The Journal of Zoology Studies
We Don't Love Animals, We Live For Them
www.journalofzoology.com

ISSN 2348-5914
JOZS 2014; 1(6): 27-32
JOZS © 2014
Received: 11-11-2014
Accepted: 21-11-2014

Icthyofaunal Diversity of River Panjkora Upper Dir Khyber Pakhtunkhwa Pakistan

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Abstract

Current study was carried out in the period of November 2012 to May 2013 in river Panjkora district Dir Upper, Khyber Pukhtunkhwa. During this study 11 species were collected from the River panjkora (Dir upper to khagram) which belong to 5 orders and 5 families. These species were *Carassius auratus, Channa punctuate, Crossocheilus diplocheilus, Crossocheilus diplocheilus, Schizothorax esocinus, Garra gotyla, Glyptothorax punjabensis, Mastacembelus armatus, Orienus plagiostomus, Racoma labiate* and *Brown trout.* The family *cyprinidae* are the most dominant family of the fish biodiversity in river Panjkora.

Keywords: Fish fauna, Diversity, River Panjkora, Dir

1. Introduction

Biodiversity is the variety of living organisms considered at all levels of organization, from genetics through species, to higher taxonomic levels, including the variety of habitats and ecosystems, as well as the processes occurring therein. Biodiversity is not the same as the number of different kinds of species in a place. Biodiversity is in fact more complex than species richness, although species richness is certainly one component of Biodiversity [1].

Fishes is the only major group of vertebrate which very much effect on human civilization from ancient time to date [2]. "The most wonderful mystery of the life may well be the means by which it created so much diversity from so little physical matter" [3].

Inland waters and freshwater biodiversity constitute a valuable natural resource, in economic, cultural, aesthetic, scientific and educational terms. Freshwater fishes are among the most diverse groups of vertebrates in the world, exhibiting extraordinary taxonomic breadth, endemism, and geographic scope in their distribution [4].

Fish constitutes half of the total number of vertebrates in the world. They live in almost all conceivable aquatic habitats. A total of 21,723 living species of fish have been recorded, out of these 8,411 are fresh water species and 11,650 are marine [2].

There are more than 186 freshwater fish species described from freshwater bodies of Pakistan. Substantial quantities of commercially important fish are caught from rivers annually. The inland commercially significant native fish fauna comprises about 30 species of which the economically important species are*: Labeo rohita, Gibelion catla, Cirrhinus mrigala, Cirrhinus reba, Channa straita, Channa marulius, Sperata sarwari*, *Wallago attu*, *Rita rita*, *Bagarius bagarius*, *Tenualosa ilisha*, *Notopterus notopterus, Nemacheilus spp*., T*or macrolepis, Schizothorax spp.,* and *Clupisoma naziri* [5].

Many researchers had valuable contribution to the fish fauna of the Khyber Pakhtunkhwa. Butt JA [6] reported 94 species of fishes from the whole province of Khyber Pakhtunkhwa.

In a study by akhtar and colleagues at Manglawar Valley of river Swat, total number of 18 fishes belonging to 3 orders and 3 families were recorded. These species *were Barilius pakistanicus, Barilius vagra, Cirrhinus mrigala, Crossocheilus diplocheilus, Cyprinus carpio, Garra gotyla, Glyptothorax cavia, Glyptothorax punjabensis, Glyptothorax sufii, Labeo rohita, Mastacembelus armatus, Puntius sophore, Rasbora daniconius, Salmophasia bacaila, Salmophasia punjabensis, Schizothorax plagiostomus, Tor macrolepis* and *Tor putitora* [7].

The current study was conducted to explore the icthyofaunal diversity and to explore the fish fauna of river Panjkora, Upper Dir Khyber Pakhtunkhwa Pakistan.

2. Materials and methods

2.1 Materials

During the collection of fishes the following materials were used. Fishing rod, nets, dragon nets, hook nets; hand nets, wood nets and digital camera were used. 10% Formaldehyde, bottles, jars, beakers, forceps, surgical instruments, petri dishes, surgical gloves, tissue papers, counting needles, magnifying glasses, mask and light microscope were used in laboratory.

2.2 Methods

The collection was done on river Panjkora. The study area were divided into nine different collection zones i.e. Dir Upper, Chukyatan pull, Unkar, Bibwayar, Gandigar, Darora, Sahib abad, Wari and Khagram.

For catching the fishes cast net, automatic rod, hook nets and hand nets were used. Hook nets and wood net were used commonly. In hand hook different types of food were put like maize floor and worms, and then dropped the hook into river, where the fishes came for food and captured. Wood net was dropped into water and searched fishes, where the fishes found, were captured in wood net. Fishing rod also used for collection. Hook net was thrown in a specific area and after sometime than raised the net, captured fishes in net were collected. Digital camera was used for capturing the picture of collected fishes.

Bottles and jars were used to put the collected fishes for preservation and identification. After capturing the fishes were dropped into 4% solution of formaldehyde and 96% of water in the bottles and jars and covered the lid to keep preserve. After that the collected fishes were brought to laboratory for identification.

In laboratory surgical gloves were put into hands to safe the hands from chemicals. Mask was put to nose from bad smell of formaldehyde. The fishes were put into petri dish one by one to study the fins, mouth position, color and other body parts. By using counting needle the fins and scales of fish were counted for identification well as other characters. Forceps were used to catch the fish to see all body and separating fins.

Magnifying glasses were used to zoom the fish and saw clear the fish. Tissue papers were used for cleaning. Beakers were used to put the sufficient amount of water and formaldehyde. Light microscope were used to see clear the scales on fish body. For scientific study different taxonomic and identification keys were applied.

3. Results

The survey of ichtyofauna of river Panjkora district Dir Upper, Khyber Pukhtunkhwa was carried out in November 2012 to May 2013. During the research project 11 species were collected from the River panjkora (Dir upper to khagram) which belong to 5 orders and 5 families. The family *cyprinidae* are the most dominant family of the fish biodiversity in river Panjkora. The fish species which were collected and identified from the river Panjkora are below.

Table 4.1: Diversity of fish species in Panjkora River with common names, local names, amount and present status

Order	Family	Scientific Name	Catch amount	Present status
Cypriniformes	Cyprinidae	Crossocheilus diplocheilus	08	++++
		Carassius auratus	04	++
		Garra gotyla	12	+++
		Orienus plagiostomus	05	+++
		Racoma labiates	07	+++
		Schizothorax esocinus	02	++
Siluriformes	Sisoridae	Glyptothorax punjabensis	02	+
Channiformes	Channidae	Channa punctata	O4	++
		Channa gucha	02	++
Mastacembeliforms	Mastacembelidae	Mastacembelus armatus	O3	++
Salmoniformes	Salmonidae	Salmo trutta	01	_

Keys

+++ Most abundant ++ Abundant
+ Less abundant - Rare

During the current study the morphometric measurements of the fishes were measured. The morphometric measurements are given below in table 4.2.

Table 4.2: Morphometric measurements of Fish species of River Panjkora

Fish name	T.L/cm	S.L/cm	H.L/cm	E.d/cm	Sn.L/cm
Carassius auratus	16.3	14.2	3.6	0.6	0.4
Channa punctate	8.5	7	2.2	0.3	0.3
Crossocheilus diplocheilus	10.5	9.3	02	04	01
Schizothorax esocinus	25.4	24.3	5.9	01	2.2
Garra gotyla	10.5	9.3	02	0.5	01
Glyptothorax punjabensis	11.2	10.9	2.5	0.4	1.2
Mastacembelus armatus	19.5	18.7	2.2	0.3	1.6
Orienus plagiostomus	26	22	4.6	0.6	2.3
Racoma labiate	20	17	4.2	0.6	1.47
Brown trout	10	7.5	2.5	0.5	01

Keys
T.L=Total length **S.L**=Standard length
H.L= Head length **E.d** = Eye diameter
Sn.L=Snout length

4. Discussion

The present study was conducted of Ichtyofaunal diversity of river Panjkora in upper Dir from November 2012 to May 2013. During the survey different fishes were collected from the main River as well as streams.

There are more than 186 freshwater fish species described from freshwater bodies of Pakistan. Substantial quantities of commercially important fish are caught from rivers annually [5].

During the present research 11 species of different fishes were captured in the river Panjkora. Some of these fishes were commercial fishes which are available in local market like Gold Fish, *Garra gotyla, Orienus plagiostomus, Racoma labiata*. While the other are very less in number.

Fishes are the most diverse group of living vertebrates, with more than 24,600 extant species currently known. The Order *Cypriniformes* is the planet's largest monophyletic group of freshwater fishes, with over 400 genera and 3000 species native to Asia, Europe, Africa, and North America [8].

During research of Ichtyofaunal diversity of river Panjkora in upper Dir the most dominant and abundant group of fishes were order *salmoniformes*, family *salmonidae* due to rich habitat and cold water.

Fishes are one of the important elements in the economy of many nations as they have been a stable item in the diet of many people. They constitute slightly more than one-half of total number of approximately 54,711 recognized living vertebrate species; there are descriptions of an estimated 27,977 valid species of fishes [8].

During current research a lot of people have seen which were capturing fishes from river Panjkora and bring them to local markets. By this way they earn a lot of money, So Fishes play a key role in the economy of the country. Increase in population day by day the demand of proteins contained diet is increasing, and the fishes are richest group of proteins. So this is possible if the diversity is explored and give protection to fish population, so the economy will be develop.

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 [9]. During the current study it has been seen that the fishes are the source of food. Lot of people was capturing the fishes for getting the fresh meat.

Fish species are also an important indicator of ecological health. The abundance and health of fish will show the health of water bodies [10]. It has been observed during the present research that different fish species were captured in different locations of upper Dir which indicated different ecological state like in upper parts of river Panjkora the fish fauna was in abundance due to healthy water while in lower parts the fish population was low due to polluted water.

Growth of the human population, rising consumption, and rapid globalization have caused widespread degradation and disruption of natural systems, especially in the freshwater realm. Freshwater ecosystems have lost a greater proportion of their species and habitat than ecosystems on land or in the oceans, and they face increasing threats from dams, water withdrawals, pollution, invasive species, and overharvesting [11].

During recent research it has been seen that the fish fauna in the polluted areas like Darora, Wari and Khagram were reduced due to water pollution in that areas. it indicated that human globalization had produced a lot of problems and threats in fresh water realm due to increase in population and destruction of natural habitats, thus the freshwater ecosystems have lost their species and habitat due to different human activities like pollution, overhunting and blasting.

During current study it has been seen that like other rivers Panjkora is also facing anthropogenic problems. These anthropogenic problems are over hunting and using of blasting materials to catch the fishes, due to which fishes are destroying and reducing.

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 [12].

Present research showed that the fresh water ecosystem is destroying by the local peoples. They were using different kinds of blasting materials in river Panjkora which cause the destruction of habitats and its race. So some fishes are endangering like *Glptothorax punjabensis* etc.

Biodiversity is essential for stabilization of ecosystem, protection of overall environmental quality for understanding intrinsic worth of all species on the earth [13].

The current study showed that Biodiversity is very important. From the diversity it was found to avoid from those activities which causes the declining of different species.

During the current research it has been seen that fresh water ecosystem is very important to human beings it provides the food materials in the form of fish. It also provides a recreation and also maintains important biota like floating weeds etc.

Exotic introductions are often done with the best of intentions but they have subjected native fish species to new competitors, predators or other agents that they are unable to withstand [14].

Recent research showed that the introduction of exotic species was a good step, but that has greatly affected the native fishes like in upper parts of river Panjkora the brown trout are introduced which disturbed the native fishes.

River Kabul is the river which originates from Afghanistan and enter to Pakistan, the Panjkora River also flows to river Kabul, in which 11 species were recorded from the upper part of Panjkora in upper dir.
The damming of rivers and streams is often implicated as a cause for fish population decline and local extinction of freshwater fish [15].

The damaging of rivers and streams mainly occurred by two ways. Natural which include flood while the other is anthropogenic activities. In Panjkora flood has destroyed the habitats while nowadays human interaction is very high.

Human activities such as modification of the environment, harvesting and culture and effects of modernization have contributed to the pollution of water bodies which serve as habitat for fishes [16].

Modernization when occur in the global village it adversely affect the water bodies. Like in upper Dir the waste products of factories and industries are flowing to water and thus the water become polluted and affects the fish fauna. During the recent research it that has been seen different diversities of different fishes in different locations. From this variations found out that the herbivores were more in number, where the aquatic weeds were in abundant.

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Ahmad L, Saeed K, Khan S, Akhtar N. Icthyofaunal Diversity of River Panjkora Upper Dir Khyber Pakhtunkhwa Pakistan. Journal of Zoology Studies. 2014; 1(6):27-32.

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