

Research paper

Study of Fish diversity of River Chandoli (Kota, Rajasthan) and occurrence of fishparasites therein

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Received: 14/02/2023 Revised: 20/02/2023 Accepted: 24/02/2023

Abstract: Chandloi River is a small, semiperennial left bank tributary of Chambal River. Its location is 25.23 Latitudinal and 75.99 Longitudinal near Kota City. Rajasthan, India. Fish biodiversity includes all unique species, their habitats and interaction between them. The ichthyofaunal diversity was studied in a segment of Chandloi River (from its origin up to Kaithoon village, district Kota, Rajasthan) for a period of three years from July 2017 to June 2020. In the period of present study, a total of 16 species of fishes were recorded - 7 species of order Cypriniformes, 5 species of Siluriformes, 2 species of Anabantiformes, 1 species of Cichliformes species and 1 of Synbranchiformes. Among these Ichthyofauna Cypriniformes was found as the dominant group throughout the study period. Order Cypriniformes (44%) was dominated over Siluriformes (31%), Anabantiformes (12.5%), Cichliformes (6%) and Synbrachiformes (6%). Some of the parasites found during the study on few fishes. The parasites mainly belong to Protozoa, Ciliophora, Arthropoda and Platyhelminthes group. Heavy infection is observed in gills, fins and skin.

Keywords: Chadloi River, Cypriniformes, Siluriformes, Anabantiformes, Cichliformes, Synbranchiformes, Semiperennial, Ichthyofaunal Diversity.

Introduction:

Fish biodiversity can be defined as variety of fish species. Fish biodiversity encompasses fresh water ecosystems. including lakes, ponds, reservoirs, rivers, streams, groundwater and wet lands as well as marine ecosystems including oceans and estuaries. Fish biodiversity includes all unique species, their habitats and interaction between them. Due to the life history traits fishes are suitable as early warning signals of anthropogenic stress on natural ecosystem dynamics, or conversely, as indicators of ecosystem recovery and of resilience. Their presence in large number and variety in lentic bodies is a good indication that water is virgin and suitable for human consumption and utility (Sharma et al., 2019). Together all fishes are rich source of edible protein food for the growing Indian population and contributing in economic lift up of

fishermen, part of aquatic food chain, nutrient cycling and energy flow. In India, several important contributions on ichthyofauna and their diversity and ecological importance has been made in different parts of country such as Banyal and Kumar, 2015; Nair and Chaitanya Krisna, 2013; Dutta and Majumdar, 2018; Wagh and Ghate, 2003; Banyal and Kumar, 2020; Sarkar et al., 2008; Sharma et al., 2019. There have been a number of studies conducted on ichthyofaunal diversity in various riverine ecosystem, but no work has been conducted on this River Chandloi, a tributary of Chambal.

Thus, the present work aimed to access the fish diversity and there ectoparasites of River Chandloi, which is mainly used for commercial fishing practices, irrigation purpose and recreation.

Material and Methods:

Specimens of fishes were procured from different selected localities during the study period of July 2017 to June 2020, once in a month of the entire fishing season, The help of local marketers and fishermen who were using different types of nets namely gillnets, cast nets and dragnets was taken. Immediately after procurement specimens. of the photographs were prior taken to preservation since formalin decolorizes the fish. Formalin solution was prepared by diluting one part of concentrated formalin (commercial formaldehyde) with nine parts of water i. e., 10% formalin. Fishes brought to the lab were fixed in this solution in separate jars according to the size of species. Smaller fishes were

directly placed in the formalin solution while larger fishes were given an incision on the abdomen before they were labelled giving serial number tag bearing certain information such as collection site, date, time, weight and length etc. Identification of collected specimens was done using 1889; Jayaram, keys (Day, 1999: Srivastava, 1995) for fishes of the Indian subcontinent. The identification of the species was done mainly on the basis of the colour pattern, specific spots or marks on the surface of the body, shape of the body, structure of various fins etc. and also with the help of taxonomic expertise.

The fishes were examined for ectoparasites by hand lens and microscopic examination of the mucilage and skin scrapping. All the collected parasites were fixed in glycerin and identified of taxonomic keys.

Study area:

Chandloi River is a small, semi-perennial left bank tributary of Chambal River. It originates from Aalania Dam near Aalania village and meets the River Chambal near village Kashoroipatan. It's location is 25.23 Latitudnal and 75.99 Longitudnal in Kota city, Rajasthan. The river flows nearly 100 Km. before entering River Chambal and it's average width is 50 to 80 meters. Present work has been conducted on four sampling sites of Chandloi River. Site 1 has two ghats located in towards East at Kaithoon village. Site 2 is another side of side 1 situated in the Western side of the river. Site 3 is near origin of river situated near Aalania village. Site 4 is before entering into Chambal River near Kashoroipatan (Figure 1).



Figure 1: Location map of the study area with two study sites

Results and Discussion:

The present study from July 2017 to June 2020, highlights good ichthyofaunal diversity in the Chandloi River. Total 16 species of fishes belonged to phylum Chordata, class Actinopterygii, 5 orders

and 7 families were recorded. 16 species identified of fishes representing 5 orders Cypriniformes, Anabantiformes, Siluriformes, Cichliformes and Synbranchiformes. Order Cypriniformes

has 7 species, Anabantiformes has 2, Siluriformes has 5, Cichliformes has 1 and Synbranchiformes has 1 species. Order Cypriniformes (44%) has dominated over Siluriformes (31%), Anabantiformes (12.5), Cichliformes (6%) and Synbranchiformes (6%), respectively (Table 1)

Order Cypriniformes has single family (Cyprinidae), Anabantiformes has also single family (Channidae). Order Siluriformes has 3 families (Ariidae, Siluridae, Bagridae), Order Cichliformes (Cichlidae), family has one and Synbranchiformes has one family (Mastacembelidae). Family Cyprinidae has 7 species Mylopharyngodon piceus (Black carp), Crucian carassius (Crucian carps), Cirrhinus cirrhosus (Mrigal carp), Labeo rohita (Rohu), Labeo catla (Young catla), calbasu (Labeo), Labeo Osteochilus vittatus (Bonylip barb). Family Channidae has 2 species Channa argus (Northern snakehead), Channa striata (Striped Family Ariidae has one snakehead). species Plicofollis dussumieri (Catfish). Family Siluridae has 3 species Ompok bimaculatus (Butter catfish), Wallago attu Phalacronotus (Helicopter catfish), apogon (Sheat fish). Family Bagridae has one species Sperata aor (Long whiskered catfish). Family Cichlidae has one species Oreochromis niloticus (Tilapia) and Family Mastacembelidae has one species Mastacembelus moorii (Eel fish).

Order Cypriniformes and family Cyprinidae were dominent class with 7 species, followed by order Siluriformes with 3 families and 5 species. Order Anabantiformes and family Channidae has species. Order Cichliformes. 2 Synbranchiformes and family Cichlidae and Mastacembelidae have single single species. Among all species Labeo rohita, Labeo catla. Labeo calbasu.

Mastacembelus moorii, Sperata aor. Channa argus, Channa striata, Wallago attu seen more in all fishes. While not all 16 species appeared on polluted sites. Oreochromis niloticus, Crucian carassius, Cirrhinus cirrhosus, Ompok bimaculatus seen more with other species in nonpolluted sites whereas only species Oreochromis niloticus and Crucian carassius were recorded in more polluted site. This shows that these species have high tolerance power not only the industrial chemicals but also worst ecological conditions.

Pir et al. (2019) studied diversity and abundance of fishes inhabiting the Western region of Narmada River, Madhya Pradesh. India. A total of 52 species belong to 10 orders containing 16 families were observed. Family Cyprinidae contained highest number of species 25, followed by Bagridae, Siluridae and Ophiocephalidae containing 4 each. respectively.

Banyal and Kumar (2020) studied ichthyofaunal diversity of Mej River in Bundi district Rajasthan. 11 species of fishes belonging to 9 genera, 6 families and 4 orders were recorded.

Pathak and Lavudya (2021) studied diversity of fresh water fishes in Narmada River, Madhya Pradesh. A total of 176 species from freshwater habitats out of which 13 orders, 46 families, 107 genera and 176 species recorded. The order Cypriniformes represented the highest diversity with 79 species followed by Perciformes (35 species), Siluriformes (32 species), Clupeiformes (11 species), etc. Freshwater fish diversity information could also provide a baseline for future more complex ecological studies, and planning the conservation and sustainable use of inshore inland water resources.

Phylum	Class	Order	Family	Genus & Species
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Mylopharyngodon
				piceus
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Crucian Carassius
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Cirrhinus cirrhosis
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Labeo rohita
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Labeo catla
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Labeo calbasu
Chordata	Actinopterygii	Cypriniformes	Cyprinidae	Osteochilus vittatus
Chordata	Actinopterygii	Anabantiformes	Channidae	Channa argus
Chordata	Actinopterygii	Anabantiformes	Channidae	Channa striata
Chordata	Actinopterygii	Siluriformes	Ariidae	Plicofollis dussumieri
Chordata	Actinopterygii	Siluriformes	Siluridae	Ompok bimaculatus
Chordata	Actinopterygii	Siluriformes	Siluridae	Wallago attu
Chordata	Actinopterygii	Siluriformes	Siluridae	Phalacronotus apogon
Chordata	Actinopterygii	Siluriformes	Bagridae	Sperata aor
Chordata	Actinopterygii	Cichliformes	Cichlidae	Oreochromis niloticus
Chordata	Actinopterygii	Synbranchiformes	Mastacembelidae	Mastacembelus moori

Table 1: Qualitative estimation of fishes in Chandloi River (Kota) during July 2017 toJune 2020.

Pie diagram showing percentage of different orders of Fishes in Chandloi River from June 2017 to July 2020.



Some of the parasites found during the study on few fishes. They are listed in Table 2. This may be due to polluted sites 1 and 4, main factors are anthropogenic activities and hazardous industrial chemical wastes.

The parasites mainly belong to Protozoa, Ciliophora, Arthropoda and Platyhelminthes group. Heavy infection is observed in gills, fins and skin. Fish parasites are the primary damaging agents during stress conditions followed by bacterial and fungal infection. Fish parasites multiply rapidly during stress condition or under favourable conditions and cause economic loss, regularly cause high mortality (Dogiel, 1956).

Table 2:	Qualitative estimation	of Parasites	on fishes in	Chandloi River	(Kota) during
	•	July 2017 to	June 2020.		

Group	Name of parasite	Host Fish	Frequently	Common	Rare	Site of infection
Protozoa	Piscinoodinum	Oreochromis niloticus	F	-	-	Skin &Fins
	Thelohanellus	Channa striata or Channa argus	F	-	-	Skin & Fins
	Glugea	Cirrhinus cirrhosis	-	С	-	Gills
Ciliophora	Chilodonella spp.	Labeo catla	-	С	-	Gills
	Trichodins Spp.	Labeo rohita	-	С	-	Gills & Skin
Arthropoda	Argulus spp.	Mastacembelus moori	F	-	-	Skin & Fins
	Lernaea cyprinacea	Channa striata	-	С	-	Skin & Dorsal fin
Platyhelminthes	Dactylogyrus	Labeo rohita	-	С	-	Gills
	Gyrodactylus	Labeo Catla	-	С	-	Skin



Infected Oreochromis niloticus



Infected Mylopharyngodon piceus



Infected Cirrhinus cirrhosus

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