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NEW CHECKLIST OF FRESHWATER FISHES OF DISTRICT BUNER, KHYBER PAKHTUNKHWA, PAKISTAN

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Abstract: The present survey was conducted to identify the Ichthyofauna of River Barandu, District Buner from November 2012 to October 2013. A total of 13 fish species were collected belonging to 4 orders, 5 families and 10 genera. The richest family of the fish was Cyprinidae represented by 8 species viz. *Barilius pakistanicus, Crossocheilus diplocheilus, Crossocheilus latius, Gara gotyla, Puntius sophore, Puntius ticto, Schizothorax plagiostomus* and *Tor macrolepis. Schistura punjabensis* and *Triplophysa naziri* from family Nemacheilidae, *Mastacembelus armatus* from family Mastacembelidae, *Channa gachua* from family Channidae and *Glyptothorax punjabensis* from family Sisoridae were also collected from the river. A very important observation is the absence of exotic fishes from the river. The most important contribution of the present study is that it adds two (2) new records from District Buner namely *Crossocheilus diplocheilus* and *Puntius ticto*.

Keywords: Fish diversity, Buner, River Barandu, new records, Cyprinidea.

Introduction

About half of the total number of vertebrates is fish. They live in almost all aquatic habitats. Out of 21, 723 living species of fish recorded so for 8,411 are freshwater species and 11,650 are marine (Rankhamb, 2011). Studying the fish fauna of an area is very important as it gives us ideas about the biodiversity of the region.

Biodiversity is not only essential for stabilization of an ecosystem and protection of overall environmental quality but for understanding intrinsic worth of all species on the earth as well (Ehrlich and Wilson, 1991). Many workers have recorded positive correlations between biomass production and species abundance (Nikolosky, 1978).

District Buner lies between $34^0 - 11^{'}$ to $34^o - 43^{'}$ north latitudes and $72^o - 13$'to $72^o - 45^{'}$ east longitudes. River Barandu is a tributary of river Indus (Mirza, 1973). It is the main river in Buner valley. It originates from Elum and Dosara Mountains, and flows at the midst of the district. It is the only drainage basin of the area, and is used for irrigating most of the plains of Buner District. River Barandu is formed from both spring water and rushing streams form the permanent "Ice caps" in the lofty mountains of Buner Swat, and Buner – Shangla.

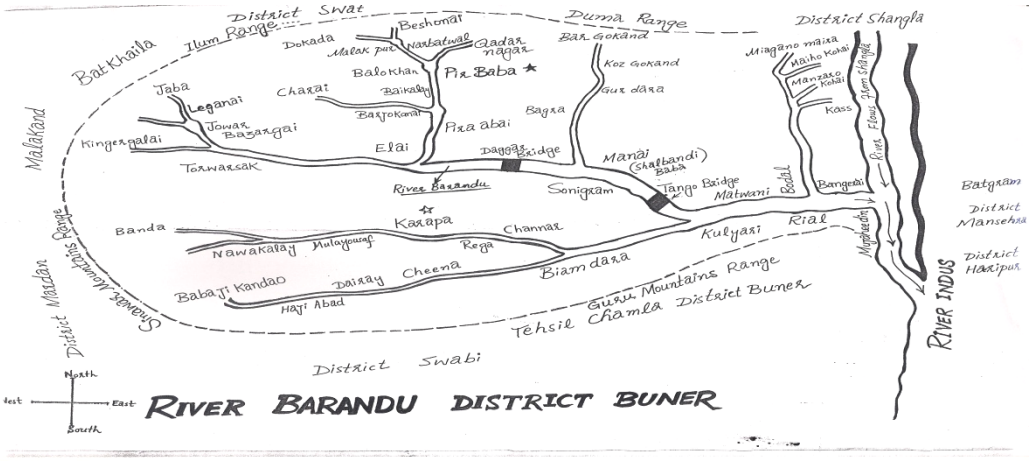

Fig.1. showing the rivers network of Khyber Pakhtunkhwa; Source: Irrigation Department, Peshawar, 2013.

River Barandu joins with a river which flows from District Shangla at a small village Mujahideen. Both the rivers flow jointly and fall into the river Indus in the east. Most of its tributaries are rain fed. These tributaries join the river and affect the flow and water quality of river Barandu. Some tributaries are perennial whereas most of them are seasonal. Some of the important tributaries of River Barandu are Sangairay Khwar, Pir Baba Khwar, Gokand Khwar, Biam Dara Khwar and Chagarzi Khwar (Buner Census Report, 1998; Saeed *et al.* 2013)

Materials and Methods

The collection of fishes was done for about 5-months, from August to December 2009. Fishes were collected at weekends with the help of hand nets, cast nets, Patti nets and were also purchased from the local fishermen. All possible efforts were made for the collection of maximum number of species. The collection was made from different localities i.e. Elai, Daggar Bridge, DHQ Daggar, Sonigram and Kulyari. The fishes were mostly caught by cast net, hand net and simple hooks.

After collection the larger fishes were preserved in 10% Formalin, while smaller fishes were preserved in 5% Formalin. The larger specimens were given an injection of 10 ml of Formalin in the abdomen to avoid any decomposition. Some fishes were also preserved in 70% Alcohol. During laboratory work surgical gloves, magnifying glass, optics, forceps, counting needle, vernier caliper and ruler were used to take morphometric measurements and meristic counts for identification. The identification of fishes was made with the help of keys of Mirza and Sandhu (2007); Jayaram (1999) and Talwar and Jhingran (1991).

The alpha diversity of the fish fauna was determined from the Shannon's Index and then Evenness of the fish species present in the river Barandu, District Buner was also determined. The following formulae were used to determine Shannon's Index and Evenness of the fish diversity.

$$H_s = -\sum(P_i)(lnP_i)$$

$$E = H_s/lnS$$

Where H_s and E are the symbols for Shannon's Index and Evenness respectively, p_i is the population proportion of total individuals belonging to the i^{th} species, *ln* is the natural logarithm and S is the number of species.

Results and Discussion

During the study some physico-chemical parameters of the water of river Barandu were also recorded. The average air and water temperature was 26.2 ^{0}C and 19.8 ^{0}C respectively during the study period. The average pH was 7.5, average width of the river 15m, average depth 4 feet and it flows at an average speed of 0.38m/sec.

Fish fauna of River Barandu was also studied from Elai to Kulyari from November 2012 to November 2013. In this survey the following species were recorded from the river:

These fishes belong to 4 orders, 5 families and 10 genera. The richest family of the fish was Cyprinidae represented by 8 species viz. *Barilius pakistanicus, Crossocheilus diplocheilus, Crossocheilus latius, Gara gotyla, Puntius sophore, Puntius ticto, Schizothorax plagiostomus* and *Tor macrolepis*. Present study confirms that like other freshwater bodies of Pakistan, the richest family of the fish in river Barandu, is family Cyprinidae. This result coincides with Saha and Bordoloi (2009) which reported 59 fish species from floodplain wetlands of Assam out of which 20 fishes belong to family Cyprinidae.

Among the other fish species family Nemacheilidae is represented by *Schistura punjabensis* and *Triplophysa naziri* family Mastacembelidae by *Mastacembelus armatus* family Channidae by *Channa gachua* from and family Sisoridae by *Glyptothorax punjabensis* were also collected from the river.

Table 1 Relative abundance and % of occurrence of each species during the Study Period.

S/No	Order	Family	Genus and species	Number of Specimens	%age
1	Cypriniformes	Cyprinidae	*Barilius pakistanicus*	62	7.23
2			*Crossocheilus diplocheilus*	86	10.03
3			*Crossocheilus latius*	53	6.18
4			*Puntius ticto*	38	4.43
5			*Puntius sophore*	46	5.36
6			*Garra gotyla*	33	3.85
7			*Schizothorax plagiostomus*	118	13.76
8			*Tor macrolepis*	144	16.80
9		Nemacheilidae	*Schistura punjabensis*	58	6.76
10			*Triplophysa naziri*	45	5.25
11	Siluriformes	Sisoridae	*Glyptothorax punjabensis*	66	7.70
12	Chaniformes	Channidae	*Channa gachua*	27	3.15
13	Mastacembeliformes	Mastacembelidae	*Mastacembelus armatus*	81	9.45
	***S = 13**		**Total No of Specimens**	**857**	

*Number of species

The richness and evenness of species determines alpha diversity of a population. This can be calculated through population indices, the most common population index is the Shannon's index. Shannon's index can predict the uncertainty of species' richness in a random sample of community. It is shown from the formulas that the richness of species is directly proportional to the number (S) of species present in a community. The values of Shannon's index and evenness of the fish fauna of River Barandu, District Buner are 2.452 and 0.956 respectively. The fish diversity of River Barandu is richer in terms of number of species as shown by the high value of Shannon's index and nearly evenly distributed as indicated from the value of evenness.

Saeed *et al.* (2013) have conducted a six (6) months survey of fish fauna and reported 11fish species named; *Barilius pakistanicus, Crossocheilus diplocheilus, Crossocheilus latius, Gara gotyla, Puntius sophore, Puntius ticto, Schizothorax plagiostomus, Tor macrolepis, Schistura punjabensis, Triplophysa naziri, Mastacembelus armatus, Channa gachua* and *Glyptothorax punjabensis* from River Barandu, District Buner. All the above reported species match with the present study except two species, *Crossocheilus diplocheilus* and *Puntius ticto* reported in the present study but had not been recorded in the survey of Saeed *et al.* (2013) the reason might be that present study is based on the collection of the whole year (November, 2012 to October, 2013). Two species *Barilius vagra* and *Schistura alepidota* earlier recorded from Buner by Mirza (1973) *and* Rafique and Javed (2002) respectively are missing not only in the present study but also in Saeed *et al.* (2013) collection. Ahmad and Mirza (1963), recorded 8 species including two new loaches from Swat valley, but the present collection does not contain any species reported by Ahmad & Mirza in 1963.

Ahmad (1969), recorded 9 species from Swat, Buner valleys. But the present collection matches only 2 species; *Tor macrolepis* (previously called as *Tor putitora*) *and Schizothorax plagiostomus,* and the remaining species have not been collected in the present survey whereas he was not able to collect 9 species collected in this survey.

Mirza (1973) conducted a detailed study of river Swat and adjoining areas including Buner. He reported some of the species of the present collection like *Puntius ticto, Crossocheilus diplocheilus, Channa gachua, Tor macrolepis, Mastacembelus armatus,* and *Schizothorax plagiostomus*. Many species are those which were not collected by Mirza, but are recorded in the present collection. These include *Barilius pakistanicus, Puntius sophore, Glyptothorax punjabensis, Schistura punjabensis* and *Gara gotyla.*

Ahmad (1994) recorded 17 species from district Swat. But the present collection matches only 6 species viz. *Tor macrolepis, Mastacembelus armatus, Schizothorax plagiostomus, Crossocheilus diplocheilus, Puntius ticto, Gara gotyla,* and the remaining 11 species were not collected in the present survey. Rafique and Javed (2002) recorded 20 species from Swat and Buner Valley's. The present collection matches only 9 species i.e. *Crossocheilus diplochelius, Channa gachua, Tor macrolepis, Mastacembelus armatus, Schizothorax plagiostomus, Puntius ticto, Puntius sophore, Barilius Pakistanicus* and *Gara gotyla,* while the remaining 11 species were not recorded in the present collection.

Hasan *et al*. (2013) recorded 50 species and Yousafzai *et al*. (2013) reported 38 species from River Swat. The present collection includes all of the species reported by above two extensive works except for *Crossocheilus latius* and *Schistura punjabensis* which have not been reported by both of them which confirms that these species are only confined to the Bunair valley.

The above discussion shows that some fish species reported by other workers has not been collected by us in the present collection. One probable reason is that all of them worked on the fish fauna of both district Swat and dsistrict Buner whereas this work is exclusive to district Buner only. Similarly change in distribution and abundance of fish is quite natural in natural waters. Human activities increase the pace of this change by applying catch pressure on certain species and stressing others by polluting the water.

During the visits, discussion with people living around the river Barandu, it has been revealed that the river Barandu contained a large variety of fish in the past, but after the establishment of Marble factories in Buner valley and release of their untreated effluents directly in the river, the fish diversity and population has drastically been reduced. Another important reason for fish population decline is illegal fishing by dynamiting, poisoning and electric current. People of the area catch fish with small mesh size nets which causes damage to the young stages of the fish causing decline in fish population.

Conclusion

It is concluded from the present study that the fish fauna of district Buner is rich in number according to the environmental conditions. Two fish species namely *Crossocheilus diplocheilus* and *Puntius ticto* have been reported for the first time from district Buner as compared to the previous studies. The alpha diversity showed more evenness among the species distribution.

It is recommended that the water pollution should be controlled to keep the water quality in normal range for growth and survival of fish in the river which will in turn help the uplift of the socio-economic conditions of the local people.

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