. The ichthyofauna observed during the study; 18 fish species that were categorized into seven families and six orders. In terms of fish species, Cyprinidae was the dominant family which includes the following eight species: *Gibelion catla*, *Cirrhinus mrigala*, *Ctenopharyngodon idella*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Labeo calbasu*, *Labeo rohita* and *Macroptepis putitora*. The present study was useful in providing the baseline information on species distribution and diversity. The work was initiated to make the checklist of fish fauna of River Satluj at Mailsi Syphon; one of the neglected site by researchers. If prompt and relevant mitigation measures will not adopted, the biodiversity of the area be severely affected.

Keywords: Fresh water, Ichthyofauna, wetland, Satluj

1. Introduction

Pakistan being an agriculture country has world's largest irrigation System. This comprises mainly dams, barrages, and a network of irrigation canals and waterways^[1]. It is considered these three dams; Tarbela, Mangla and Hub are the largest ones.^[1, 4, 13]. The prime function to construct these dams was to regulate and channelize river water for energy production, and to supply water for irrigation in Punjab and Sindh, as agriculture is the pillar of Pakistan's economy. Besides these irrigation canals, several link canals connect the rivers^[13]. These link-canals are mainly used to shift water from one river to another. Some of the larger barrages are the Chashma, Taunsa, Merala, Rasul, Qadirabad, Guddu and Sukkur Barrages^[1].

In Pakistan, 14 million ha are irrigated. There are three major reservoirs, plus 19 barrages, 12 interlink canals and 43 independent irrigation command areas. The total length of main canals is 58 500 km^[1, 2]. About 79 percent of the total wheat crop comes from irrigated fields. None of the major dams include fish passes, but some barrages have fish passes which, however, are largely non-functional. Most pumping stations have no fish protection devices and where these are present, they do not function well. In the year 2000, 144 000 tonnes of fish were captured from rivers, reservoirs, natural lakes and irrigation canals; 36 000 tonnes were produced in aquaculture, and about 75 percent of these were produced in fish ponds fed by irrigation canals^[2].

This study is premier in a way that no other work has been conducted before to cover diversity and conservation for the fish fauna of River Satluj at Syphon Mailsi.

2. Materials and Methods

2.1 Study Area

The princely states of Bahawalpur, during the 20th century with the British India Government, made three major water barrages; under project title 'Satluj Valley Project'. These were Suleimanki Headworks, Islam Barrage and Punjnad Headworks. In this study the authors intended to find the ichthyofaunal diversity and threats posing due to various anthropogenic activities of study site which was constructed in 1965 after Indus Water Treaty. The main function of Mailsi Syphon is to regulate supply of river water and control flood. This site has a complex of terrestrial and aquatic ecosystems because it retains features of both these types. Pakistan exhibits a larger fresh water reservoir ecosystem. Out of them, River Satluj is one of the main eastern tributary of the Indus River.

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Length of river Satluj in Pakistan is approximately 329 miles. This river is included along other two rivers whose water management has been given to India under an accord called Indus Water Treaty. Pakistan with the help of World Bank has made water reservoirs and link canals to use the river beds these three eastern rivers.

2.2 Methodology

Both direct and indirect method was applied to collect the data. Fish sampling was done randomly on monthly basis from Jan 2012 to Dec 2013. The research site of Syphon Maisli was explored extensively both upstream and downstream. The fish specimens were collected with the help of local fishermen and fish contractors by using different fishing nets. Fish species were identified by the literature available. Mirza [5-9, 11, 12] Talwar and Jhingram [16]. Collections were made from an area 500 meters upstream and downstream from each locality and along both banks of the river.

3. Results

Among the total fish fauna of Pakistan, 86 species (8 exotic and 78 indigenous) have been identified as “species of special importance” [3, 14]

In the present study, the authors found 18 fish species (with 406 individual counts) that were categorized into seven families and six orders; *Sperata sarwari*, *Rita rita*, *Wallago attu*, *Bagarius bagarius*, *Channa Punctatus*, *Colisa fasciata*, *Oreochromis mossambica*, *Heteropneustes fossilis*, *Gibelion catla*, *Cirrhinus mrigala*, *Ctenopharyngodon idella*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Labeo calbasu*, *Labeo rohita*, *Macroptepis putitora*, *Mastacembelus armatus*, and *Gudusia chapra*

In terms of fish species, Cyprinidae was the dominant family which includes the following eight species: *Gibelion catla*, *Cirrhinus mrigala*, *Ctenopharyngodon idella*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Labeo calbasu*, *Labeo*

rohita and *Macroptepis putitora*.

The families Mastacembelidae, Notopteridae and Sisoridae were observed least with respect to species diversity, because one species each belonging these families was observed namely: *Mastacembelus armatus*, *Gudusia chapra* and *Bagarius bagarius*.

Commercially important fish species captured at Maisli Syphon of Satluj River include *Cirrhinus mrigala*, *Cirrhinus reba*, *Gibelion catla*, *Catla catla*, *Labeo rohita*, *Labeo calbasu*, *Ctenopharyngodon idella* and *Hypophthalmichthys molitrix*.

4. Discussion

The diversity of fish fauna observed in the present study was lower in other studies conducted in fresh water reservoirs. However, it is pertinent to mention here that literature on the Satluj is not available to support or oppose our present results. The results of the present studies are not in accordance with the work of others who reported fish diversity at Taunsa Barrage with 22 species and 42 respectively [4] but these are in consistent with studies conducted on Neelum River (a tributary of River Jehlum) [10].

Fresh water ecosystems are being considered a good habitat for several of fish species have been introduced for fish culture. [15] A study conducted on Indus River indicated 70 fish species were present during the course of investigation [15]

Following threats were observed at the study site : a) Increase in hazardous chemicals (POPs) due to extreme loads of fertilizers and pesticides in agricultural land b) Fish diseases due to decrease in water, and growing absorption of waste matters c) over and illegal fishing for marketing.

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 Maisli Syphon; one of the neglected site by researchers.

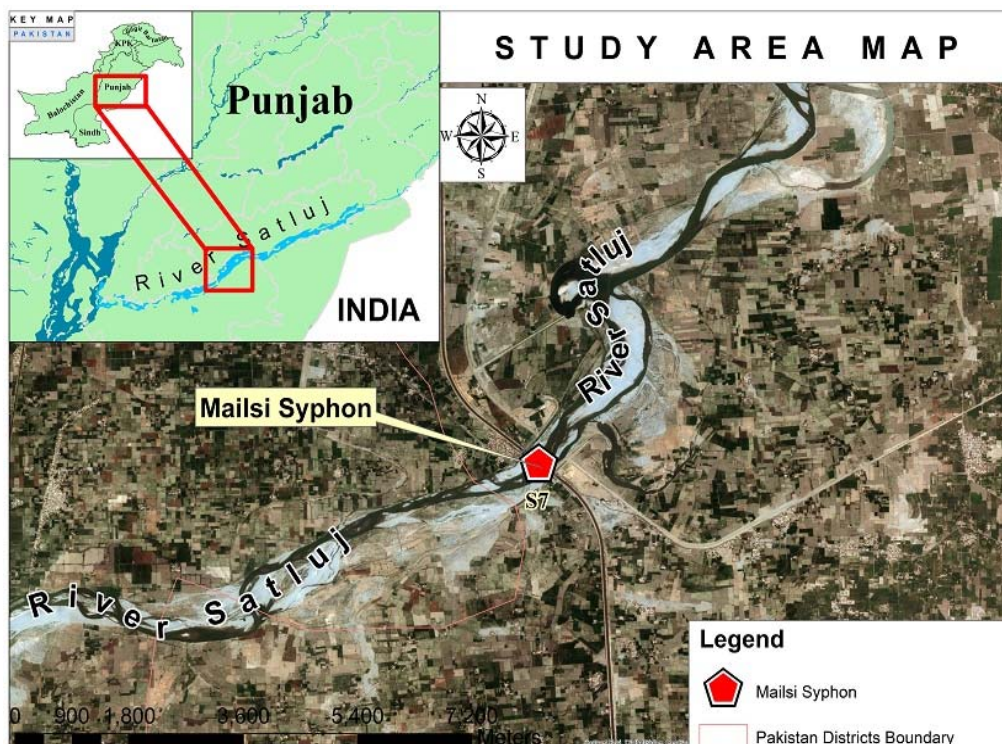


Fig. Study Area Map

Table 1: Fish Diversity at Study Area

S. No.	Scientific Name	Common Name	Individual Counts	Relative Abundance
1	<i>Sperata sarwari</i>	Singhari	34	0.083743842
2	<i>Rita rita</i>	Khaga	12	0.02955665
3	<i>Wallago attu</i>	Mullee	17	0.041871921
4	<i>Bagarius bagarius</i>	Fauji Khagga	21	0.051724138
5	<i>Channa Punctatus</i>	Daula	9	0.022167488
6	<i>Colisa fasciata</i>	Bari kanghi	2	0.004926108
7	<i>Oreochromis mossambica</i>	Tilapia	3	0.007389163
8	<i>Heteropneustes fossilis</i>	Singhi	5	0.012315271
9	<i>Gibelion catla</i>	Theila	51	0.125615764
10	<i>Cirrhinus mrigala</i>	Mori	47	0.115763547
11	<i>Ctenopharyngodon idella</i>	Grass Carp	32	0.078817734
12	<i>Cyprinus carpio</i>	Gulfam	24	0.0591133
13	<i>Hypophthalmichthys molitrix</i>	Silver Carp	46	0.113300493
14	<i>Labeo calbasu</i>	Kalbans	18	0.044334975
15	<i>Labeo rohita</i>	Rohu	73	0.179802956
16	<i>Macroptepis putitora</i>	mahseer	3	0.007389163
17	<i>Mastacembelus armatus</i>	Bam	6	0.014778325
18	<i>Gudusia chapra</i>	Palli	3	0.007389163
			Total = 406	

4. Conclusion

The result of present study showed that fish diversity of river Sutluj at Maili Syphon was low as compared to other local rivers of Pakistan like Indus, Jehlum and Chenab. It was observed during study that ichthyofaunal diversity of river Satluj was decreasing gradually due to decrease water flow, anthropogenic activities, overuse of agrochemicals (being cotton growing area) and illegal fishing, threatening the fish fauna to seriously. Discussion with the locals revealed that the fish diversity has reduced up to alarming level in recent 20 years due to reduced water flow and aforementioned facts. If prompt and relevant mitigation measures will not adopted, the biodiversity of the area be severely affected.

5. Acknowledgement

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