DIVERSITY AND THREATS TO INDIAN AND CHINESE CARPS OF RIVER CHENAB IN PAKISTAN

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ABSTRACT: Fish fauna of Pakistan has been observed by large number of researcher at wide range; present data collected at specific two sites, Head Qadirabad and Head Khanki at River Chenab, and also observed the threats to Carps fish and its ecology in successive three years (2007-09). In this data observed that the population of carps was decreased gradually and also identified the threats to fish fauna of river Chenab. Shannon-Weiner Diversity Index (H’) of Carps fish in Head Qadirabad were observed 1.396 in 2007; 1.36 in 2008 and 1.136 in 2009, while Evenness (E) were 1.396 in 2007; 1.36 in 2008 and 1.136 in 2009 and Richness were 2.943 in 2007; 3.042 in 2008 and 3.188 in 2009 and Shannon–wiener diversity of Head Khanki were 1.328 in 2007; 1.123 in 2008 and 1.094 in 2009 while Evenness (E) were 0.741 in 2007; 0.63 in 2008 and 0.611 in 2009 and Richness were 2.8601 in 2007; 3.0244 in 2008 and 3.080 in 2009.

Key words: Carp River Chenab Diversity Threats.

INTRODUCTION

River Chenab was an important wetland, a large variety of fishes, migratory and resident birds’ fauna as well as reptiles, mammals and amphibians were also found at this place. One of the best known functions of wetlands was to provide a habitat for wildlife and fish. Humans have been aware of the link between fishes and wetlands for thousands of years. Unsustainable used of underground water and in the catchment’s 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.

Pakistan has many of the world’s climatic and vegetation zones within even a small area. Extensive water management programs were started to ensure regular supply of water after independence in 1947. In this regard three water storage reservoirs, sixteen barrages, twelve interlink canals, two siphons and forty three main channels were built to prosper the agro based economy of the country by IUCN (1989). Butt and Nawaz, 1978; Butt and Mirza, 1981; Day, 1887; Mirza, 1990; Mirza, 2003; Mirza, 1993; Mirza, 1994; Akhtar, 1991 and Akhtar, 1992 worked at the diversity of fish in Pakistan.

Twenty eight species of snow trout in the Himalayan and sub-Himalayan regions observed including China and Pakistan (Sharma, 1989). Menon (1954) observed the distribution of Himalayan fish. Sehgal (1988) observed masheer in rivers (Jhelum, Beas, Sutlej and Yamuna) in winter season. Sehgal (1999) described about exotic brown trout (Salmo trutta). Shrestha (1999) has listed 59 cold water indigenous and two exotic fish species from Nepal. Dubey (1978) observed the cold water as well as warm water fishes from Bhutan.


**MATERIALS AND METHODS**

**Study area**

River Chenab Situated in India and Pakistan, The data was collected at the two important sites like Head Qadirabad (32°19'04 N, 073°41'36 E and elevation is 210 M) and Head Khanji (32°24'07 N, 073°58'39 E and elevation is 219 M) form Pakistan. The data was collected in 3 successive years (2007, 2008 and 2009).
Climate
Climate of this area regarded as temperate and has four seasons. All the seasons have slightly difference in duration. Summer temperature is touching to 45° and winter temperature lowest almost at 5°.

Water Quality
Quality of water was slightly different at two sites, Head Qadirabad ($P^H$, 7.9-8.1) and Head Khanki ($P^H$, 7.1-8.1).

Sampling
The following methods were used in the present study, direct physical Counts by netting, Group Questionnaire Surveys (Indirect Observations) and meetings with the Fisher-man (Indirect Observations). For identification of fish “A key to fishes of the Punjab” (Mirza and Sharif, 2003) book was used.

Statistical Analysis
The diversity of the species in fresh water fish fauna was observed. 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 where as the lesser values point to the homogeneity in the community.

Shannon-Weiner Diversity Index is denoted by $H'$.

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

Species richness is measured by Index of richness (R) given by Margalef (1958).

$$R = S - 1/\log N$$

Species evenness can be measured with evenness index (denoted by E) given by Hill, 1973.

$$E = H'/\ln(S)$$
Where,
\[ P_i = \text{proportion of the species } i \text{ relative to the total number of species} \]
\[ \ln P_i = \text{natural logarithm of this proportion} \]
\[ S = \text{total no. of species} \]
\[ N = \text{total no. of individual} \]

**RESULTS AND DISCUSSION**

In Head Qadirabad during study period Shannon-Weiner Diversity Index (H') were, 1.396 in 2007; 1.36 in 2008 and 1.136 in 2009 as shown in figure 1 and table I, while Evenness (E) were 1.396 in 2007; 1.36 in 2008 and 1.136 in 2009 as shown in Table III and figure 2 and Richness were 2.943 in 2007; 3.042 in 2008 and 3.188 in 2009 as shown in Table III and figure 3.

In Head Khanki during observation Shannon-Weiner Diversity Index (H') were, 1.328 in 2007; 1.123 in 2008 and 1.094 in 2009 as shown in figure 1 and table II, while Evenness (E) were 0.741 in 2007; 0.63 in 2008 and 0.611 in 2009 as shown in Table IV and figure 2 and Richness were 2.8601 in 2007; 3.0244 in 2008 and 3.080 in 2009 as shown in Table III and figure 3.

The population of carps fish is successively decreased due shortage of water, increased chemical (fertilizer, pesticide and Poison used for capturing of fish), Carps population is decreased due to nesting and hatching sits of carps are destroyed and excess hunting.

Evenness of the study area was that refer to a measure even species are in term of their number. Richness of the study area was that refer different type of species and their numerical strength; technically it referred to ratio between species and total number of individuals.

Increase toxic chemicals due to fertilizers, pesticides in agro-forest land, decrease water level gradually, fish diseases, excess fishing, bad construction of fish-ladder, and natural as well as humane disturbance of nesting, feeding and nesting areas, shortage of water, and degraded quality of foraging habitat by the invasion of introduced species.
Figure 1: Carps Diversity at River Chenab

Figure 2: Carps Evenness at River Chenab
Figure: 3. Carps Richness at River Chenab.

Table I: Summery of the data of carps at Head Qadirabad

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Raho</td>
<td>Labeo rohita</td>
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<td>0.364</td>
<td>-0.368</td>
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Table II: Summary of the data of carps at Head Khanki

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<td>0.09</td>
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Table III: Diversity and Evenness of Head Qadirabad

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<td>1.36</td>
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<td>Evenness (E)</td>
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<td>Richness</td>
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Table IV: Diversity and Evenness of Head Khanki

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<tbody>
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<td>1.328</td>
<td>1.123</td>
<td>1.094</td>
</tr>
<tr>
<td>Evenness (E)</td>
<td>0.741</td>
<td>0.63</td>
<td>0.611</td>
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<tr>
<td>Richness</td>
<td>2.8601</td>
<td>3.0244</td>
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REFERENCES


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