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Ichthyofaunal diversity and physiochemical parameters of Gandiali Dam Kohat, Khyber Pakhtunkhwa, Pakistan

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Abstract
Our research focuses on the biodiversity of fishes in the Gandiali Dam in the district of Kohat. With the assistance of local fishermen, all 20 fish specimens were taken from Gandiali Dam in the district of Kohat, Khyber Pakhtunkhwa. From February to August 2022, he used various nets, including hand nets, cast nets, and hooks. Small live fishes (up to 15 centimetres) have been transferred directly to formalin and died at the scene (mix of 1 part formalin and 9x water or 10 milliliter formalin and 90 milliliter water), while big live fishes have been transferred to the solution that died instantly (mix of 1 part formalin and 9x water or 10 milliliter formalin and 90 milliliter water), After a few minutes, the deaths happened in this solution, and at the time of death, all of the fins expanded, allowing the number of fin rays, etc., to be counted, making verification of many species simple. A thin incision is made on the abdomen to preserve large specimens (15 to about 30 cm or above), and concentrated formalin was infused at many body regions along the abdominal region. Thus every fish sample was then identified to the species level. The species were identified based on their primary colours, particular spots or signs on the body surface, body shape, structure of various fins, and so on. A total of 7 species were reported during the sampling period, which belonged to two orders (Cypriniformes and Channiformes), two families (Cyprinidae and Channidae) and seven genuera. Family Cyprinidae is the most richest family having 6 species (19 samples) viz Cyprinus carpio, Labeo rohita, Ctenopharyngodon idella, Hypophathalmichthys molitrix, Carassius auratus and Puntius ticto. Family Channidae was represented by Channa punctatus (1 sample). During the sampling period, most abundant specie reported was Cyprinus carpio (08 samples) followed by Labeo rohita. The present study concludes with a note that the water bodies of Gandiali dam District Kohat, Khyber Pakhtunkhwa are home to rich and diverse fauna of cyprinids, and cyprinids have successfully adapted themselves to the haline water of the area. Further studies are required to evaluate the mechanism which enables those freshwater fishes survive and thrive in such extreme haline environment.

Keywords: Icthyo fauna, diversity, gandiali, dam and kohat

1. Introduction
Fishes are a cooled-blooded, water dwelling vertebrate with fin-like appendages, gills as primary respiratory organs, and a scale-covered body. (Berra 2001) [4]. Fishes have been around for 438 million years, according to fossil records. These are considered as earliest animals to have a backbone. Ichthyes are endothermic with a skull, gills, and fins that lives primarily in water. The term "endothermic" refers to an animal's internal temperature changing in response to its surroundings. (Allen, Cech *et al*. 2009) [3].

Fishes fauna show heterogeneous variation from one species to another (Shinde, Pathan, Bhandare & Sonawane, 2009). Biodiversity is critical for balancing ecosystems and dealing with a variety of environmental problems. Globally, unwise anthropogenic activities are wreaking havoc on nature and animal diversity. The environment of water is harmed as a result of waste release. Many people make significant contributions to the field of Ichthyology. In terms of economic importance, the coverage by ichthyofauna and ichthyo-farming and in Maharashtra considered for particular interest. The current review focuses on the aquatic species identified as well as affirmed by multiple researchers, they have discovered 165 described species belong to 09 various orders, of 26 families, and 84 different genera in Maharashtra from 2000 upto 2014, hence it is valuable for fishers, users, fish farm producers, as well as those who are researchers. (Ravindra, Patel Nisar, & Patel Yusuf, 2014) [6]. Clean water in rivers and lakes accounts for <0.01 % of total water occurring on the surface of Earth, but it is home to 42% of all fishes.

The remaining 58% are dwellers of oceans, which constitutes 97% of the world's water. (The remaining 2.99% of water are present in the form of snow, the soil, and the atmosphere.) The majority of open sea fishes live in equatorial as well as hot land areas, like, in water that is 50°F (10°C) or warmer. (Allen, 2005) [2].

Over 22,000 fish species have been identified worldwide, with 41 percent being freshwater species, 58 percent being marine and brackish water, and 1 percent being diadromous species. (Helfrich & Neves, 2009) [10]. As a result, studying fish diversity is critical in order to understand all of the variables that influence the composition of the fish community. (Belliard & Boet, 1997; Galacatos, Barriga-Salazar & Stewart, 2004) [7].

Its subsidiary and pattern of fish species in each habitat are closely linked to a variety of components of food availability, reproduction zones, water current, depth, habitat geography, and the physiochemical characteristics of the water in which they live (Harris,. 1995) [9]. About 20% of the world's fresh-water fish facing the situation of endangered one (Postel, 2002) [14]. Habitat variation, such as Dam construction, water contamination, over hunting of fishes, as well as introducing competing species, endangers fish populations. Most of the people are working to conserve habitats and create change to mitigate overfishing and pollution. (Allen, 2005) [2].

Pollution is a worldwide problem, and while some developed countries have made efforts to minimize water contamination from household and commercial point source pollution, risks from high nutrient enrichment remain (Smith, 2003) [15] as well as other chemical compounds, such as environmental toxins, are also becoming more common. (Colburn, Dumanoski & Myers, 1996) [5].

2. Materials and methods

2.1. Study Area

Gandiali Bala located in the district Kohat, KPK a province of Pakistan. Its geographical location on Earth North to the city Kohat the dam of Gandiali is situated in town. Coordinates: 33°32′N 71°37′E. Kohat district is situated in the south of Peshawar District while it is north to the districts Karak and Bannu. From capital of Peshawar it lies the far of 72 km. Gandiali includes in mini-dam located on North East of district Kohat, Pakistan. This dam was built in Kohat for storing of natural water of rain that can be used for various intention like domestic usage, drinking, as well as in agriculture.

2.2. Sample collection

All 20 Fish specimen were obtained from Gandiali dam of district Kohat Khyber Pakhtunkhwa by the use of various catching nets namely cast net, hand net, and hooks with the help of local fishermen.

2.3. Sample Preservation and identification

All of the 20 fish specimens were taken from Gandiali Dam in the district of Kohat, Khyber Pakhtunkhwa. From February to August 2022, he used various nets, including hand nets, cast nets, and hooks. Small live fishes (up to 15 centimetres) have been transferred directly to formalin and died at the scene (mix of 1 part formalin and 9x water or 10 milliliter formalin and 90 millilitre water), while big live fishes have been transferred to the solution that died instantly (mix of 1 part formalin and 9x water or 10 milliliter formalin and 90 milliliter water), After a few minutes, the deaths happened in this solution, and at the time of death, all of the fins expanded, allowing the number of fin rays, etc., making it easy for verification of various species. For preservation of large sized (from 15 to about 30 cm and above) specimen a thin cut done on the abdominal wall, concentrated formalin was also injected at several points along the abdominal region. Thus every fish sample was then identified to the species level. The species were identified based on their specific color, marks on the body surface, body shape, structure of various fins, and so on. A magnification glass, forceps, as well as steel ruler were among the tools used in the laboratory to identify fish.

Fishes were identified using fish identity keys.

1. Talwar, and Jhingran K.C. 1991 [16]. *Inland fishes of India and adjacent countries* (vol-I and vol-II)
2. *A contribution to the fishes of Punjab*.Polymer Publishers (Khan, Shakir *et al*. 2008) [11].
3. Jayram, K.C.1999. *The fresh water fishes of Indian region.*
4. Mirza, M.R.1990. *Fresh water fishes in Pakistan*.Urdu Science Board Lahore.

Results

The main of research study is to access fish fauna dwelling in Gandiali dam, Kohat, Khyber Pakhtunkhwa. From January to May 2021, several specimens were captured by the assess of local fisherman. Several specimens were collected, identified and preserved. Analysis and identification of the collected samples revealed a total of 7 species. Species belonged to two orders Cypriniformes and Channiformes, two families Cyprinidae and Channidae and seven Genera. Family Cyprinidae is the most prominent family having 6 species (19 samples) viz *C. carpio, L. rohita, C. idella, H. molitrix, C. auratus* and *P. ticto*. Family Channidae was represented by only one specie (1 sample) i.e.,*C. punctatus*. During the sampling period, most abundant specimen collected belonged to *C. carpio* (08 samples) followed by *L. rohita* (3 samples). From the study, it can be concluded that, water bodies of District Kohat are blessed with rich and diverse fish fauna of cyprinids. Few species reported in the study are because of the lack of adaptability of fishes to the highly concentrated haline water of district Kohat, KPK, Pakistan. Further studies are required to evaluate the mechanism which enables those freshwater fishes reported here to live in such saline environment.

Table 1: Fish Species collected at Gandiali dam, Kohat, Khyber Pakhtunkhwa

S/N	FISH Name	Phylum	Class	Order	Family	Genus	Species
01	Channa punctate	Chordata	Teleostei	Perciformes	Channidae	Channa Scopoli	Channa punctatus
02	Labeo rohita	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Labeo	Labeo rohita
03	Cyprinus carpio	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Cyprins	Cyprinus carpio
04	Puntius ticto	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Puntius	P.ticto.P
05	Hypophthalmichthys molitrix	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Hypophthalmichthys	Hypophthalmichthys molitrix
06	Ctenopharyngodon idella	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Ctenopharyngodon	Ctenopharyngodon idella
07	Carrassius auratus	Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Carassius	Carassius auratus

Discussion

Biological diversity, also known as biodiversity, refers to the variability of organisms from all sources, including terrestrial, marine, and other aquatic ecosystems, as well as the functioning of ecosystems of which they are a part; this includes diversity within species, diversity between species, and diversity of ecosystems. The diversity of fish species is nearly equally divided with both marine and freshwater habitats. Overexploitation, water contamination, flow modification, habitat destruction or degradation, and exotic species invasion are the five interconnected risks to global freshwater biodiversity. Anthropogenic impacts and environmental changes pose significant threats to the biodiversity of species. The loss of fish biodiversity may result in the loss of ecological, economic, and cultural values. Fish are important players in cycling of nutrients since they store a large fraction of ecosystem nutrient content in their body tissue, transport nutrients farther than other aquatic animals, and excretory nutrients in solubilized configurations that are easily accessible to primary producers who play important roles in nutrient recycling.

In our study, a total of seven species were captured belonging to seven genera and two families. Family Cyprinidae was the most abundant family with 6 reported species viz *H. molitrix*, *L. rohita*, *C. auratus*, *C. carpio*, *P. ticto* and *C. idella* and family Channidae by a single spp i.e., *C. punctata*. Hameed *et al* (2015) [8] also work on fish diversity of the Gandiali dam. They reported six species viz *C. mrigala*, *L. rohita*, *H. molitrix*, *C. auratus*, *C. catla* and *C. idella*, respectively. All collected species belonged to family Cyprinidae. Another eminent work on the dam of Gandiali, located in district Kohat carried out by Ilyas (2004) who investigated about 10 species of cyprinid namely *C. carpio*, *B. vagra*, *L. rohita*, *C. auratus*, *C. catla*, *C. mrigala*, *C. idella*, *P. ticto*, *P. sophore*, *H. molitrix*, respectively. Six species reported in our study are in common with those results.

Similarly, Khan & Hasan (2011) [12] undergone their research on fishes variation of Changhoz dam, district Kohat and they collected seven 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*. In our research study we find that Cyprinid fishes were the most common and abundant group of fishes found in this area. *C. carpio*, *H. molitrix* were reported in our study too and Cyprinidae family again was the most abundant. Hameed *et al* (2015) [8] collected 4 fishes species belonging to family Cyprinidae i.e., *L. rohita*, *C. mrigala*, *H. molitrix*, *T. khudree* from Sarki Lawaghar dam, district Karak. Two species were common with our findings. Zubia *et al* (2015) investigated the Fish fauna Damai stream Tehsil Domel, Bannu district and reported five speciesbelonging to two orders, two families and four genera. Among them, three species i.e.,*B. vagra*, *L. rohita* and *P. sarana* were belonging to family Cyprinidae, while the remaining two species including *O. aureus* and *O. niloticus* were belonging tofamily Cichlidae respectively.

Our result made the similar agreement with several authors (Hameed *et al* 2015; Hasan *et al*. 2014; Khan, Zubia *et al* 2015 & Hasan 2011) [8] who investigated family Cyprinidae as the abundant family having a huge variety of species inhabiting freshwater reservoirs of many districts in Khyber paktunkhwa, Pakistan. The richness of family Cyprinidae is due to their best adaptation in both fresh as well as saline aquatic environments. While Channa punctatus was reported the rare one due to their inability to adopt properly with both fresh as well as saline aquatic environments

In Pakistan, about thirty economically important commercial fish species have been recorded and among them, three species like *L. rohita*, *C. mrigala* and *Carassiusauratus* were reported from Gandiali dam in our study In the last four decades, Pakistan has innovated several alienexotic fish species e.g. grass carp (*C. idella*), bighead carp (*Hypophthalmichthysnobilis*), common carp (*C. carpio*), silver carp (*H. molitrix*), gold fish(*C. auratus*), 3species belongs to tilapia (*O. mossambicus*, *O. aureus*,*O. niloticus*) in warm waters, while two trout species i.e., the rainbow trout (*Oncorhynchus mykiss*) and the brown trout (*Salmo trutta fario*) in colder regions (Khan *et al*., 2011) [12]. Our present collection from Gandiali dam also contains some of these exotic species namely *H. molitrix*, *C. idella* and *C. auratus*.

Conclusion

The results of the current study reveals that individuals of the family Cyprinidae are found to be richest in Gandiali dam of district Kohat, KP, Pakistan, which shows that ecosystems functioning in the area of Gandiali dam are more appropriate for the growing of cyprinid species. Therefore present study will provides more useful information's to the fisheries managers and fish culturists for promoting the carp culture, conservation and management of the diversity of many carp species found in Gandiali dam.

References

1. Allan JD, Flecker AS. *Biodiversity conservation in running waters. BioScience*. 1993;43:32-43.
2. Allen CJ. *Grzimek's., Student Animal Life Resource, Fishes*. Thomson Gale. Library of Congress Cataloging-in-Publication Data, 2005.
3. Allen PJ, Cech JJ, *et al*. Mechanisms of seawater acclimation in a primitive, anadromous fish, the green sturgeon. Journal of Comparative Physiology 2009;B179(7):903-920.
4. Berra TM. *Freshwater fish distribution*, San Diego, CA: Academic Press, 2001.
5. Colburn T, Dumanoski D, Myers JP. *Our Stolen Future.* Dutton, New York, U.S.A, 1996.
6. Ravindra PH, Patel Nisar G, Patel Yusuf E. Review on fresh water fish diversity of Maharashtra (India). Journal of Entomology and Zoology Studies. 2014;2(5):358-364.
7. Belliard J, Boet P. Regional and longitudinal patterns of fish community structure in the Seine River basin, France. *Environ. Boil. Fishes*. 1997;50(2):133-147
8. Hameed Urrehman, Masood Z, Mengal M, Durrani S, Ilyas M, Razzaq W, *et al*. Assessment study on the diversty of cyprinid species found in Gandiali dam of Kohat District, Khyber Pakhtunkhwak, Pakistanm 2015.
9. Harris JH. The use of fish in ecological Assessments. Aust. J. Ecol. 1995;20:65-80.
10. Helfrich LA, Neves RJ. *Sustaining America's Aquatic Biodiversity Freshwater Fish Biodiversity and Conservation*. Virginia cooperative extension, publication, 2009, pp: 420-525.

11. Khan A, Shakir H, *et al*. "Ichthyofaunal survey of some freshwater reservoirs in Punjab." Journal of Animal and Plant Sciences. 2008;18(4):155-157.
12. Khan MA, Hasan Z. A preliminary survey of Fish fauna of Changhoz Dam, Kohat, Khyber pakhtunkhwa, Pakistan. *World Journal of Fish and marine sciences*. 2011;*3*(5):376-378.
13. Mirza MR. Freshwater fishes and zoogeography of Pakistan. *Bijdragen tot de Dierknnde*. 1975;45(2):143-180.
14. Postel S. Rivers of life: the challenge of restoring health to freshwater ecosystems. *Water Science and Technology*. 2002;45(11):3-8.
15. Smith VH. Eutrophication of freshwater and coastal marine ecosystems – a global problem. *Environmental Science and Pollution Research*. 2003;10:126-139.
16. Talwar PK, Jhingran AG. Inland fisheries of India and adjacent countries. 1991;I-II:1-1158.