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Diversity and population status of fish fauna of river Barandu district Buner Khyber Pakhtunkhwa Province Pakistan

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Abstract

The survey of fish fauna, of River Barandu District Buner Khyber Pakhtunkhwa Pakistan was carried out from April to September 2012. A total 11 species which belongs to 3 order and 4 families were recorded from the River Barandu. These Species are *Barilius pakistanicus, Triplophysa naziri, Tor putitora, Crossocheilus latius, Schizothorax plagiotomus, Channa gachua, Gara gotyla, Glyptothorax punjabensis, Matacembelus armatus, Puntius sophore*and *Schistura punjabensis*. Minimum fish species collected belong to family Channidae while maximum fish species collected belong to family Cyprinidae. The widely distributed fish species found in the area was *Schizothorax plagiostomus*. The population of *Schizothorax* and *Mahasheer* are near to extinct due to overhunting and marble pollutants. Marble pollutants also affect the growth of fish in river Barandu. Oil spill is also a great factor which affects the aquatic biota.

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Introduction

Buner is a district of Malakand division. It consists of Tehsil Daggar, Gagra, Totalai, Chagharzi, Chamla and Gadeze. The Daggar is the head quarter of the district. Buner lies between 34-09 and 34-43° N latitude and 72-10 and 72-47° E longitude. It is bounded on the north by Swat District, on the west by Malakand agency, on the south by Mardan District, and on the east by river Indus and Hazara division. Elevation varies from 1200 ft in Totalai in the south to 9,550 ft of Dosara peak. River Barandu is the largest river of the district (Hamayun *et al*., 2003). The river Barandu originates from many springs and streams in different area of district Buner. River Barandu flow in tehsil Daggar and then enter to tehsil Gagra. River Barandu is the most important water line as it connects with all major villages eventually falling into the river Indus at Kala Dhaka (Khan *et al.,* 2012).

Fishes are one important group of vertebrates which influences the life of human in various ways. Fishes have a rich source of food and provide a meat, several by- products such as fish meal, fish glue, fish oil, etc. fish diet provides proteins, fat, vitamins A, B and D, minerals like Ca, Mg, P, Na, Fe, I, etc. They have good taste and are easily digestible and growth promoting value. Considerable studies on ichthyo fauna diversity from different fresh water bodies of India have been carried out during the last few decades (Shaikh *et al*., 2011).

Fisheries play a predominant role not only in terms of food value but also generate income as well as employment to the public. Country's inland capture fishery resource comes from the reservoirs yet the fish yield is low (Sinha, 2001). The sustainability of fish diversity and its abundance is based on the hydrological parameters as well as plankton diversity. Stocking of economically viable native fish species in the reservoirs more productive and is an important measure from aqua-biotic point of view. Ichthyo diversity refers to variety of fish species; depending on context and scale, it could refer to alleles or genotypes within fish population to species of life forms within a fish community and to species or life forms across aqua regimes (Shinde *et al.,* 2009).

Identification of fish fauna is a very important feature of studying a water body. Lot of work has been done in this regard on different lentic and lotic habitat of this province. In recent past valuable contribution have been made by the researcher like Butt who reported 94 species of fishes from the whole Khyber Pakhtunkhwa province (Khan and Hasan, 2011). Approximately 20% of the world's freshwater fish is currently either endangered or extinct. Throughout the world, freshwater life is disproportionately more at risk, compared with land based or terrestrial life, and this can be generally attributed to the degradation and destruction of habitat and are found in heterogeneous assemblage (Ali *et al*., 2010). They can be found thriving in vernal pools, intermittent streams, tiny desert springs, the vast reaches of open oceans, deep oceanic trenches, cold mountain streams, saline coastal embayment, and so on through or nearly endless list of aquatic environments.

Fish constitutes half of the total number of vertebrates in the world. They live in almost all conceivable aquatic habitats;21,723 living species of fish have been recorded out of 39,900 species of vertebrates out of these 8,411 are fresh water species and 11,650 are marine (Shinde et al 2009). At least 180 species of fish are reported to exist in Pakistan freshwaters, including representatives from important groups such as Loaches, carps and catfish. There are 28 fish species listed as inhabiting cold waters of Pakistan. Most of the snow trout are restricted to the Trans-Himalayan Region of the Indus system. The famous game fish Mahasheer and Schizothoracines are becoming rare due to over-fishing and the disappearance of spawning grounds, submerged by reservoirs such as Tarbela and the Ghazi Barotha.

The aim of present study was to explore fish biodiversity in different zones of Barandu river, its population status, major threats and to propose recommendation for future planning.

Materials and method

The collection was done on Barandu river District Buner. The study area was divided into eight collection zones: Pirbaba, Daggar Pul, Sunigram, Takhtaband, Tangu Pul, Matwani, Budal and Mujahedeen. The material used during collection includes cast nets, automatic rod, gill nets, dragon nets, hook net, hand nets, pH meter, thermometer, measuring tape and digital camera. Fishes was 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 solution in these jars, live fishes were dropped into these jars one by one and then covered these jars with lids. The preserved fishes were then brought to the laboratory and attached a label to each jar indicating the name of locality, date and time of collection. Various morphometric measurements of fish were made by ruler and venire caliper. Other instruments used for laboratory work are Petri dishes, surgical gloves, forceps, and tissue papers, counting needles, magnifying glass and light microscope. Identification and classification of fishes for scientific study was done through various taxonomic and systemic keys.

Result and discussion

The survey of Fish Fauna, of River Barandu District Buner Khyber Pakhtunkhwa Pakistan was carried out from April to September 2012. During the survey 11 species were recorded from the River Barandu. These Species are *Barilius pakistanicus, Triplophysa naziri, Tor putitora, Crossocheilus latius, Schizothorax plagiotomus, Channa gachua, Gara gotyla, Glyptothorax punjabensis, Matacembelus armatus, Puntius sophore*and *Schistura punjabensis*. Some of the species which might be present in the area but could not be captured during the survey.

About 600 marble factories are present in District Buner (Khan *et al.,* 2012). The pollutants of marble from these factories are discharged directly to river Barandu. The people of remote areas use those polluted water not only for their domestic animals but also for their own drinking. Some are still doing the same. Some poor and remote areas people got kidney problem/ kidney stones, hepatitis, rashes, skin, eyes diseases and crops disease. Mostly marble pollutants affect the gills of the fish. Marble Sediment destroys spawning and feeding grounds for fish, reduces fish and shellfish populations, destroys pools used for resting, smothers eggs and fry, and fills in lakes and streams, and decreases light penetration, thus endangering aquatic plants. The water of river Barandu also used for irrigation purposes. Majority of the area of Sunigram, Rega, Swari, Takhtaband, Kalpani, and Bajkata irrigated from river Barandu. So the crops of these areas are affected from marble pollutant water. Beside this the plants species like (Popular, willow, mulberry etc.) are drier day by day due to marble polluted water.

So the fishes of the area and their netch might be destroyed and due to this reason the fish species would have disappeared from the concerned area. The escaped species are *Mastacemblus armatus, racoma labiata, Schizothorax esosinus, and Glyptothoraxstocki.* Endemic and migratory fish fauna found in River Barandu. Endemic include *Baralius pakistanicus, Crossocheilus latius, Schizothorax plagiotomus, Tor putitora, Schizothorax plagiostomus* and *Glyptothorax punjabensis*. In the endemic fish fauna, *Schizothorax plagiostomus, Torputitora, Crossochilius latius, Gara gotyla*collected during this survey. The population of Schizothorax (Swati fish) and Mahasheer are near to extinct due to marble pollutants.As a result of severe population decline. *Tor putitora* has been declared Critically Endangered. It is under severe threat from over fishing, loss of habitat and decline in quality of habitat resulting in loss of breeding grounds. In addition, with several dams planned for construction

in the future in the Himalayan region, they could have a more drastic effect on its populations blocking their migrations and affecting their breeding. It is estimated that population of the species has already declined by more than 50% in the past and if the current trends continue, the population may decline even up to 80% in the future (IUCN, 2011). Population of some of the species is declining due to habitat loss and degradation, water abstraction, drainage of wetlands, dam construction, pollution and eutrophication. These factors have caused substantial declines and/or changes in inland fish species (Khan *et al.,* 2012).

Table 1. The dominant fish species in various zones of river Barandu along with different parameters.

S. No	Location	Temp	pH	Width of river	Depth of river	Dominant species
1	Pirbaba	15-25 C°	8	10-15 m	3-5 m	Puntius sophore
2	Daggar pul	18-25 C°	7.5	25-30 m	10-15m	Tor putitora, Schizothorax plagiostomus
3	Sunigram	20-25 C°	7	30-35 m	7-10 m	Schizothorax plagiostomus
4	Takhtaband	20-25 C°	6	25-30 m	10-15m	Tor putitora, Gara gotyla
5	Tangu pul	15-25 C°	8	15-30 m	10-15m	Tor putitora, Channa gachua
6	Matwani	18-25 C°	8.5	25-30 m	5-10 m	Puntius sophore
7	Budal	15-25 C°	8	15-20 m	10-15m	Schizothorax plagiostomus
8	Mujahedeen	20-25 C°	7.5	25-30 m	10-15m	Tor putitora, Schizothorax plagiostomus

Table 2. Fish population size in different zones of Barandu river District Buner.

Location → Species↓	Pir baba	Dagar pul	Suni gram	Takhta band	Tangu pul	Matwani	Budal	Mujahedeen	Total Species
Tor putitora	70	600	550	500	450	400	250	450	3270
Schizothrax plagiostomus	100	570	480	450	530	370	250	300	3050
Puntius sophore	150	400	450	400	350	370	200	250	2570
Gara gotyla	200	350	400	420	350	300	250	320	2590
Channa gachua	180	400	350	370	320	300	270	310	2500
Barilius pakistanicus	200	450	400	350	300	300	250	310	2560
Glyptothorax punjabensis	250	400	350	300	270	280	200	270	2320
Crossochelius latius	150	300	320	280	250	230	210	300	2040
Mastacembelus armatus	200	280	300	280	300	250	200	250	2060
Schistura punjabensis	210	380	400	350	300	270	250	300	2460
Tryphlophysa naziri	150	300	280	250	200	200	150	250	1780

The present fish fauna survey belongs to 3 order and 4 families. Cyprinidae is the richest family among them, which is represented by 7 species. All of these fishes important from economic and fishery point of view but the *Schizothorax plagiostomus*, *Tor putitora*, *Cyprinus carpio* are very important economically because there are the food fishes of the area. *Catla catla, Cyprinus carpio and Labio rohita* is an exotic fish which only thrive in fresh water. These are very delicious fish. *Cyprinus carpio* also an exotic fish which is an endanger condition. There are also an important food fish. So hatchery must be built for their better production. *Schizothorax plagiostomus* is very common in River Barandu and in every part of river. These are under high fishing pressure. It can be commercialized by establishing the rearing ponds by providing semi control condition in these ponds

Fig. 1. A view of Barandu River.

Conclusions and recommendation

A study to explore the fish fauna of River Barandu District Buner Khyber Pakhtunkhwa Pakistan was conducted from April to September 2012. During the present study 11 species were collected, preserved, identified and labeled. Minimum fish species collected belong to family Channidae while maximum fish species collected belong to family Cyprinidae. The widely distributed fish species found in the area was *Schizothorax plagiostomus*. Majority of fish species are near to extinct due to overhunting. The population of Schizothorax (Swati fish) and Mahasheer are near to extinct due to marble pollutants. Marble pollutants also affect the growth of fish in river Barandu. Oil spill is also a great factor which affects the aquatic biota.

It is suggested that the fishery authorities should investigate and practice the proper exploitation and management of this inland fishery resources according to ecological principals. They should recommend and determine the stocking standards and reasonable introduction according to potential of fish productivity and character of this water body. Scientific fishing standard and fishing quotas are to be worked out; this will play an important role in protection of the Ecology and reservoir and its biodiversity.

Thus it is necessity of every individual to play an active role to achieve the goals of sustainable fishery development and handover the resources in healthy conditions to the future generations. Identify industrial units that are the biggest polluters of river water in District Buner. The drainage system should be improved. Regular government monitoring should be introduced to improve environmental condition. EPA should check and strictly monitor on these marble factories. The fishery department of District Buner also should play active role to conserve the fish fauna of river Barandu. Government should built fish hatchery in District Buner to protect and improve the fish production. Awareness should be created among the people about the extinction of aquatic fauna of river Barandu. Tree plantation may be undertaken to reduce water pollution.

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