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Ichthyofaunal Study of Bhakra-Yamuna Link Canals in Narwana Region, Haryana

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Abstract: ***Fish are keystone species in many aquatic food webs, where they may regulate the abundance and diversity of prey organisms through top-down effects. Present study was aimed to analyse the ichthyofaunal diversity of Bhakra-Yamuna link canals in the Narwana region of Haryana from January, 2013 to December, 2013. The total fish composition comprised 12 species of fishes belonging to 4 families and 2 orders were identified. The most abundant order of fish was the Cypriniforimes (9 species). Relatively higher numbers of fish species were recorded at site S_3 as compared to site S_1 and S_2.***

Keywords: Ichthyofaunal, Diversity, Bhakra-Yamuna link, Cypriniforimes

1. Introduction

Fish are the most abundant, widespread and diverse group of vertebrates with various forms shapes and sizes. The country is endowed with vast and varied resources possessing river ecological heritage and rich biodiversity. Freshwater fishery sites are varied like 45,000 Km. of rivers, 1,26,334 Km. of canals, ponds and tanks 2.36 million hectares and 2.05 million hectares of reservoirs. The assessment of fresh water fishes is done mainly on the basis of 6 drainage systems in the country. These are Indus river system, Upland cold-water bodies, Gangetic river system, Brahmaputra river system, East flowing river system and West flowing river system.

About 21,730 species of fishes have been recorded in the world; of which, about 11.7% are found in Indian waters. Out of the 2546 species so far listed **2**, 73 (3.32%) belong to the cold freshwater regime, 544 (24.73%) to the warm fresh waters domain, 143 (6.50%) to the brackish waters and 1440 (65.45%) to the marine ecosystem (Kar, 2003).

Fishes of Kurukshetra district was studied by Rishi and Dutta Gupta (1979) and a preliminary study of fishes of Haryana was done by Kaul et al., (1982). Johal and Jha (2007) recorded 60 species belonging to 6 orders, 19 familie and 36 genera. Vats and Gupta (2011) studied the ichthyofauna of four district of northern Haryana and recorded 64 species belonging to 35 genera and 16 families from all over Haryana state. However, there is no information about ichthyofaunal diversity of Bhakra –Yamuna Link canals in Narwana region. Hence, present study is intended to access ichthyofaunal study of Bhakra-Yamuna link canals in Narwana region of Haryana.

2. Material and methods

2.1 Study area

For the present study, three sampling sites (S_1, S_2, and S_3) were selected on Bhakra-Yamuna link canal system which include Sirsa branch of WYC and Barwala link canal in Narwana region, Haryana (Fig. 1). Site S_1 is located 1 km upstream from Dhakal Head on Sirsa branch of Western Yamuna Canal (Longitude 29º63'N and latitude 76 º17'E). Site S_2 is located 1km upstream to the Dhakal head in Narwana region on Barwala link canal (Longitude 29º61'N and latitude 76 º15'E). It originates from Khanauri head (Sangrur district, Punjab) on Bhakra Main Line and joined with Sirsa branch of Western Yamuna Canal in Narwana region. Site S_3 is located about 2.5km downstream from joining point of the Sirsa branch of WYC with Barwala link canal (Longitude 29º59'N and latitude 76 º14'E).

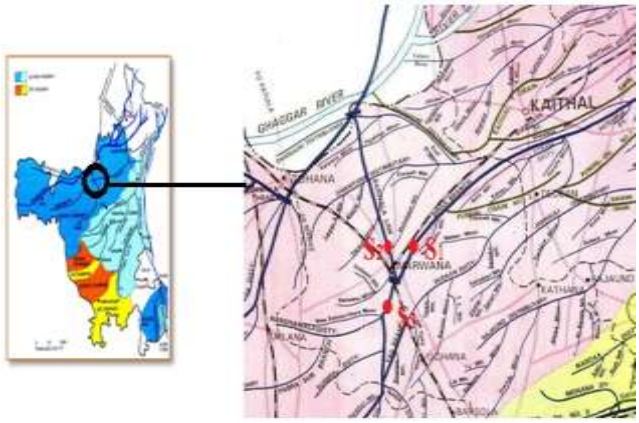

Figure 1: Map showing study sites on selected canals

2.2 Collection

Fishes were collected from selected canals with the help of local fishermen using different type of nets namely cast nets and drag nets. Photographs of the fish stock were taken on the spot with help of digital camera and one specimen of each species was brought to laboratory for further identification. The identified specimens were preserved in 10% formalin solution in separate specimen jars according to the size of species.

2.3 Identification

Meristic and morphometric characters of fishes were measured and identified up to the species level with the help of standard keys and books (Day, 1878; Johal and Tandon, 1979, 1980; Talwar and Jhingran, 1991; Jayaram, 1999).

3. Result and Discussion

Fishes occupy all three levels such as primary, secondary, tertiary consumer of food web in aquatic ecosystem. During the present investigations, a total of 12 species belonging to two orders namely Cypriniformes (9species), Siluriformes (3species) were presented in Table 1 and photographs of all species were presented in Plate 1. With 9 species, order Cypriniformes was found to be dominant comprised 75 percent of total fish fauna, followed by order Siluriformes which was represented by 3 species constituting 25 percent of total species richness.

At site S_1, 7 species of fishes belonging to family Cyprinidae, Siluridae and Sisoridae were recorded (Table 1). Family Cyprinidae was represented by five species namely, *Puntius sophore*, *Cirrhinus mrigla*, *Labeo bata*, *Labeo calbasu and Labeo rohita* and family Siluridae and Sisoridae were represented by single species *Wallago attu* and *Bagarius bagarius* respectively (Fig. 2).

At site S_2 fish fauna was represented by 10 species belonging to four families i.e. Cyprinidae, Siluridae, Schilbeidae and Sisoridae (Fig. 2). All recorded species were common with fish diversity at site S_3 (Table 1). Four species namely, *Puntius sophore*, *Cirrhinus mrigla*, *Labeo bata* and *Labeo rohita* were common with site S_1.

Maximum fish diversity i.e. 11 species was recorded from study site S_3. Out of the 11 species, 8 species belonging to family Cyprinidae and Siluridae, Schilbeidae and Sisoridae were represented by one species each; namely, *Wallago attu*, *Bagarius bagarius* and *Eutropichthys vacha* respectively and individually constituted 9 percent of total fish fauna. Only four species *Puntius sophore*, *Cirrhinus mrigla*, *Labeo bata* and *Labeo rohita* were found at all study sites (Table 1 and Fig. 2).

As compared to earlier studies conducted in different region of Haryana, there is less number of species of fishes during present study which may be due to alteration in their habitat and breeding grounds. It is suggested that periodic fish faunal surveys must be conducted so that gain or loss of diversity of fish can be evaluated. Effective conservation methods such as restoration of fishing habitats, protection of breeding grounds and prevention of aquatic resources from pollution should be adopted.

3.1 Table

Table 1: Fish diversity recorded at study sites S_1, S_2 and S_3 during study period

Name of species	Site S_1	Site S_2	Site S_3
Order-Cypriniformes			
Family-Cyprinidae			
Hypophthalmichthys moltrix (Valencies,1981)	–	+	+
Tor putitora (Hamilton,1822)	_	+	+
Puntius sophore (Hamilton-Buchanan, 1822)	+	+	+
Cirrhinus mrigla (Hamilton-Buchana,1822)	+	+	+
Cirrhinus cirrhosus (Bloch,1795)	_	+	+
Labeo bata (Hamilton-Buchana,1822)	+	+	+
Labeo calbasu (Hamilton-Buchana,1822)	+	_	_
Labeo rohita (Hamilton,1822)	+	+	+
Schizothorax sp. (Grey,1832)	_	+	+
Order-Siluriformes			
Family-Siluridae			
Wallago attu (Bloch and Schneider,1801)	+	_	+
Family-Schilbeidae			
Eutropichthys vacha (Hamilton,1822)	_	+	+
Family-Sisoridae			
Bagarius bagarius (Hamilton,1822)	+	_	+

3.2 Figure

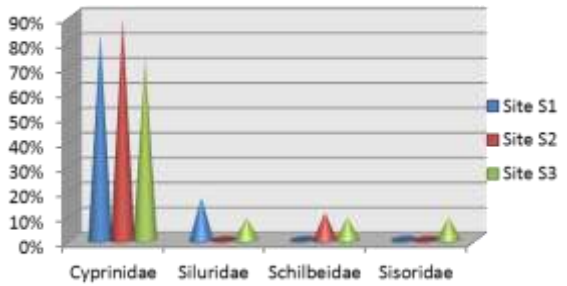

Figure 2: Percent distribution of different families of fishes at study sites S_1, S_2 and S_3

4. Conclusion

Site S_3 was characterised by highest number of fish species and Site S_1 with lowest species of fishes. *Hypophthalmichthys moltrix*, *Tor putitora*, *Schizothorax* sp. and *Eutropichthys vacha* were restricted to site S_2 and site S_3 and species *Labeo calbasu* was restricted only at site S_1.

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Author Profile

Parmila Devi received Ph.D. and M.Phil degree from Kurukshetra University, Kurukshetra, Haryana, India in 2017 and 2009 respectively. She worked on the ecology of canal water in Haryana and specialization in Zoology. During her stay in the research work she worked in fisheries Laboratory in Department of Zoology, KU Kurukshetra. She is now working as Lecturer in Zoology in F.C. College for women, Hisar.

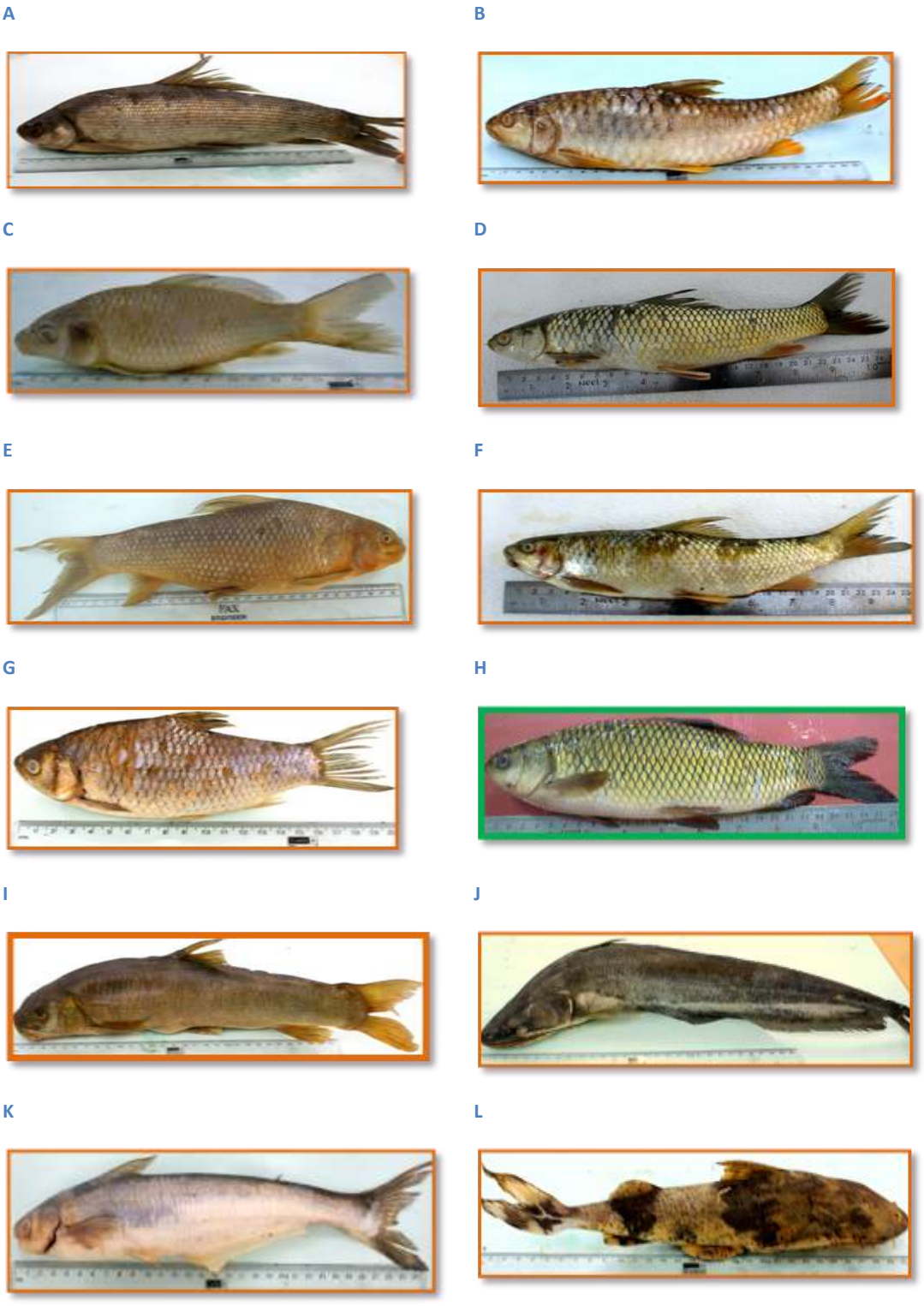

Plate 1 : A- *Hypophthalmichthys moltrix*, B- *Tor putitora*, C- *Puntius sophore*, D- *Cirrhinus mrigla*, E- *Cirrhinuscirrhosis*, F- *Labeo bata*, G- *Labeo calbasu*, H- *Labeo rohita*, I-*Schizothorax* sp., J- *Wallago attu*, K- *Eutropichthys vacha*, L- *Bagarius bagarius*.