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Freshwater Fish Fauna in Different Water Bodies of District Tank, Khyber Pakhtunkhwa

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MR, KK, and SA conducted the field survey, preserved and identified. MR prepared the research article. MSA and MS supervised the research work and provided all the facilitations. MS and AM drafted and finalized the manuscript, and TF and AF assisted in field visits and technical support.

Key words
Freshwater, Diversity, Lowland streams, Water bodies, Tank, Ichthyofauna, Upland streams

ABSTRACT

This study focused on the diversity and insightful analysis of fish fauna in various water bodies in the Tank district, KPK province. The study was conducted from December 2023 to June 2024 at 11 study sites with five water body types. The water bodies were rivers, ditches, lowland streams, upland streams, and wetland ponds. The fish was collected using cast nets, drag nets and hand-picking. The study documented 20 fish species distributed over 16 genera and six families. The results highlight the abundance of fish in wetland ponds and rivers, which are essential for ecosystem health and local fisheries. They reflect the ecological roles of these habitats in supporting fish populations. The findings of this research can help enhance local management policies to conserve fish diversity in KPK province and expand the current knowledge of Pakistan's ichthyofauna, which could be used to prepare a species atlas.

INTRODUCTION

Rivers, streams, estuaries, wetland ponds, and lakes are abundant in Pakistan (Javed and Abbas, 2018). It constitutes a transitional zone attributed to the significantinfluence and variation in fish fauna (Dudgeon *et al*., 2006). Pakistan has 9.7% wetland area out of nearly 26% coastal and 74% freshwater wetlands (Altaf *et al*., 2014). It provides habitat to diverse fauna and flora of the freshwater ecosystem. Over the years, fish diversity has declined, and even a few species have been lost; some are endangered and threatened by the freshwater ecosystems of India and Pakistan (Prakash, 2020).

Data on the checklist and the diversity of fish fauna across the country are available. In Pakistan, the earliest work on the fish fauna was done by Ahmad (1963), who described the fauna of West Pakistan. In Khyber Pakhtunkhwa (KPK), Butt (1986) reported 94 species of fish from the whole province of KPK. Hussain and Shah (1960) identified six species from the river Swat. Nisar (1998) reported 23 species of the fish from Tanda Dam, Kohat. Shahjehan and Khan (2000) reported 26 fishes belonging to 8 families from Baran Dam, Bannu. Jan *et al*. (2025) studied the rainbow trout breeding success and fecundity in Jaghour trout hatchery, Chitral. Many ichthyologists have documented the fish diversity of the river Indus (Hussain *et al*., 2016) and its tributaries (Khan *et al*., 2011). Knowing species spatial distribution and area diversity is essential for future sustainability and conservation. Therefore, the proposed research was conducted for the first time in different water bodies in the district of Tank, Khyber Pakhtunkhwa. The findings of this research can help local management policies to conserve fish diversity and enhance existing knowledge of the country's ichthyofauna.

MATERIALS AND METHODS

The study was conducted in the district of Tank, KP. The district has a total area of 1,679 km^2 and an altitude of 265m. It is a lowland area with mountains on

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the southern side. The monsoon rains averaged around 4.5 inches in July and August and almost zero in June or September (Shehzad *et al*., 2023). High temperatures are recorded in June and July (35-45°C). The coldest months are December, January, and February (5-8 °C) (Marwat *et al*., 2012; Saeed and Khan, 2014). It has a large number of wetlands. Most of the water comes from streams, and some from Gomal Zam Dam. The canal system also comes from the Gomal Zam Dam. The streams have shallow water, but certain places are benthic (Rehman *et al*., 2022).

A total of 11 study sites were sampled for species collection. All the study sites were in low-elevation areas (below 280 m). It included streams (lowland streams (two sites) and upland streams (one site)), rivers (two sites), ditches (three sites), and wetland ponds (three sites). Streams were wadeable water bodies with a width of not more than 10 m, rivers were not wadeable with a width of more than 10 m, and ditches were artificial, narrow channels dug. Spring-fed, floodplain ponds and cut-off channels were indicated as wetland ponds (Ishiyama *et al*., 2014).

Twenty-two field surveys were carried out from December 2023 to June 2024. The fish samples were collected using hand-picking, cast, and drag nets. Hand-picking, a method commonly used for capturing fish in shallow waters, involves four to ten people sitting in a way that makes it impossible for fish to escape. Slowly, the people move their hands in the water, and whenever fish touch their hands, they directly grip and capture them. This traditional method is deeply rooted in the local culture. Cast net and dragnet were used more than 15 times in each study site of both wadeable and non-wadeable water bodies.

After collections, all fishes were possibly identified at the species level and released directly, while some were collected for preservation. The collected samples were preserved in a 10% formalin solution and stored in an airtight jar. Small specimens (less than 10 cm) were preserved directly in a formalin solution, whereas larger specimens were preserved after the formalin was injected into the belly (Nwaigwe, 2017). The specimens were identified using the keys of Mirza and Sandu (2007) and Mirza and Sharif (1982). The geographical coordination of the study sites was also recorded using GPS (Offline maps, travel guides, and navigation). The conservation status of each species was determined from the IUCN Red List (www.iucnredlist.org).

RESULTS AND DISCUSSION

Twenty fish species distributed over six families were documented in different water bodies of the district Tank, KPK (Table I). The upland stream shows lower diversity range. Rivers (15 individuals) and wetland ponds have higher density of fish, followed by lowlands and ditches. Upland streams were the least abundant water bodies. They reflect the ecological roles of these habitats in supporting fish populations. For biodiversity conservation, rivers, lowland streams, and wetland ponds are emphasised as these habitats have abundant fish species. However, the overall diversity is relatively stable across different water bodies.

Salmophasia bacaila (Chela) was collected and observed from the lowland, upland streams, ditches, and rivers. It is abundantly present in the study area. It is a small indigenous freshwater cyprinid throughout the Indian subcontinent, including Bangladesh, India, Pakistan, Nepal, and Afghanistan (Froese *et al*., 2017). Saeed *et al*. (2013) reported this species from River Barandu District, Buner KPK. It is also reported from Jinnah Barrage at the Indus River (Kar *et al*., 2006). *Botia birdi* (Birdi loach) was collected from the lowland stream in the study area. It is mainly found in shallow water. Previously, it was recorded from the Indus River at Taunsa Barrage (Rafique, 2000), in River Ravi (Pervaiz *et al*., 2018) and in the Suleman mountain range, Dera Ghazi Khan Region (Mirza, 1989).

Ompok pabda (Pallu) was collected from benthic water. The species were observed from the study area's lowland, upland, and ditches. Previously, it was recorded in the Kabul River at Nowshera, KPK(Mirza, 1973). Tanda Dam of Kohat district (Shahjehan and Khan, 2000) and freshwater of District Malakand, KPK (Ali *et al*., 2020). *Cirrhinus reba* (reba) is found in deeper freshwater and is less common in the study area; it is only found in lowland streams and wetland ponds. These fish were previously reported from the Panjkora River, Sheringal, KPK by Muhammad *et al*. (2014). *Garra gotyla* (Pathar Chat) was observed in shallow freshwater, particularly in lowland, upland, and wetland ponds. Ishaq *et al*. (2014) collected this species from River Swat. It was also reported in the round stream and Konhaye stream, a Rivsser Panjkora tributary, in Lower Dir, KPK (Hasan *et al*., 2015) and reported this species from the water bodies of Hazara Division (Akhtar *et al*., 2014).

Mastacembelus armatus (Machimara) is distributed in lowland streams, ditches, and wetland ponds in the study area. It is a freshwater fish found in shallow streams and standing water. Previously, it was collected from the Rasul Barrage, Punjab (Akbar and Janjua, 2010) and Dera Ghazi Khan Region (Hussain *et al*., 2016), recorded in Chashma Barrage and the Indus River (Altaf *et al*., 2015; Muhammad *et al*., 2017). *Channa punctata* (Sole) is less abundant in the study area and found in lowland streams, ditches, and wetland ponds. It is mainly found in

Table I. Fish species and number documented from water-bodies in district Tank, Khyber Pakhtunkhwa.

S. No.	Species	Conservation status	Water bodies				
			Lowland stream	Upland stream	Rivers	Ditches	Wetland ponds
Order: Cypriniforms, Family: Cyprinidae							
1	*Garra gotyla*	LC	10	2	-	-	5
2	*Puntius chola*	LC	5	2	4	10	15
3	*Hypophthalmichthys molitrix*	NT	-	-	3	-	-
4	*Labeo bata*	LC	2	-	-	2	1
5	*Barilius vagra*	LC	6	5	10	-	15
6	*Puntius sophore*	LC	3	-	-	8	5
7	*Barilius pakistanicus*	NE	10	-	10	-	14
8	*Cirrhinus mrigala*	LC	-	-	2	-	-
9	*Salmophasia bacaila*	LC	8	4	-	5	15
10	*Tor putitora*	EN	-	-	15	-	-
11	*Cyprinus carpio*	VU	-	-	6	-	5
12	*Labeo rohita*	LC	5	4	8	10	8
Order: Cypriniformes Family: Botiidae							
13	*Botia birdi*	NE	5				
Order: Channiformes, Family: Channidae							
14	*Channa punctata*	LC	4	-		10	4
Order: Mastacembeliformes, Family: Mastacembelidae-							
15	*Mastacembelus armatus*	LC	4	1		3	2
Order: Siluriformes, Family: Bagridae							
16	*Cirrhinus reba*	LC	1	-	-	-	2
17	*Mystus bleekeri*	LC	3	-	-	2	-
18	*Mystus cavasius*	LC	2	-	-	-	-
Order: Siluriformes, Family: Siluridae							
19	*Ompok pabda*	NT	2	1	-	4	-
20	*Wallago attu*	NT	5	2	-	2	-

LC, least concern; NT, near threatened; NE, not evaluated; VU, vulnerable; EN, endangered.

fresh or stagnant water with significant vegetation. It was reported in the Barandu District Buner, KPK (Akhtar *et al*., 2015), River Swat (Hasan *et al*., 2013), Kabul River, Nowshera (Ahmad *et al*., 2015), and Lower Dir (Hasan *et al*., 2015). *Puntius chola* (Chola punti) was abundantly found in all water bodies in the study area. The species was previously recorded in District Malakand (Haseeb *et al*., 2016), the Indus River at Taunsa Barrage (Kar *et al*., 2006), the Downstream Indus River, Sindh (Mirza, 2003), and Southern Punjab (Muhammad *et al*., 2016). *Hypophthalmicthys molitrix* (Silver carp) was collected from rivers. It is found in both shallow and deeper water. Previously, it was reported in Gomal Zam Dam, South Waziristan agency (Hameed *et al*., 2015), Panjnad Canal, Abbasia Canal, and Abu Dhabi Canal at Panjnad Headworks Bahawalpur (Hasan *et al*., 2013), and River Kabul, Nowshera, KPK (Ahmad *et al*., 2015).

Barilius vagra (Pepal) is the most abundant fish species in the study area and is found in lowland streams, upland streams, ditches, and wetland ponds. It is found in shallow water. Mirza and Sandhu (2007) recorded this species from the River Ravi in Punjab. It was also reported from the Kabul River (Rafique, 2001), Rhound Stream District Lower Dir (Ullah, 2013), Hazara division of KPK (Akhtar *et al*., 2014) and River Swat (Saeed *et al*., 2013). *Labeo bata* (Bata/Rahu minnow/Seriyo) were collected in the benthic zone of lowland streams, ditches, and wetland ponds. Its number was less common. Mirza (2003) reported this species from the Downstream Indus River, Sindh. *Barilius pakistanicus* (Pakistani Chalwa) is abundant in

the study area and found in lowland streams, rivers, and wetland ponds. It was found in shallow water, especially in slow-moving water. Previously, it was reported from Panjkora River, Sheringal (Ishaq *et al*., 2014), River Swat (Hasan *et al*., 2013), and River Kabul (Naz and Zaidi, 2012). *Puntius sophore* (Pothi) was recorded from the lowland stream, ditches, and wetland ponds in the district Tank. It was also recorded from Lower Dir KPK (Ullah, 2013), Hazara Division (Akhtar *et al*., 2014) and river Kabul (Burton *et al*., 1992).

Cirrhinus mrigala (Mori) was observed and collected from the river water across the study area. Previously, it was reported from Bahawalpur (Hasan *et al*., 2013) and Tanda Dam of Kohat district (Sarkar *et al*., 2012). *Labeo rohita* (Rohu) was collected from all five types of water bodies. Altaf *et al*. (2015) recorded *Labeo rohita* from the Chashma Barrage. Sheikh *et al*. (2017) and Rehman *et al*. (2016) also recorded in Bahawalpur and Dargai Pal Dam South Waziristan Agency. *Tor putitora* (Masheer) was rare in the study area and only in the river water body type. It was observed in benthic water. Hameed *et al*. (2016) reported this species from Gomal Zam dam, South Waziristan Agency, Usman *et al*. (2018) from River Harrow Hazara Division; and Ullah and Hasan (2013) from water bodies of Panjkora at District Dir Upper. *Mystus bleekeri* (Bleeker's fish) were collected from deeper water and were less common in the study area, only found in lowland streams and ditches. It was previously recorded from the river Kabul at Nowshera (Khattak *et al*., 2015), Dera Ghazi Khan Canal (Rasheed *et al*., 2022), Indus River at Taunsa Barrage (Muhammad *et al*., 2017), and the River Jhelum, Pakistan (Mirza *et al*., 2011). *Mystus cavasius* (Seengara) were documented only in lowland water canals and were less common. Muhammad *et al*. (2017) reported the fish from the Indus River at Taunsa Barrage in Punjab, also documented from the river Chenab (Altaf *et al*., 2015) and water bodies of Suleman mountain range (Ali *et al*., 2010). *Wallago attu* (Mallay) was collected from deeper water of lowland streams and ditches. It was recorded from the Panjnad Headworks in Bahawalpur (Naz *et al*., 2023), the river Jhelum (Mirza *et al*., 2011), head of Qadirabad (Altaf *et al*., 2011), the lower reach of the Indus River, Sindh province Section (Abro *et al*., 2020), and the Rasul Barrage, Punjab, Pakistan (Muhammad *et al*., 2019). *Cyprinus carpio* (Gulfam/common carp) was documented in deeper water and not abundantly present, only found in river and wetland ponds. Previously, it was recorded in Chashma Barrage by Ashraf *et al*. (2022), in Southern Punjab by Bibi *et al*. (2018), in Rasul Barrage, Punjab by Muhammad *et al*. (2019), and in River Panjkora Dir by Haseeb and Yousafzai (2023).

DECLARATIONS

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Generative AI and AI-assisted technology statement

The authors have declared that no generative AI or AI-assisted technologies were used to create this manuscript.

Statement of conflict of interest

The authors have declared no conflict of interest.

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