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Ichthyofaunal Diversity And Population Status Of Major Fish Species In Sarki Lawagahr Dam, District Karak, Khyber Pakhtunkhwa, Pakistan

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ABSTRACT

Aim of our research work is concerned on biodiversity of fishes of Sarki lawagahr dam of district Karak. A total of 68 Fish samples were collected from Sarki lawagar dam of district Karak Khyber Pakhtunkhwa with the of local fishermen. By using different types of tools like hand net, cast net and hooks from August 2022 to January 2023. All the fishes were brought to laboratory of Government Degree College Takht e-nasrati Karak. Then each fish was identified up to specie level. Identification of the species was made on the basis of their color pattern, specific spots or marks on the surface of the body, shape of the body, structure of various fins etc. A total of 7 species were reported during the period, which were belonged to the same class (Actinopterygii), same order (Cypriniformes) and same family (Cyprinidae) and seven genera. The species which are found in Sarki Lawagahr dam during the present study are, Labeo rohita, Hypophthalmichthys molitrix, Cirrhinus cirrhosus, Hypophthalmichthys nobilis, Puntius ticto, Cyprinus carpio and Ctenopharyngodon idella. Out of total 78 fish samples, most abundant fish species was L. rohita (19 samples) followed by H.

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molitrix (16 samples) and *C. cirrhosus* (14). *Puntius ticto* was represented by 09 samples, *Hypophthalmichthys nobilis* represented by 07 samples, *Cyprinus carpio* represented by 02 samples and *Ctenopharyngodon idella* was represented by only one sample. The present study concludes that the Sarki lawagahr dam district Karak, Khyber Pakhtunkhwa is favorable for fish Cyprinidae family. Hence, the present study will provide useful information about the diversity of fish fauna of Sarki Lawagahr dam district karak and it will be later important in taxonomic, fisheries management and conservation.

Keywords: Fish, Sarki Lawagahr Dam, Ichthyodiversity.

Introduction

Background

Fish are cold-blooded, aquatic vertebrates with gills as the primary respiratory organ, fins for locomotion, and a streamlined body structure adapted to diverse aquatic environments (Berra, 2001). Fossil records suggest that fish have existed for more than 438 million years, making them the earliest vertebrates on Earth. Their evolutionary success has led to a remarkable diversity in morphology, habitat preference, and ecological roles (Allen et al., 2009).

Fish biodiversity, also known as ichthyodiversity, plays a critical role in maintaining aquatic ecosystem health by regulating food webs, supporting nutrient cycling, and acting as indicators of environmental quality (Moyle & Leidy, 1992). The study of ichthyofaunal diversity has garnered increased attention due to its ecological, economic, and conservation relevance. Globally, approximately 22,000 fish species have been documented, of which 41% are found in freshwater environments despite freshwater ecosystems representing less than 0.01% of the planet's total water volume (Helfrich & Neves, 2009).

Ichthyo diversity and Importance

The term biodiversity encompasses the variety, abundance, and distribution of species across different biological levels—from genes to ecosystems (Mace et al., 2005). In freshwater environments, fish constitute the most diverse group of vertebrates and serve as reliable indicators of ecosystem health due to their sensitivity to environmental changes (Froese & Pauly, 2010). The study of ichthyodiversity, therefore, provides crucial information about ecosystem stability, resource availability, and human impact. Pakistan's freshwater bodies—including rivers, lakes, wetlands, and man-made reservoirs—support rich ichthyofaunal diversity. Approximately 193 freshwater fish species have been reported from the country, belonging to 13 orders, 30 families, and 86 genera (Rafique & Khan, 2012). The family **Cyprinidae**, which includes ecologically and commercially important species such as *Labeo rohita* and *Hypophthalmichthys molitrix*, is particularly dominant in the region's inland waters (Ali, 1993). However, anthropogenic stressors, including overfishing, habitat fragmentation, and pollution, have caused declines in fish populations, with several species now classified as endangered or vulnerable according to IUCN criteria (Rafique & Khan, 2012).

1.3 Threats to Freshwater Fish Diversity

Globally, the major threats to ichthyofaunal diversity include overfishing, pollution, invasive species, habitat degradation, and hydrological alterations caused by dam construction (Dulvy et al., 2003; Garcia et al., 2006; Leveque, 2007). These pressures are further compounded by global environmental changes such as climate warming, altered precipitation patterns, and increased runoff (Poff et al., 2002; Galloway et al., 2004). In Pakistan, destructive fishing practices like the use of poisons and electric shocks, especially in rural and semi-arid areas, have accelerated biodiversity loss (Mirza, 1975; Rafique & Khan, 2012).

Moreover, dam construction, while critical for water storage and flood control, can significantly alter natural flow regimes, impede fish migration, and degrade aquatic habitats (Nilsson et al., 2005). In Khyber Pakhtunkhwa (KPK), numerous small dams have been constructed under government projects, yet limited research exists on their ecological impact or the status of fish populations within these reservoirs (Butt, 1986; Shahjahan & Khan, 2000). For example, previous ichthyofaunal assessments from dams such as Tanda, Chambai, Khaisari, and Muhabbat Khel in the Karak District have documented species richness largely confined to the Cyprinidae family (Yousaf et al., 2016; Junaid et al., 2017).

Economic Importance of Fish

Fish contribute significantly to global food security, livelihoods, and economic development. Aquaculture is one of the fastest-growing food production sectors worldwide, with annual global fish production reaching approximately 154 million tons and per capita consumption at 18.5 kg (Wake & Geleto, 2019). Fish are rich in proteins, essential fatty acids, vitamins, and minerals, making them a critical component of human nutrition (Ashok, 2014). Additionally, fisheries support employment and income generation in rural communities, especially in semi-arid regions where alternative livelihoods are limited (Tidwell & Allan, 2001).

In Pakistan, inland fisheries and aquaculture are increasingly recognized for their role in poverty alleviation and food production, yet these sectors remain underdeveloped due to limited research, inadequate policy enforcement, and poor infrastructure. Understanding the composition and abundance of fish species in reservoirs like Sarki Lawagahr Dam can help inform conservation policies and promote sustainable utilization.

Justification and Study Objectives

The Sarki Lawagahr Dam, located in the Karak District of Khyber Pakhtunkhwa, is a semi-arid reservoir primarily constructed for irrigation and water storage. Despite its ecological and socioeconomic importance, there is a significant lack of data on its ichthyofaunal diversity. Given the mounting environmental pressures and the potential for aquaculture development, a detailed assessment of fish diversity is essential.

Previous studies in similar environments (e.g., Hassan et al., 2016; Junaid & Rehman, 2017) have shown that dams in the Karak region typically support a limited number of fish species, often dominated by members of the family Cyprinidae. However, the extent to which this pattern holds true for Sarki Lawagahr Dam remains unexplored.

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This research aims to fill this knowledge gap by providing baseline data on species composition, abundance, and ecological patterns.

Objectives of the Study

To assess the ichthyofaunal diversity of Sarki Lawagahr Dam

To determine the population structure and relative abundance of each fish species found in the dam.

Materials and Methods

Study Area

The present study was conducted at Sarki Lawagahr Dam, situated in the Karak District of Khyber Pakhtunkhwa, Pakistan. Karak is a semi-arid region located approximately 150 km southeast of Peshawar along the Indus Highway (N-55), which connects Karachi to Peshawar. Geographically, the district lies between 32.47° to 33.28° North latitude and 70.30° to 71.30° East longitude. The terrain is predominantly hilly, ranging from 600 to 1400 meters above sea level.

Sarki Lawagahr Dam is located in Tehsil Takht-e-Nasrati, specifically at coordinates 33°02'21.98"N and 71°11'43.82"E, at an altitude of approximately 2,600 feet above sea level. The dam was constructed under the Government of Khyber Pakhtunkhwa's Small Dams Project. It is considered one of the major barani (rain-fed) reservoirs in the Karak District and is constructed over a branch of the Kurram River. The site is characterized by its green, mountainous landscape and abundant seasonal rainfall, with a water table ranging from 60 to 120 feet.

Although the dam was primarily constructed for irrigation and flood control, its high water quality also makes it suitable for drinking and aquaculture purposes (Rehman et al., 2015).

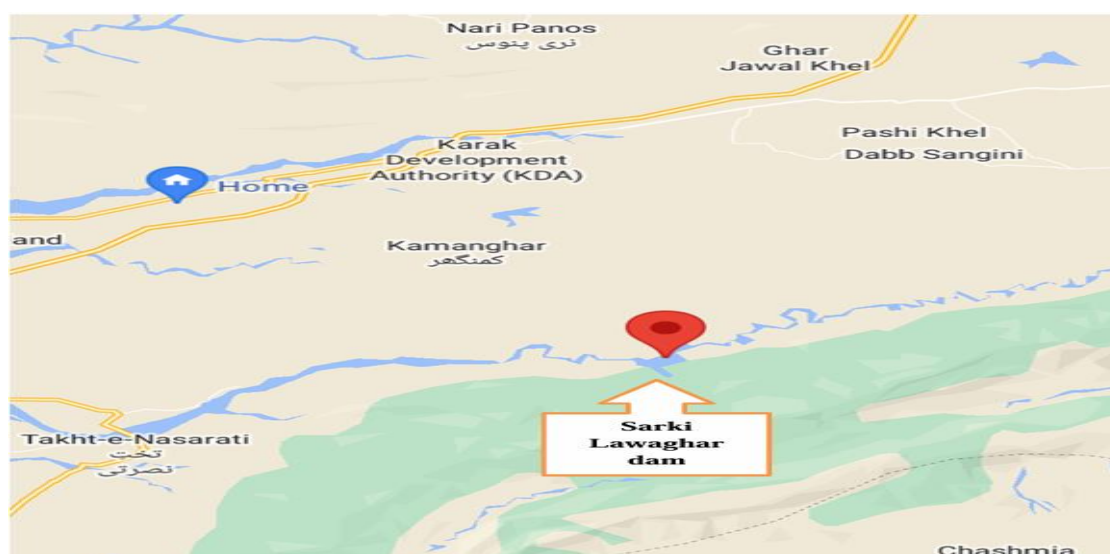


Figure 2.1 Map of Sarki Lawagahr dam

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Collection of Samples

Fish sampling was carried out from various predetermined locations within the Sarki Lawaghar Dam from August 2022 to January 2023. Collection efforts were conducted in collaboration with local fishermen using a variety of traditional fishing techniques. Sampling gear included gill nets, cast nets, drag nets, hand nets, and multiple sizes of fishing hooks. Sampling was performed at regular intervals to ensure representative coverage of fish diversity across the study period.

A total of 68 fish specimens were collected and immediately processed for morphological and taxonomic analysis. The objective of the sampling was to assess the ichthyofaunal diversity and relative abundance of fish species present in the dam ecosystem.

Preservation of Samples

After collection, each fish specimen was photographed in fresh condition to capture its natural coloration and morphology. Subsequently, all specimens were preserved in 10% formalin solution to prevent decomposition and microbial activity. The preserved samples were then transported to the Zoology Laboratory at Government Degree College, Takht-e-Nasrati, Karak, for detailed examination and taxonomic identification.

Identification of Specimens

Fish identification was performed in the laboratory using standard taxonomic procedures. Morphological features such as body shape, coloration patterns, fin structure and positioning, and presence of specific distinguishing marks were examined. Systematic identification was carried out using established taxonomic keys and field guides provided by Talwar and Jhingran (1991), Jayaram (1999), and Mirza (1990). Comparative reference to these standard works ensured the accuracy of species classification.

Results

The aim of our research study was to find the ichthyofaunal diversity of sarki lawagahr dam, district karak, Khyber Pakhtunkhwa. With the help of local fisherman by using different types of capturing tools and techniques during the period of August 2022 to January 2023, several samples were collected. Then the collected samples were identified and preserved. Analysis and identification of the collected samples revealed a total of 7 fish species viz *L. rohita*, *H. molitrix*, *C. cirrhosus*, *H. nobilis*, *P. ticto*, *C. carpio*, *C. idella*. All the species were belonged to order Cypriniformes, family Cyprinidae, and seven genera.

The identified fish species and their respective relative abundances were as follows:

Labeo rohita – 19 individuals (28%)

Hypophthalmichthys molitrix – 16 individuals (24%)

Cirrhinus cirrhosus – 14 individuals (21%)

Puntius ticto – 9 individuals (13%)

Hypophthalmichthys nobilis – 7 individuals (10%)

Cyprinus carpio – 2 individuals (3%)

Ctenopharyngodon idella – 1 individual (1%)

Table No.1 Fish species collected at Sarki lawaghar dam, Karak, Khyber Pakhtunkhwa.

S/N	Fish name	Phylum	Class	Order	Family	Genus	Specie
01	Labeo rohita	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Labeo	<i>L. rohita</i>
02	Hypophthalmichthys molitrix	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Hypophthalmichthys	<i>H. molitrix</i>
03	Cirrhinius cirrhosus	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Cirrhinius	<i>C. cirrhosus</i>
04	Hypophthalmichthys nobilis	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Hypophthalmichthys	<i>H. nobilis</i>
05	Puntius ticto	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Puntius	<i>P. ticto</i>
06	Cyprinus carpio	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Cyprinus	<i>C. carpio</i>
07	Ctenopharyngodon idella	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Ctenopharyngodon	<i>C. idella</i>

Among the recorded species, Labeo rohita emerged as the most dominant, representing more than a quarter of the total catch. The substantial abundance of this species may be attributed to its broad ecological tolerance and adaptability to a wide range of environmental conditions. Notably, the average **water temperature** during the study was **30.5°C**, and the **pH** was measured at **6.96**, which fall well within the optimal range for the growth and reproduction of *L. rohita* (28–33°C, pH 6.5–9.0).

Ichthyofaunal Population of Sarki Lawagahr dam: During our collection, we collect total of 68 fish samples. Out of which 19 were *L. rohita*, 16 were *H. molitrix*, 1 was *C. idella*, 7 were *H. nobilis*, 14 were *C. cirrhosus*, 9 were *P. ticto* and 2 were *C. carpio*.

Figure 4.1 Categorical graphic representation of fish samples collected from Sarki Lawaghar dam

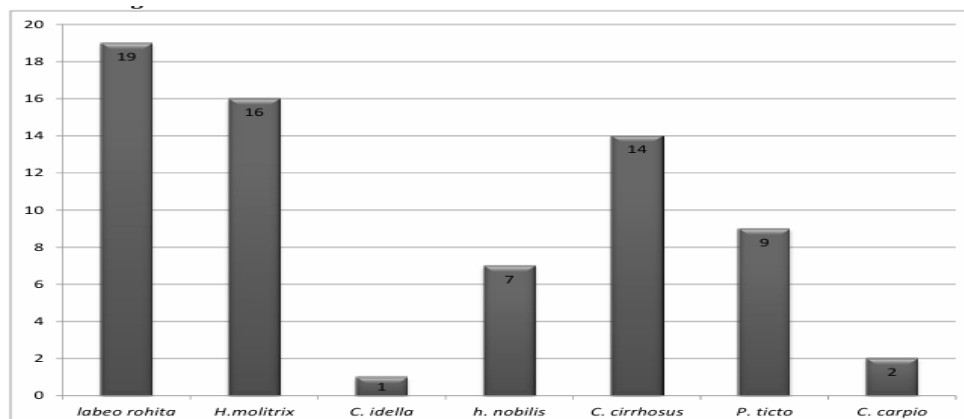
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The fish found in Sarki Lawagahr Dam exhibit species-to-species variation. The pH and temperature of Sarki Lawagahr Dam's water are most suitable for the growth and population of these fishes, i.e., Sarki Lawagahr Dam's temperature and pH are 30.5°C and 6.96 (Rehman et al., 2015) respectively, and *L. rohita* requires optimum temperature and pH for their best growth 28–33°C and 6.5–9.0 (Shahjahan et al., 2021) respectively. Additionally, Sarki Lawagahr Dam contains food matters required for the survival of *L. rohita* like insects, worms and other small invertebrates. *H. mlitrix* are commonly phytoplankton feeders, eating diatoms, algae, debris, rotifers, bacteria, and small crustaceans. *C. cirrhosus* is an algae and invertebrate feeder as well as detritus-like debris found in the bottom layer of water.

C. idella and *C. carpio* are found in relatively small quantities in Sarki Lawagahr dam because they both need higher pH than Sarki Lawagahr dam, i.e., *C. idella* and *C. carpio* need optimum pH of 7-9 and 7.5, respectively. The optimum temperatures for each of these fish are 23°C and 26°C (Sapkale et al., 2011, Bozkurt et al., 2017) respectively, which is significantly lower than the temperature of the Sarki Lawagahr dam. Additionally, aquatic insects that prey on their larvae and adult fish that are vulnerable to predation by other fish and humans are difficulties that affect their population, which is why it is in small quantities than that of other fish in the Sarki Lawagahr Dam.

Figure 4.2 Representation of population of different fish species found in Sarki Lawagahr dam in percentage

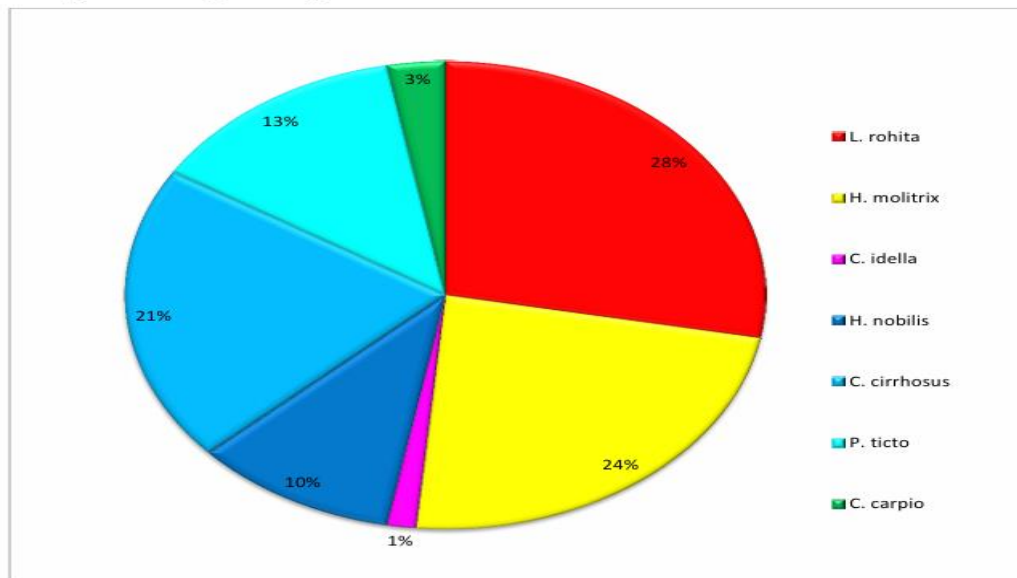
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Hypophthalmichthys molitrix and Cirrhinus cirrhosus were also recorded in high numbers, indicating their compatibility with the dam's limnological parameters. In contrast, species such as Cyprinus carpio and Ctenopharyngodon idella were found in very low numbers. The limited presence of these species could be due to several factors, including **suboptimal habitat conditions**, **limited food availability**, or **higher predation and competition**. Additionally, their lower adaptability to local environmental fluctuations may have contributed to their reduced representation. Overall, the results suggest that the dam offers favorable conditions for native cyprinid species but may be less suitable for certain exotic or introduced species. The species composition and abundance trends provide valuable insight into the ecological dynamics of the reservoir.



Fig 4.3

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Labeo rohita

Taxonomic position:

Phylum: Chordata

Class: Actinopterygii

Order: Cypriniformes

Family: Cyprinidae

Genus: Labeo

Specie: L. rohita

Common names: Rahu

Fin formula: D. 15-16; P1. 16-17; P2. 9; A. 7

Morphology: Body compressed and dorsal profile is more convex than that of ventral profile. Single pair of barbel (maxillary) present. Dorsal profile brownish or greenish and silvery on both sides and beneath. Fins are gray in color with orange margin in larger specimen. Lateral line present and complete. Scales moderate.

Habit and habitat: Found in freshwater bodies, rarely in brackish water; some common habitats are ponds, ditch, canals, bays, floodplains, hoars, boars (oxbow lakes), rivers, lake etc. Niche is middle layer of water body.

Food and feeding: Takes food from middle layer of habitat. Often from surface layer. Talwar and Jhingran (1991) mentioned this fish as bottom feeder fish. Feed on both natural and supplementary feeds. This fish feed on plant matters including decaying vegetation and also well habituated in taking rice bran, wheat bran, mustard oil cake and other supplementary feed under aquaculture system.



Fig 4.4

Hypophthalmichthys molitrix

Taxonomy position:

Phylum: Chordata

Class: Actinopterygii

Order: Cypriniformes

Family: Cyprinidae

Genus: Hypophthalmichthys

Specie: H. molitrix

Common name: Silver carp

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Local name: Silver carp, Silver cup

Fin formula: D 3/7; P1 1/17; P2 1/7; A 2-3/12-14 (Rahman and Ruma, 2007)

Description of the species: Body is stout and compressed, with a sharp keel from throat to vent. Head rather small, post operculum with radiated stries; snout blunt, obtusely rounded anteriorly. Mouth is terminal, lower jaw slightly longer than upper. Dorsal fin is short, in serrated slightly behind pelvic fins, scales small. Color silvery–white with blood red spots on body especially on caudal peduncle. Fins are dark. Silver carp was first introduced from Honkong in the ponds of Riverine Fisheries Research Station at Chand pur in 1969. (Rahman, 1989; Rahman, 2005; Rahman and Ruma, 2007).

Habit and Habitat: According to Hara and Pillay (1962), silver carp is a pelagophil and planktophagous species when kept in ponds it thrives well on artificial feeds, such as bone meal, rice bran and flour.



Fig 4.5

Hypophthalmichthys nobilis

Taxonomic position:

Phylum: Chordata

Class: Actinopterygii

Order: Cypriniformes

Family: Cypridae

Genus: *Hypophthalmichthys*

Specie: *H. nobilis*

Common name: Bighead carp.

Local name: Bighead.

Fin formula: P.14: D.48: V.5: A.34: C13

Morphology: The bighead carp is a large, narrow fish with eyes that project downward. Coloration of the body is dark gray, fading to white toward the underside, and with dark blotches on the sides. Its head has no scales, a large mouth with no teeth, and a protruding lower jaw. Its eyes are located far forward and low on its head. It is very similar to the silver carp, and can be distinguished by the dark coloration on its sides. The bighead carp can be identified by a smooth keel between the anal and pelvic fins that does not extend anterior of the base of the pelvic fins.

Habitat and Habit: Bighead carp is a eurythermic fish, being able to tolerate water temperatures of 0.5-38 °C. It is a native freshwater fish. Bighead carp normally dwell in the upper layer of the water column and prefers high fertility water with abundant

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natural food.



Fig 4.6

Cyprinus carpio

Taxonomic position:

Phylum: Chordata

Class: Actinopterygii

Order: Cypriniformes

Family: Cyprinidae

Genus: Cyprinus

Species: Cyprinus carpio

Local name: Gulfam

Fin Formula: D. 3/17; P. 15; V. 9; A. 3/5; C. 19; L. L. 36-38

Morphology: Body elongated and head comparatively small. Dorsal of the body is very convex and abdomen is bulky. Body is compressed and snout rounded. Whole body covered with moderate size scales. Abdomen rounded. Dorsal side the fish is brownish.

Habitat: Rivers, lakes, dams, canals, ponds (Cultured in suitable waters of Pakistan and all over the world). Breeding time: Usually breed in rainy season (Talwar & jhingran, 2001)

Distribution: KP, Punjab, Baluchistan, Sindh, Azad Kashmir. It is an exotic fish cultured throughout the world in warm waters.



Fig 4.7

Cirrhinus cirrhosus

Taxonomy position:

Phylum: Chordata

Class: Actinopterygii

Order: Cypriniformes

Family: Cyprinidae

Genus: Cirrhinus

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Specie: *C. cirrhosus*

Local name: Mori Fin formula: D. 16 (3/13); P1. 17; P2. 9 (1/8); A. 8(3/5). (Rahman, 2005)

Morphology: According to Rahman (1989), dorsal profile is more convex than that of abdomen. Snout obtusely rounded, covering upper lip and provide with prose. Upper lip is entire, not continuous with lower lip. Eye situated nearer to the end of the snout than the hind edge of operculum. Two pairs of nostrils present at anterior superior angle of orbits. A pair of rostral barbels present. Gill openings wide; gill rakers arranged at short intervals, caudal peduncle short, lateral line compete, scales hexagonal. Distance between pelvic and anal large, caudal deeply forked. Maximum length is 60 cm (Hamilton, 1822). Longest specimen in collection from the field is 35 cm.

Habit and Habitat: It is a bottom feeder and it feeds on vegetables and small animals. The stomach contents include algae 20%, bits of higher plants 30%, protozoa 15%, crustacea 25%, mud and sands 10% (Bhuiyan, 1964). It usually does not take worms, insects, mollusks and fishes. River, rivulets, tanks and ponds are its main habitats.



Fig 4.8

Puntius ticto

Systematic Account

Phylum: Chordata

Class: Actinopterygii

Order: Cypriniformes

Family: Cyprinidae

Genus: Puntius

Species: *P. ticto*

Fin Formula: D.3/8-9; P.15; V.1/8; A.3/5; C.19; L. L. 23-26

General Characters Morphology Mouth is small and its position is terminal. Barbels are absent, color is silvery. Two Black spots found on the lateral line. Depth of body less than one-third of the standard length

Color: Body silvery with grey dorsal. Body with two lateral spots. First on 3-4 scale and second on 18-19

Habitat: found in rivers, streams, pools and ponds. Food and feeding: Surface feeder and feed on Diatom, algae, Crustaceans, Rotifer, insects etc. Size: 10 cm TL

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Distribution: KP, Punjab, Sindh, Azad Kashmir, Bangladesh, India, Nepal, Myanmar.

Ecological role: Harmless, reduce water pollution.



Fig 4.9

Ctenopharyngodon idella

Taxonomic position:

Phylum: Chordata

Class: Actinopterygii

Order: Cypriniformes

Family: Cyprinidae

Genus: Ctenopharyngodon

Species: C. idellus

Local name: Grass carp, Grass cup.

Fin formula: D. 3/7, P1. 1/17, P2. 1/8, A. 3/7-8 (Bhuiyan, 1964)

Morphological description: Elongated body is compressed in posterior part. Head is depressed and flattened. Mouth is terminal and lips are thin. The upper jaw is slightly longer than the lower jaw. Eyes are large and lateral in position. Barbells are absent. Dorsal fin is inserted slightly ahead of pelvis. Anal fin is short caudal fin is found. Scales are cycloid (Talwar and Jhingran, 2001). Color in life, dark gray above, silvery on flanks and belly, base of each scale dark brown. Fins are dark. Scales number on the lateral line is 40 to 45. Scales number is mentioned by Talwar and Jhingran (2001) as 40-42 scales on the lateral line series.

Habit and habitat: These are a middle dweller and extremely herbivorous fish. Ponds, rivers, lakes, canals, beels, boars etc. both open and closed water bodies.

Breeding time: Usually breeds in rainy season. This exotic carp species is now well known in Bangladesh. Seeds can be produced by induced breeding technique. Now found all over Bangladesh especially all culture ponds and boars (Rahman, 2005)

Discussion

The term "biological diversity" or "biodiversity" refers to the variety of living things found in all habitats, including terrestrial, marine, and other aquatic ecosystems as well as the ecological communities to which they belong. This diversity includes that found within and between species as well as among ecosystems. The variety of fish species is nearly comparable between freshwater and marine (oceanic) habitats. Five interrelated

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categories overexploitation, water pollution, flow alteration, habitat destruction or degradation, and invasion by exotic species can be used to classify the threats to freshwater biodiversity worldwide. The biodiversity of species is seriously threatened by human activity and environmental change. Ecological, economic, and cultural values may all be lost if fish biodiversity is lost. Because they store a significant portion of an ecosystem's nutrients in their tissues, transport nutrients farther than other aquatic animals, and excrete nutrients in dissolved forms that are easily accessible to primary producers who play roles in nutrient recycling, fish play an important role in nutrient cycles. In the course of our investigation, a total of seven species from seven genera in the same family, same order, and same class were collected. Those seven species names were *L. rohita*, *H. molitrix*, *C. cirrhosus*, *H. nobilis*, *P. ticto*, *C. carpio* and *C. idella*. Hameed et al., (2015) also worked on ichthyofaunal diversity of sarki lawagahr dam, district karak and collected 4 species belonging to family Cyprinidae i.e., *L. rohita*, *H. molitrix*, *C. mrigala*, *T. khudree*, five species which are missed by Hameed et al., (2015) collection and are reported in our present survey are, *C. cirrhosus*, *H. nobilis*, *P. ticto*, *C. carpio* and *C. idella*. Another eminent work was done by Hasan et al., (2015) on Sarki lawagahr dam district Karak, who reported 10 species of fishes. Out of which 8 were Cyprinid species i.e., *B. vagra*, *B. pakistanicus*, *P. sophore*, *P. ticto*, *C. diplocheilus*, *C. watsoni*, *L. rohita*, *C. carpio*, and two species i.e., *O. pabda*, *M. armatus* from family Siluridae. Similarly, Junaid et al., (2017) worked on the fish fauna of Khaisari dam (Ghundi Shahbaz Khan) district Karak, Khyber pakhtunkhwa and described four species i.e., *H. molitrix*, *L. rohita*, *C. cirrhosus* and *C. carpio*. All the species were belonging to family Cyprinidae. Yousaf et al., (2016) also worked on the ichthyofaunal diversity of Chambai dam Karak and studied three species viz *L. rohita*, *H. molitrix* and *C. catla* 30 belonging to family Cyprinidae. Kalim et al., (2022) collected seven species i.e., *L. rohita*, *C. catla*, *C. auratus*, *C. mrigala*, *H. molitrix*, *C. carpio* and *T. khudree* from Urbashi dam district Karak, province KPK, which were belonging to family Cyprinidae. Junaid et al., (2016) described the fish fauna of Muhabbat Khel dam (Lake Kana) district Karak and collected four species belonging to family Cyprinidae. The species which were collected in this survey were *L. rohita*, *H. molitrix*, *C. carpio* and *C. cirrhosus*. Zaryab et al., (2017) studied the fish fauna of Dandi Idhar Khel Lake of district Karak and collected seven fish species, out of which five were from family Cyprinidae while the remaining two species belonged from family Anguillidae and Siluridae. The five Cyprinids fish species were *A. morar*, *C. mrigala*, *C. idella*, *L. rohita*, and *C. catla*. And family Anguillidae and Siluridae was represented by *A. Anguilla* and *O. pabda* respectively. Similarly Khan & Hassan (2011) worked on the fish fauna of Changhoz dam, district Kohat and collected 7 species belonging to 2 orders, 2 families and 5 genera viz, *B. vagra*, *B. pakistanicus*, *C. latius*, *L. rohita*, *C. carpio*, *H. molitrix* and *M. armatus*. They found that the Cyprinidae family is most abundant family in this area and we revealed the most abundant family is Cyprinidae too. Zubia et al., (2015) investigated the fish fauna of Damai stream Tehsil domail, Bannu district and reported 5 species belonging to 2 orders, 2 families and 4 genera, in which three species were belonging to family Cyprinidae, i.e., *B. vagra*, *L. rohita*, and *P. sarana*, while the remaining two species including *O. aureus* and *O. niloticus* were belonging to family Cichlidae respectively. Our result was also in

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agreement with several authors (Hameed et al., 2015; Hasan et al., 2014; Khan, Zubia et al., 2015& Hassan 2011) who also reported Cyprinidae as the richest family represented by great number of species found in freshwater reservoirs of various districts in Khyber pakhtunkhwa, Pakistan. During the present study, all the species we found were belonged to family Cyprinidae. The richness of family Cyprinidae is due to their best adaptation in both fresh and as well as saline aquatic environment. Some species which are not found in Sarki Lawagahr dam and potentially can be introduced and cultured in it are, *Cirrhinus mrigala*, *Tilapia*, *Channa punctatus* and *Carassius auratus* because of their occurrence in other nearby dams of district Karak. In the last four decades Pakistan has introduced several alien exotic fish species e.g. grass carp (*C. idella*), bighead carp (*H. nobilis*), silver carp (*H. molitrix*), common 31 carp (*C. carpio*), gold fish (*C. auratus*), three species of tilapia (*O. aureus*, *O. mossambicus*, *O. niloticus*) in warm waters, while two trout species i.e., the rainbow trout (*O. mykiss*) and the brown trout (*S. fario*) in colder regions (Khan et al., 2011). Our present collection from Sarki Lawagahr dam district Karak also contain some of these exotic species namely *C. idella*, *H. molitrix*, *H. nobilis*, *C. carpio*.

5. Conclusion

The result of the present study reveals that the aquatic environment of Sarki Lawagahr dam is highly suitable for Cyprinidae as we found all the species during our study were belonged to family Cyprinidae. Fish culture could easily be managed and transported in this destitute area for enhancing trade and industry which may in turn improve the earnings and life quality of the people of this area. And our present study will provide useful information about the diversity of fish fauna of Sarki Lawagahr dam district karak and it will be later important in taxonomic, fisheries management and conservation.

Recommendation

It has been found that a considerable number of fingerlings, fry, and even adult fish are washed away by overflowing water during the rainy season. Similar to this, merciless, illegal fishing has grown to be a serious threat to the reservoir's fish population. The government should provide appropriate management procedures for the reservoir's fisheries the attention they deserve. To increase the fish productivity in the area, fingerlings of culturable fish species should be introduced into the reservoir. With these management techniques, which include stocking and reducing overfishing, this dam might represent a significant source of food, especially in terms of protein, and provide income for the government.

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