

Fish Fauna of River Darmai Upper Swat Khyber Pakhtunkhwa Pakistan

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ABSTRACT

A descriptive study was conducted on river darmai upper swat Khyber Pakhtunkhwa in the period of August to December 2014 to explore the fish fauna of river darmai. A total of 114 specimens were collected which were belonging to 2 orders and 3 families, 5 genera and 7 species. These species were *Schizothorax esocinus*, *Schizothorax palgiostomus*, *Orienus plagiostomus*, *Schistura alepidota*, *Barilius pakistanicus*, *Glyptothorax punjabensis*, *Glyptothorax stocki*. The *Schizothorax palgiostomus* was the dominant specie in the river darmai. No anthropogenic activities were found in study period in river darmai and therefore the fish fauna of the river darmai was rich in number. The pH and temperature of the river darmai was checked which reveals good standard water for the survival of fishes.

KEYWORDS: Fish fauna, River darmai, Swat

INTRODUCTION

The study of fish is called ichthyology. Fish have been studied for centuries, beginning with the early Chinese, Egyptians, and Greeks. The study of fish and other aquatic animals is called aquaculture (Helfrich and Neves, 2009).

Ichthyodiversity refers to the diversity of fish species; depending on scale, it could refer to alleles within fish population to species of life forms within a fish culture and to species or life forms across aqua regime (Burton *et al.*, 1992).

Fish show the greatest biodiversity of the vertebrates with over 22,000 species. Out of these, approximately 58 percent are marine, 41 percent are freshwater species, and 1 percent move back and forth between marine and freshwater. As estimated, marine fishes are the most diverse because saltwater covers 70 percent of the earth. Only 1 percent of the earth is covered by freshwater. This small area is home to 8,000 species of freshwater fishes (Helfrich and Neves, 2009).

Fish comprise half of the total number of vertebrates in the world and live in almost all water habitats. A total of 8,411 freshwater fish species have been reported throughout the world, out of these 930 species live in freshwater aquatic system of India. India is one of the extra-large biodiversity countries in the world and occupies the ninth position in terms of freshwater extra-large biodiversity (Shinde *et al.*, 2009).

About 180 species of fishes have been reported in Pakistan, including representatives from important groups such as loaches, carps and catfish. 28 fish species listed as living in cold waters of Pakistan. Most of the snow trout are restricted to the Trans-Himalayan Region of the Indus system (Mirza and Bhatti, 1999).

Many researchers had valuable contribution to the fish fauna of the Khyber Pakhtunkhwa. 94 species of fishes from the province of Khyber Pakhtunkhwa had been reported by Butt (Butt, 1986).

Mirza *et al* reported 13 species of fishes from river Kurram. The contribution of (Hussain and Shah, 1960) lead to the exploration of fishes of the river swat, they reported 6 species from river Swat. Work of (Nisar, 1998) on the fish fauna of Tanda Dam Kohat explores the fish fauna by reporting 23 species. Shahjehan and Khan (2000) reported 26 fishes belonging to 8 families from Baran Dam, Bannu.

In a study on the fish biodiversity of River Swat from Madyan to Chakdara total number of 18 species were collected belonging to 5 orders and 6 families. These species were *Barilius pakistanicus*, *Crossocheilus diplocheilus*, *Cyprinus carpio*, *Carassius auratus*, *Garra gotyla*, *Orienus plagiostomus*, *Puntius sophore*, *Racoma labiata*, *Schizothorax esocinus*, *Tor macrolepis*, *Schistura alepidota*, *Triplophysa naziri*, *Glyptothorax punjabensis*, *Glyptothorax stocki*, *Channa gachua*, *Channa punctatus*, *Mastacembelus armatus* and *Oncorhynchus mykiss*. The richest family was family Cyprinidae represented by 10 species (Ishaq *et al.*, 2014).

In a study by akhtar and colleagues at Manglawar Valley of river Swat, 18 fish species 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* (Akhtar *et al.*, 2014).

The current study was conducted to explore the fish fauna of river darmai upper swat Khyber Pakhtunkhwa Pakistan.

MATERIAL AND METHODS

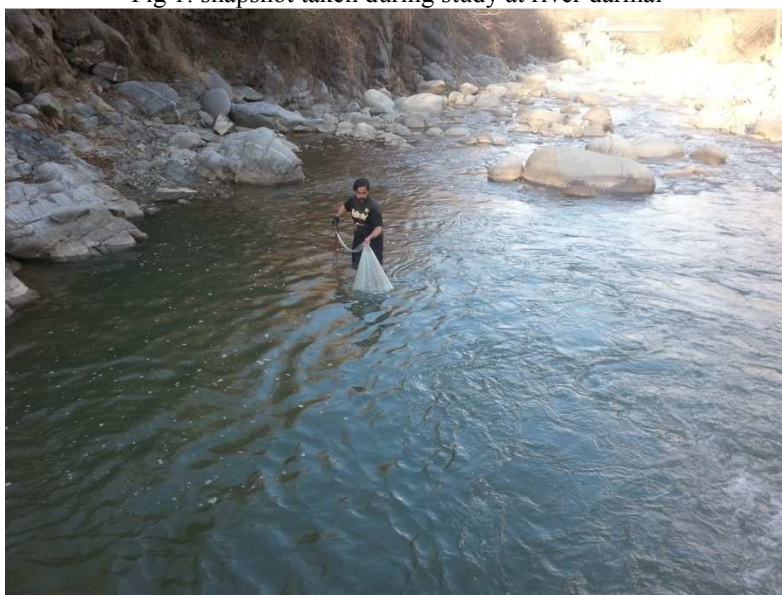
Introduction to swat

Swat is a beautiful valley of KPK formally called as (NWFP), Pakistan and situated between 34° 34" and 35° 55" north latitudes and 72° 08" and 72° 50" east longitudes. The total area of the district is 5337 Km². Swat is located in the lap of mountainous ranges, which are the off shoots of Hindukush; so the larger part of Swat is covered with mountains and hills. True plain is not found in Swat, yet local people call some areas plain surfaces. These plain surfaces receive water from River Swat and its tributaries for irrigation.

Introduction of study area

Darmai is a beautiful valley of district swat and lies between Latitude 35°4'53.46" Longitude 72°26'54.8". Darmai is very famous for its river as it contains good fish fauna. Darmai is surrounded by beautiful lush green mountains. The distance from mingora to darmai is about 52 km. The study area was divided in 3 collection points (Sakhra, Darmai and Kalakot).

Fig 1: snapshot taken during study at river darmai



Methods

A descriptive study was conducted on the fish fauna of river darmai upper swat in the period of September to December 2014 to explore the fish fauna of river darmai.

Materials

The materials used were different types cast nets, hooks, automatic rod, gill nets, counting needles, magnifying glasses, digital camera, formalin solution, gars, digital pH meter and digital thermometer.

Sampling

Fish species were collected from the river darmai with the help of different types cast nets, hooks, automatic rod, gill nets etc. The collected fishes were preserved in 10% formalin solution. In order to preserve the fish in original form and to avoid spoiling the fishes were injected with 2% diluted formalin. The fishes were then brought to the laboratory of Zoology department, Abdul Wali Khan University Mardan (Buner Campus) Khyber Pakhtunkhwa Pakistan.

pH and Temperature

pH and temperature was measured through the digital pH meter and digital thermometer.

Identification

The collected fishes were then identified through available keys described by mirza (Mirza, 2003).

RESULTS

During the 4 month study period 114 specimens belonging to 2 orders and 3 families, 5 genera and 7 species were recorded from the river darmai. These species were *Schizothorax esocinus*, *Schizothorax palgiostomus*, *Orienus plagiostomus*, *Schistura alepidota*, *Barilius pakistanicus*, *Glyptothorax punjabensis*, *Glyptothorax stocki*. The details of the species collected are given in table 1.

Table 1: Taxonomic position of species collected during study

Order	Family	Species
Cypriniformes	Cyprinidae	<i>Schizothorax esocinus</i>
Cypriniformes	Cyprinidae	<i>Schizothorax palgiostomus</i>
Cypriniformes	Cyprinidae	<i>Barilius pakistanicus</i>
Cypriniformes	Cyprinidae	<i>Orienus plagiostomus</i>
Cypriniformes	Nemacheilidae	<i>Schistura alepidota</i>
Siluriformes	Sisoridae	<i>Glyptothorax punjabensis</i>
Siluriformes	Sisoridae	<i>Glyptothorax stocki</i>

During the study fishes collected were of different sizes. The large fish collected was *Schizothorax esocinus* and the small fish collected was *Barilius pakistanicus*. The morphometric measurements of fishes collected are given in table 2.

Table 2: Morphometric measurements of fishes collected during study

Fish species	Total length	Standard length	Head length	Eye diameter	Snout length
<i>Schizothorax esocinus</i>	25.6 cm	21.2 cm	4.3 cm	0.9 cm	2.2 cm
<i>Schizothorax palgiostomus</i>	18.6 cm	15 cm	3.4 cm	0.3 cm	1.3 cm
<i>Orienus plagiostomus</i>	19 cm	14.8 cm	3.9 cm	0.7 cm	1.5 cm
<i>Schistura alepidota</i>	9.7 cm	8 cm	1.4 cm	0.2 cm	0.9 cm
<i>Barilius pakistanicus</i>	8.2 cm	6.8 cm	1.6 cm	0.4 cm	0.5 cm
<i>Glyptothorax punjabensis</i>	11.2 cm	9.3 cm	2.5 cm	0.3 cm	1.2 cm
<i>Glyptothorax stocki</i>	9.4 cm	7.3 cm	1.2 cm	0.2 cm	0.8 cm

During the study the pH and temperature of the water was checked and was found suitable for the survival of fishes. The detail of the pH and temperature is given in table 3.

Table 3: Detail of pH and temperature

Collection point	Temperature	pH
Sakhra	18-25°C	6.8
Darmai	18-25°C	7.2
Kalakot	16-22°C	7.0

In current study 114 specimens belonging to 2 orders and 3 families were collected from the three collection points. The details are given in table 4.

Table 4: Collection of fishes from different points

Collection point	Frequency	Percentage
Sakhra	26	22.80%
Darmai	42	36.84%
Kalakot	46	40.35%

DISCUSSION

Fishes are one of the main important elements in the aquatic habitat and play a key role in economy of many nations (Okoye *et al.*, 2011) as they have been a staple item in the diet of many people (Essetchi *et al.*, 2003). Animal proteins are consumed by 1 billion people worldwide (Sallam, 2007; Marichamy *et al.*, 2011). Fishes are the

important source of income for the people of district swat. Local people and fisherman catch the fishes and sold at as a source of income.

During study conducted on the fish biodiversity of River Swat from Madyan to Chakdara 18 species were collected belonging to 5 orders and 6 families. These species were *Barilius pakistanicus*, *Crossocheilus diplocheilus*, *Cyprinus carpio*, *Carassius auratus*, *Garra gotyla*, *Orienus plagiostomus*, *Puntius sophore*, *Racoma labiata*, *Schizothorax esocinus*, *Tor macrolepis*, *Schistura alepidota*, *Triplophysa naziri*, *Glyptothorax punjabensis*, *Glyptothorax stocki*, *Channa gachua*, *Channa punctatus*, *Mastacembelus armatus* and *Oncorhynchus mykiss* (Ishaq *et al.*, 2014).

In our study the species collected were *Schizothorax esocinus*, *Schizothorax plagiostomus*, *Orienus plagiostomus*, *Schistura alepidota*, *Barilius pakistanicus*, *Glyptothorax punjabensis* and *Glyptothorax stocki*.

In a study by Akhtar and colleagues 18 fishes belonging to 3 orders and 3 families were recorded during study on river swat at manglawar valley. 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* (Akhtar *et al.*, 2014).

In a study by Akhtar Shah student of M.Sc Zoology Hazara university mansehra 9 fish species were identified from the upper river swat. These species were *Oncorhynchus mykiss*, *Schizothorax richardsonii*, *Carassius auratus*, *Crossocheilus diplocheilus*, *Schistura alepidota*, *Glyptosternum reticulatum*, *Cyprinus carpio*, *Triplophysa choprai* and *Triplophysa naziri* (Shah, 2010).

In our study the 7 species were identified from river darmai. These species were *Schizothorax esocinus*, *Schizothorax plagiostomus*, *Orienus plagiostomus*, *Schistura alepidota*, *Barilius pakistanicus*, *Glyptothorax punjabensis* and *Glyptothorax stocki*.

In 1960 Hussain and Shah recorded six species from the river swat viz *Schizothorax curvifrons*, *Schizothorax esocinus*, *Schizothorax longipinnus*, *Schizothorax plantifrons*, *Schizothorax progastus*, *Schizothorax nasus* (Hussain and Shah, 1960). In accordance to Hussain and Shah in our study the only species *Schizothorax esocinus* was recorded in our study.

Fish diversity is more apparent than in their morphology. Fishes range in size from the very small to the very large, adult gobies may be just 8 mm, whereas the whale shark, *Rhincodon typus*, may reach 12 m (Nelson, 1994).

In our study the fishes show variable size. The largest species was *Schizothorax esocinus* having size 25.5cm while the smallest species was *pakistanicus Barilius* having 8.2 cm.

Water temperature of River Swat ranged from 15-26 °C. Water temperature influences the distribution and migration of fishes (Lagler *et al.*, 1962). The pH value of river swat was reported 7.3-7.9 by IUCN (IUCN, 1994). The pH of River Swat ranged from 7.2 to 7.9. This value falls within the limits of WHO (Utang and Akpan, 2012) recommended value, 7.5-8.5. The pH value is good for fishes, and shows good quality of water. Usually water quality parameters proportionately deteriorated with the increasing fish density in culture ponds (Salam *et al.*, 2013). The affected fish farms were using rivers as the main source of their water with water temperature in the range of 14.3-22.7°C, dissolved oxygen of 6.68-8.92 mg/l, pH of 7.85-8.16 (Kia and Mehrabi, 2013).

In our study the pH and temperature of different collection points was checked. The temperature of water at collection point Sakhra was 18-25°C and pH was 6.8, temperature of water at collection point darmai was 18-25°C and pH was 7.2 and temperature of water at collection point kalakot was 16-22°C and pH was 7.0.

Conclusion

In the present study no anthropogenic activities were found in river darmai. Fish fauna in the river darmai was rich in number. The temperature and pH of the study area was good and was found suitable for the survival of fishes.

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