

ECOLOGY AND DIVERSITY OF FRESHWATER FISHES OF HEAD QADIRABAD, GUJRANWALA

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Abstract: During the survey of Head Qadirabad, situated at river Chenab, 33 fish species were observed. The data was collected from December 2005 to November 2006. Shannon-Weiner Diversity Index (H') of freshwater fish was observed in Head Qadirabad (3.106). The highest (0.221) relative abundance was recorded for *Oreochromis niloticus*. Various types of threats to fish and its ecology were observed during the sampling.

Keywords: Chenab, freshwater, fish diversity, ecology, threats

INTRODUCTION

River Chenab is an important agro-forest land and wetland. A great variety of fishes, migratory and resident bird's as well as amphibians, reptiles and mammals were found in this area. One of the best known functions of wetlands was to provide a habitat for wildlife and fishes. Humans are known to have the link between fishes and wetlands for thousands of years. Unsustainable use of underground water and in the catchment areas have contributed to the decline of quality and quantity of wetlands. Hence, it was imperative to focus on the preservation, conservation and restoration of these endangered habitats to achieve ecological sustainability.

Number of studies has been carried out on the fish fauna of different water bodies situated in all the provinces of Pakistan (Khan, 1946; Ahmad, 1963a,b,c; Ahmed and Khan, 1974; Mirza, 1990; Akhtar, 1991;

Akhtar, 1992; Mirza, 1993; Mirza, 1994; George, 1995; Mirza, 2003; Mirza and Sharif, 2003), but the data on the fishes of Head Qadirabad is deficient.

Freshwater resources of Pakistan were dominated at the Indus River system, which drains into the Arabian Sea through the Indus delta. Indiscriminate and over-fishing has been a real threat to Pakistan's native fish fauna of commercial value. Pakistan's fisheries policy deals only with aquaculture, fishing licenses and auctions of fishing rights. Although the rules regarding the capturing of undersize fish for commercial purposes exists, however the implementation of these rules needs special attention. The conservation of indigenous fish and other animal species or habitats has not been an important issue in fisheries policies and laws of Pakistan. Important aquatic mammal like the threatened Indus dolphin has not been mentioned in the fisheries laws (Bashir, 1992).

MATERIALS AND METHODS

The data was collected from December 2005 to November 2006 from Head Qadirabad. Different types of nets including Drift nets and Wahera nets were used during present study for the fish collection. These nets were usually fixed by wooden poles or bamboos. Different mesh sizes were used in both streams as well as in stagnant water.

Study area

Head Qadirabad is situated at the river Chenab, about 80 km from Lahore and 45 km from Gujranwala city. Wetland area of Head Qadirabad consists of 2816 ha and situated upstream left at 32°20'06 N, 073°41'36 E, 206 M upstream right at 32°19'04 N, 073°41'36 E, 210 M, downstream left at 32°18'56 N, 073°41'16 E, 199 M and downstream right at 32°19'33 N, 073°40'57 E, 200 M. The main function of the Head Qadirabad is to regulate supply of river water and control of flood. Head Qadirabad is a complex of fresh water and terrestrial ecosystems because it had characteristics of both these types. The area had well diversified flora and fauna of aquatic and terrestrial ecosystem.

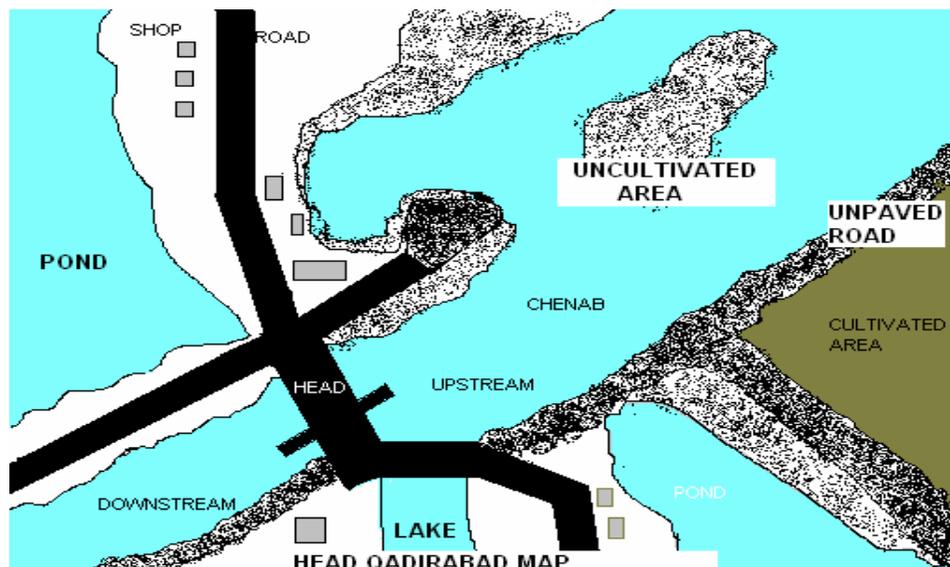


Figure 1. Map of Head Qadirabad, Gujranwala

Statistical Analysis

The diversity of the fresh water fish fauna was analyzed from the collected data. This index accounts for the abundance of the species in natural environment as shown by the equation below (Shannon and Weaver, 1963) and is used to assess the diversity. The higher value of index of diversity indicates the variability in the type of species and heterogeneity in the community whereas the lesser values points to the homogeneity in the community.

Shannon-Wiener Diversity Index was calculated in order to evaluate the fish species diversity in aquatic habitats under study. The presence of one individual of species was not necessarily indicative of the species being present in a large number. It was calculated based on the abundance of the species by the following formula:

$$H' = -[\sum P_1 \ln P_1]$$

Where, H' = diversity Index

P_1 = proportion of the species relative to the total number of species

$\ln P_1$ = natural logarithm of this proportion

By using all above equations and software results were compiled.

RESULTS AND DISCUSSION

During the survey 33 fish species were observed. In Head Qadirabad, during study period Shannon-Weiner Diversity Index (H') was 3.1059 in 2005.

$$H' = -[\sum P_i \ln P_i]$$

$$H' = 3.1059$$

The most abundant fishes of Head Qadirabad are presented in Table I.

In Pakistan, 104 freshwater fish species were recorded by Mirza and Sharif (2003). In 2004 this list was modified and 171 fish species were reported by Mirza (2004). During the study period, following threats were observed which may pose serious coercion to fish populations in the coming years.

Threats

1. Increase in toxic chemicals due to excessive loads of fertilizers and pesticides in agro-forest land.
2. Fish diseases due to decrease in water, and increasing concentration of waste material.
3. Excess fishing for marketing and export.
4. Non technical construction of fish-ladder which has hampered the migration of fish.
5. Stocking of genetically deteriorated fish seed in river by the concerned government authorities.

Table I: Fishes of Head Qadirabad in 2005.

Scientific name	Relative abundance
<i>Barilius bendelisis</i>	0.031
<i>Tor microlopsis</i>	0.035
<i>Channa punctata</i>	0.037
<i>Wallago attu</i>	0.037
<i>Rita rita</i>	0.039
<i>Bagarius bagarius</i>	0.043
<i>Mystus cavasius</i>	0.045
<i>Cirrhinus mrigala</i>	0.052
<i>Labeo rohita</i>	0.056
<i>Oreochromis niloticus</i>	0.221

Table II: Fishes of the head Qadirabad, River Chenab.

Common Name	Scientific Name	R.A	Pi lnPi
Grass Carp	<i>Ctenopharyngodon idella</i>	0.002066	-0.01277
Common Carp	<i>Cyprinus carpio</i>	0.004132	-0.02268
Silver Carp	<i>Hypophthalmichthys molitrix</i>	0.002066	-0.01277
Mori	<i>Cirrhinus mrigala</i>	0.051653	-0.15306
Reba Machhali	<i>Cirrhinus reba</i>	0.018595	-0.0741
Raho	<i>Labeo rohita</i>	0.055785	-0.16101
Kalbans	<i>Labeo calbasu</i>	0.016529	-0.06781
Dero Machhali	<i>Labeo dero</i>	0.020661	-0.08015
Thaila	<i>Gibelion catla</i>	0.014463	-0.06127
Dola	<i>Channa punctata</i>	0.03719	-0.12242
Soll	<i>Channa marulious</i>	0.012397	-0.05443
Tilapia	<i>Oreochromis niloticus</i>	0.221074	-0.33366
Khaga	<i>Rita rita</i>	0.039256	-0.1271
Foji Khaga	<i>Bagarius bagarius</i>	0.043388	-0.13613
Tangra Machhali	<i>Mystus cavasius</i>	0.045455	-0.1405
Baam Machhali	<i>Mastacembelus armatus</i>	0.014463	-0.06127
Sangari	<i>Sperata sarwari</i>	0.028926	-0.10248
Mali	<i>Wallago attu</i>	0.03719	-0.12242
Jhali	<i>Eutropiichthys vacha</i>	0.016529	-0.06781
Masheer	<i>Tor macrolapis</i>	0.035124	-0.11763
Bachhwa	<i>Clupisoma garua</i>	0.022727	-0.086
But Pari	<i>Notopterus notopterus</i>	0.020661	-0.08015
Patha Chalwa	<i>Barilius bendelisis</i>	0.030992	-0.10767
Sophore Popra	<i>Puntius sophore</i>	0.024793	-0.09167
Ticto Popra	<i>Puntius ticto</i>	0.022727	-0.086
Ranga Sheesha	<i>Parambassis ranga</i>	0.012397	-0.05443
Kirla Machhali	<i>Sisor raddophorus</i>	0.016529	-0.06781
Kaan Machhali	<i>Xenentodon cancila</i>	0.028926	-0.10248
Pather Chat	<i>Garra gotyla</i>	0.016529	-0.06781
Pali Roo Machhali	<i>Osteobrama cotio</i>	0.022727	-0.086
Choti Chal Machhali	<i>Salmostoma bacaila</i>	0.018595	-0.0741
Sangehi Machhali	<i>Heteropneustes fossilis</i>	0.028926	-0.10248
Gagata Cenia	<i>Gagata cenia</i>	0.016529	-0.06781
		1	-3.1059

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