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Exploring Fish Fauna of River Siran, Mansehra, Pakistan

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Abstract

Fishes are cold-blooded vertebrates having scales on their whole body to protect them from any foreign material. The study of the diversity of fishes in an essential part of science. The present research aimed to explore and identify the fish species of river Siran. The specimens were collected with the help of cast net, automatic rod, hook net and hand net. The present study was conducted at river Siran, Mansehra, Khyber Pakhtunkhwa, Pakistan, during June-August 2013. The most abundant collected and identified species was *Schizothorax plagiostomus*, 25 (33.3%) followed by *Cyprinus carpio*, 20 (26.7%) and *Crossocheilus diplocheilus*, 18 (24%), while the least abundant species was *Triplophysa choprai*, 12 (16%). The largest fish species was *S. plagiostomus* (20.5 cm) and the smallest fish species was *T. choprai* (10.5 cm). We concluded that the family *Cyprinidae* has the maximum number and *Balitoridae* has the minimum number of fish species. We recommend that the study area should be explored on a large scale to protect the fish habitat loss and educate the local population about the importance of fish farming.



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Introduction

The district Mansehra is situated in the northern region of Khyber Pakhtunkhwa (KP), Pakistan. It is circumscribed in the north by Kohistan and Batagram districts, in the east by Kashmir and Muzaffarabad district of Azad Jammu Kashmir, in the south by Haripur and Abbottabad districts and in the west by Buner district. Therefore, in 1849 district Mansehra was a part of the British government. Additionally, it becomes a district of Khyber Pakhtunkhwa, during 1901 [1]. The weather condition of Mansehra is pleasant in summer and harshly cold in winter. The annual rainfall of the area was recorded 72 inches, while the temperature range is recorded between 2°C to 36°C. The high mountain peaks in summer were full due to snow arrayed, which makes and leads the distinguishing topographies in mountain ranges, the valleys, the plains, and the lakes. The most popular valleys are Kaghan, Agror, Konsh, Bhogarmang and Pakhal. The most known rivers are Siran and Kunhar, with full of the famous fish “Trout”, which makes it the bliss of peace [1]. The aim of the present study was to explore the fish fauna of the district Mansehra, Khyber Pakhtunkhwa, Pakistan.

Among the vertebrates, fishes are cold blooded animals, which having gills for breathing and fins for swimming. Therefore, fishes live under water to get oxygen, food, shelter and support for the movement in search of other biological activities. Moreover, fish are three types *viz.* Lampreys (Jawless fishes), Sharks and Rays (Cartilaginous fishes) and most fish species are (bony fishes) [2]. Therefore, on the basis of feeding habits, fish were divided into two main groups, the first one is that which get their flesh as food like lampreys which suck the blood from other fishes. While some fishes are vegetarian, which mostly depend on aquatic plants [3]. However, fish, play an important role in the field of economy in different countries, their contribution to Pakistan GDP is 1% of the total budget. They are a good source of food and more than 1 billion people consume their cord oil as animal protein [4]. Furthermore, more than 21,723 species of fish were reported worldwide, where 11,650 species collected and documented from the marine ecosystem and 8,411 species were examined from freshwater fish [5]. In 2010, more than 180 species of freshwater fishes were reported. Among them loaches, carps and catfish are very important. Out of those, 28 species were recorded from cold water [6]. Therefore, more than 126,000 species were pronounced from freshwater territories, including aquatic plants, mammals, mollusks, fishes,

insects, reptiles and crustacean. Additionally, more than 45% of species were recorded from freshwater fish [7]. However, the most threatened group of fish is the freshwater fish after amphibians because they are easily captured [8]. The aim of the present study was to investigate, explore and identify the fish species of river Siran.

Materials and Methods

Study area

The present study was carried out during June, July and August (2013) at River Siran, Mansehra. The study area was divided into three zones: 1) Ichria to Shinkiari, 2) Dhodial to Gerwal, and 3) Banda Pira to Baffa.



Fig 1 Map of River Siran, District Mansehra, Khyber Pakhtunkhwa, Pakistan (<http://www.nccr-pakistan.org/images/Maps/MansehraMap.pdf>).

Collection materials

The collection was made with the help of cast net, automatic rod, hook net, hand net, and with the help of locally adopted devices, except illegal methods, *i.e.*, dynamiting and toxic chemicals. The mesh size used to capture fish was from 0.5 mm to 2.8 cm.

Preservation of samples

Fish were caught alive and then directly dropped into a solution of dilute formalin (5%). The solution was made by diluting one part of commercial formalin (37%) with 20 parts of water. After preparation of the solution in these jars, live fishes were dropped into these jars one by one and then covered these jars with lids. Therefore, the fish jumped and died slowly expanding its fins and rays. The above procedure

assists in identification. The preserved fishes were then brought to the laboratory and labeled indicating the name of locality, date and time of collection.

Identification and classification

Various morphometric measurements of fish were made with ruler and Vernier calliper. Identification and classification of fishes for the scientific study were done through multiple taxonomic and systemic keys as described by Mirza and Sandhu [9] and Jayaram [10].

Results

The present research was conducted at River Siran, district Mansehra, Khyber Pakhtunkhwa, Pakistan during July-August 2013. A total of 75 individuals of fish were collected from the study area. The most abundant species of the study area were *Schizothorax plagiostomus* 25 (33.33%) followed by *Cyprinus carpio* 20 (26.67%) and *Crossocheilus diplocheilus* 18 (24%) while the minimum species was *Triplophysa choprai* 12 (16%).

Table 1 Collected fish species from River Siran, Mansehra, Khyber Pakhtunkhwa, Pakistan during June-August 2013.

Order	Family	Fish species
Cypriniformes	Cyprinidae	<i>Crossocheilus diplocheilus</i>
Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i>
Cypriniformes	Cyprinidae	<i>Schizothorax plagiostomus</i>
Cypriniformes	Balitoridae	<i>Triplophysa choprai</i>

Table 2 Morphological measurements of collected fish of River Siran, Mansehra, Khyber Pakhtunkhwa, Pakistan during June-August 2013.

Length (cm)	SP	CD	TC	CC
Total length	20.5	12.5	10.5	11.5
Standard length	17	10.5	9	8.5
Head length	3	2	2	2
Body width	3.3	2	1.5	1.5
Eye diameter	0.5	0.3	0.2	0.5

SP = *Schizothorax plagiostomus*; CD = *Crossocheilus diplocheilus*; TC = *Triplophysa choprai*; CC = *Cyprinus carpio*

Morphological description of the collected fish species showed that the largest species among the collected species were *S. plagiostomus*. It has total length 20.5 cm, standard length 17 cm, head length 3 cm, body width 3.3 cm and eye diameter 0.5 cm followed by *C. diplocheilus* who has total length 12.5 cm, standard length 10.5 cm, head length 2 cm, body width is 2 cm and eye diameter is 0.3 cm. *S. carpio* has total length 11.5 cm, standard length 8.5 cm, head length 2 cm, body width 1.5 cm and eye diameter is 0.5 cm. While the minimum size of fish was *T. choprai* with a total length of 10.5 cm, standard length

9 cm, head length 2 cm, body width 1.5 cm and eye diameter 0.2 cm (Table 2).

The comparison of fish rays was made to find differences among the fishes. *S. plagiostomus* has dorsal fin rays 8, anal fin rays 5, pectoral fin rays 10-11, pelvic fin rays 7 and caudal fin rays are 21. *C. diplocheilus* has dorsal fin rays 8-9, anal fin rays 5, pectoral fin rays 13, pelvic fin rays 8 and caudal fin rays are 21. *T. choprai* has dorsal fin rays 8, anal fin rays 5, pectoral fin rays 10-11, pelvic fin rays 7 and caudal fin rays 10. However, *S. carpio* has dorsal fin rays 17, anal fin rays 7, pectoral fin rays 13-14, pelvic fin rays 17 and caudal fin rays 21 (Table 3).

Table 3 Comparison of fin rays of the fish counted during identification in the survey carried out in River Siran Mansehra from June to August 2013.

Fin rays	SP	CD	TC	SC
Dorsal fin rays	8	8-9	8	17
Anal fin rays	5	5	5	7
Pectoral fin rays	10-11	13	10-11	13-14
Pelvic fin rays	7	8	7	17
Caudal fin rays	21	18	10	21

SP = *Schizothorax plagiostomus*; CD = *Crossocheilus diplocheilus*; TC = *Triplophysa choprai*; CC = *Cyprinus carpio*

Table 4 The fish species body parameter comparison collected from River Siran Mansehra from June to August 2013

BP	SP1	SP2	SP3	SP4	Mean	SD
TL	20.5	12.5	10.5	11.5	13.8	4.6
SL	17	10.5	9	8.5	11.3	3.9
HL	3	2	2	2	2.3	0.5
BL	3.3	2	1.5	1.5	2.1	0.8
ED	0.5	0.3	0.2	0.5	0.4	0.2

BP = Body parameter; SP1 = *S. plagiostomus*; SP2 = *C. diplocheilus*; SP3 = *T. choprai*; SP4 = *S. carpio* TL= Total length; SL = standard length; HL = Head length; BL = Body length; ED =Eye diameter; SD = Standard deviation

The collected species were compared with each other to determine the mean and standard deviation (SD). The collected species mean and standard deviation (SD) for *S. plagiostomus* were 3.8 and 4.6; for *C. diplocheilus* 11.3 and 3.9, for *T. choprai* 2.3 and 0.5 and for *S. carpio* 0.4 and 0.2, respectively (Table 4).

Discussion

The study of biodiversity of living organisms is an essential field of science [11, 12]. Same is the case for fish diversity, the researchers have conducted a survey to evaluate the variety of fishes in rivers, or any other water body all over the world. In this study, the study of the fish fauna of river Siran Mansehra was carried out from June-August (2013). During the survey, four species were recorded from the river Siran Mansehra. These Species are *Crossocheilus*

diplocheilus, *Schizothorax plagiostomus*, *Triplophysa choprai* and *Cyprinus carpio*. Some of the species which might be present in the area but could not be captured during the survey. The escaped species was *Barilius pakistanicus*, these fishes travel upstream to variable distance from Khake and Inayatabad. Rafique [13] studied River Indus fish diversity and reported 177 species belonging to 27 families. Among those families, *Salmonidae*, *Poeciliidae* and *Cichlidae* were exotic to the Indus river system. The most abundant family was *Cyprinidae* followed by *Nemachilidae* and *Sisoridae*. Similarly, Sarma et al. [14] studied Ichthyo-faunal diversity of the lower reaches of the River Brahmaputra, Assam (India) and reported 97 species belonging to 26 families. The most dominant species was *Cyprinidae* followed by *Bagridae*. The lower part of River Brahmaputra was found abundant in Ichthyo-faunal diversity. However, strategies such as controlled harvest check on the growth of exotic species and controlling water pollution were suggested for the conservation of the native and endemic species of the river. In the present study, 75 specimens belong to family *Cyprinidae* and *Balitoridae* with four species, namely *Crossocheilus diplocheilus*, *Schizothorax plagiostomus*, *Triplophysa choprai* and *Cyprinus carpio* were found

The present fish fauna survey belongs to two families. *Cyprinidae* is the most abundant family among them, which is represented by three species. *Balitoridae* is represented by only one species. All of these fish are important from economic and fishery point of view, but the *S. plagiostomus* is very important economically. This fish is only present in the Northern regions of Pakistan. Their body optimum temperature is 18°C. The upper reaches of River Siran Mansehra have this temperature. The fish is very delicious and is also an important food fish. So, hatchery must be built for better production. *S. plagiostomus* is very common in every part of River Siran Mansehra. The fish is under high fishing pressure. It can be commercialized by establishing its hatchery and rearing ponds.

Conclusions

Therefore, from the present study, it was investigated that maximum fish species collected belong to family *Cyprinidae* and minimum fish species collected

belong to family *Balitoridae*. While more fish specimens of *S. plagiostomus* were collected. We recommend that the study area should be explored on a large scale to protect the fish habitat loss and educate the local population about the importance of fish farming.

Conflict of interest

The authors declare that they have no conflict of interest.

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