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A Note on Fresh water Fish diversity in major Tributaries of River Bedti of Western Ghats region of Karnataka, India

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Abstract

The present report describes the status of fish diversity in the major tributaries of river Bedti of Western Ghats region of Karnataka. Fresh water offers very common and suitable habitats of the Biosphere. It has characteristic features in chemical, physical properties and hosts a large biodiversity which have adapted to dynamic environment. It has a well-defined food chain and food web through which energy is channelized and community. The present work was carried from June 2013 to June 2014. Fishes were caught with the gill net, cast net and drag net of suitable dimensions. The fishes were soon preserved and sent to the ZSI Kokatta for identification. The identified fishes were classified up to families. Highest fish diversity was recorded in Pattanahole.

Keywords: Fresh water, fish diversity, major tributaries, taxonomy, puntius sp.

Introduction

The study area is mainly located in Uttara Kannada district depicted in figure-1. Uttara Kannada district of Karnataka state has a geographic area of 10,291sq^{2}m and situated strategically in the middle of the Western Ghats. It is located between 13^0 55' to 15^0 32' N latitude and 74^0 05' to 75^0 05' E longitude[1]. It has a typical tropical climate with well-defined seasons and receives rainfall on an average 2500mm annually. The entire district is enriched in varied varieties of flora and fauna. The abundance of flora and fauna is mainly because of the four major rivers flowing in the district. The major rivers are i. Bedti ii. Kali iii. Aghanashini and iv. Sharavati. Bedti is one of the west flowing rivers that originate in the Moist Deciduous forest areas of Dharwad district. The river is the outcome of hundreds of tributary streams which merge and become limited number of tributaries. The streams have their catchments covered with various types of Landscape element types ranging from dense forest to agricultural areas, scrubs and wasteland. The major tributaries selected for the present studies are i. Ganeshpal ii. Pattana hole iii. Sahasralinga iv. Sonda v. Majjigehalla. The objective of the present work is to reveal the fish species diversity with respect to the river tributaries.

Material and Methods

Fish sampling is the major fieldwork at all the specified locations. Fish sampling were made two times a year i.e. Pre monsoon and post monsoon. For collecting the fish Gill nets, Cast Nets and Dragnets of different mesh size were used. The net fishing is one of the most popular fishing methods. The fishes caught alive and preserved in 4% formaldehyde for the identification. The fishes caught in the net were immediately separated from the net and the numbers of fishes caught were counted and representative sample of every specimen were preserved in plastic jars using 4% formaldehyde solution. All colors, color patterns, spots blotches number and design of the fishes were carefully noted in the field note book.

For identification following morphological characters were considered: i. Total Length, Standard Length- Body depth, Head length, Head Width, Eye Diameter. ii. Position of mouth, supra terminal, terminal, sub terminal and Ventral. iii. Presence or absence of barbells, number of barbells, and location and length of barbells, iv. Height and length of Dorsal fin, length of pectoral and pelvic fins, length and height of caudal peduncle, length of longest fin ray and the number and position of spines and rays, lateral line scale count, v. Spots, blotches, bands and marks etc.

Further, the some of the unidentified fishes were sent to Zoological Survey of India, Kolkata for identification and got identified. Simpsons Diversity Index was calculated to determine the fish diversity.

Results and Discussion

A total of 19 species belonging to 4 families of fishes were recorded during the study period 2013-2014. Cyprinidae, Balitridae, Aplochaeilidiae and Ambassidae were the most abundant families. These are presented in table-1. The tributaries of river Bedti have different ecological characteristics, which have abundantly influenced the fish population. It has natural course of water without any dams and pollution. However in recent times Bedti River has been reported as polluted through urban sewage water flow. Moreover, the fishes have proved that they have the evolutionary flexibility to produce species to fill the spectrum of

niches presented. They can be very big or very small, inhabit open waters or stay close to the bottom and they are present at every consumer trophic level in both the grazing and decomposer chains. For example *Garra species* is very well adapted to torrential water flow which has a suction cup on the ventral region, just below the mouth, can adhere to rocks, thus protects itself from torrential flow of water.

The predominant fish fauna in south Asia belongs to the carp family Cyprinidae[2,3]. The carp family alone in the river was prominent with *Puntius* as major genus. The Cyprinidae alone constituted 91% of the total catch of the known species, while Ambassidae 6%, Balitridae family contributed only 2% and Aplochaeilidiae 1%. These are graphically depicted in figure -2a and 2b.

The river tributaries exhibited highest number of Cyprinidae followed Ambassidae, Balitridae and Aplochaeilidiae revealed that, the tributaries of river Bedti accounted 1076 individuals. These are presented in table-2. The significant finding of the present observation was that the occurrence of Rasbora rasbora in all tributaries while Puntius arulius was found only in Pattanahole. It was observed that the species richness was in the order Pattanahole 354, Sonda 269, Sahasralinga 245, Ganeshpal 114 and Majjigehalla 96. It has been further argued that the increase in the number of species indicates less anthropogenic pressure on that particular tributaries[4-6]. Contrary to these observations, it is noted that both in Ganeshpal and Majjigehalla river tributaries of the present study exhibited less species richness. The most interesting observation of the present study was that though species Rasbora rasbora (edible fish) are more they are not very much liked by the local community because they are less tasty to eat. Diversity of fish species is determined generally by several physical factors, size, depth, quality of stream and biotic conditions such as food, vegetation and substratum[7-9]. Habitat destruction due to deforestation results in increased erosion and suspended matter and deposition of fine sediments resulting in habitat loss and destruction of spawning grounds and species extermination[10,11]. Different river systems are known to harbor some species exclusive to the system. As per the present study family richness was more in Sahasralinga as compared to other tributaries. This is presented in table 3 and depicted graphically in figure 3.

Table-1
Distribution of fishes in five different tributaries of river Bedti

Sl.No.	Order-Cypriniformes	Species	T-1	T-2	T-3	T-4	T-5	Grand Total
1		Rasbora rasbora (Hamilton-Buchanan)	17	25	235	18	30	325
2		Puntius jerdoni (Day)	00	15	08	20	00	43
3		Puntius chola	13	00	28	06	00	47
4		Puntius filamentosus(Valenciennnes)	00	00	00	04	00	04
5		Puntius amphibeus	00	00	06	00	40	46
6		Puntius narayani (Hora)	02	07	28	00	01	38
7		**Puntius arulius**	00	00	12	00	00	12
8		Danio aequipinnatus	00	00	25	06	04	35
9	**Family- Cyprinidae**	Tor tor (Hamilton-Buchanan)	15	00	00	00	00	15
10		Garra mulya	05	48	10	12	03	78
11		Gara gotyla stenorhynchos	04	18	00	10	00	32
12		Garra garra	00	140	00	00	00	140
13		Labeo fimbratus	40	00	00	00	00	40
14		**Labeo calabus**	14	00	00	21	00	35
15		**Labeo rohita**	24	08	00	07	00	39
16		**Hypselobarbus jerdoni (Day)**	26	08	02	10	00	46
		Total	**160**	**269**	**354**	**114**	**78**	**975**
	Family- Balitoridae							
17		**Nemacheilus guentheri**	00	00	00	00	18	**18**
	Order-Cyprinodontiformes							
	Family- Aplocheilidiae							
18		Aplocheilus lineatus (Valenciennnes)	17	00	00	00	00	**17**
	ORD-Perciformes							
	Family- Ambassidae							
19		Pseudoambasis ranga (Hamilton-Buchanan)	66	00	00	00	00	**66**
								1076
T-1-Sahasralinga T-2-Sonda T-3-Pattanahole T-4-Ganeshpal T-5-Majjige halla								

Table-2
Distribution of the abundance of family and their species in five tributaries studied

S.No	Family	Total Species
1	Cyprinidae	975
2	Balitridae	18
3	Aplochaeilidiae	17
4	Ambassidae	66

Table-3
Distribution of the abundance of family and their species in five different tributaries studied

S.No	Family	Tributaries				
		T-1	T-2	T-3	T-4	T-5
1	Cyprinidae	160	269	354	114	78
2	Balitridae	00	00	00	00	18
3	Aplochaeilidiae	17	00	00	00	00
4	Ambassidae	66	00	00	00	00

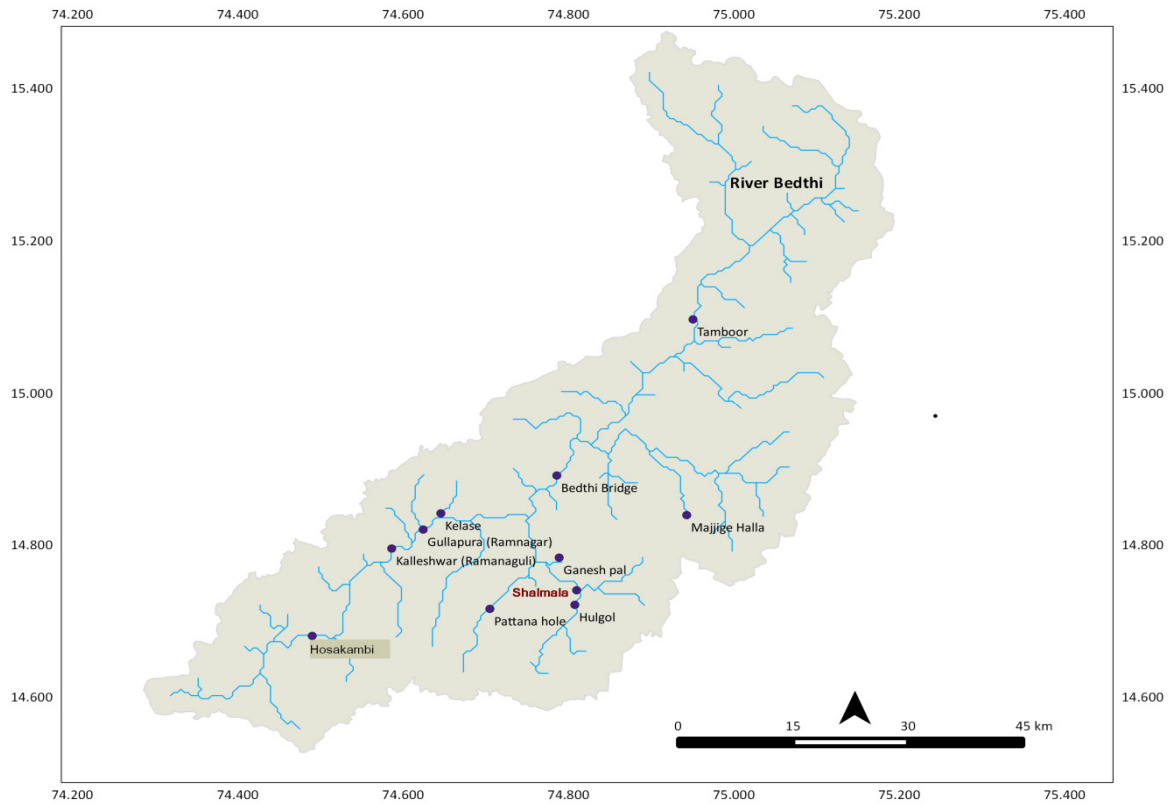

Figure-1
Major tributaries of river Bedti

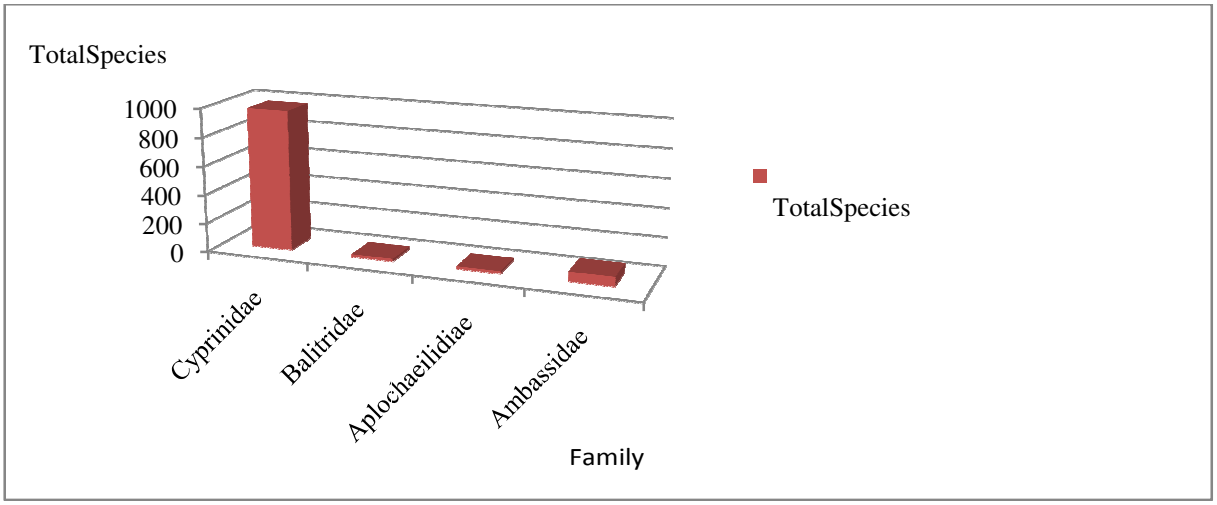

Figure-2a
Histogram showing the distribution of the abundance of family and their species in five tributaries studied

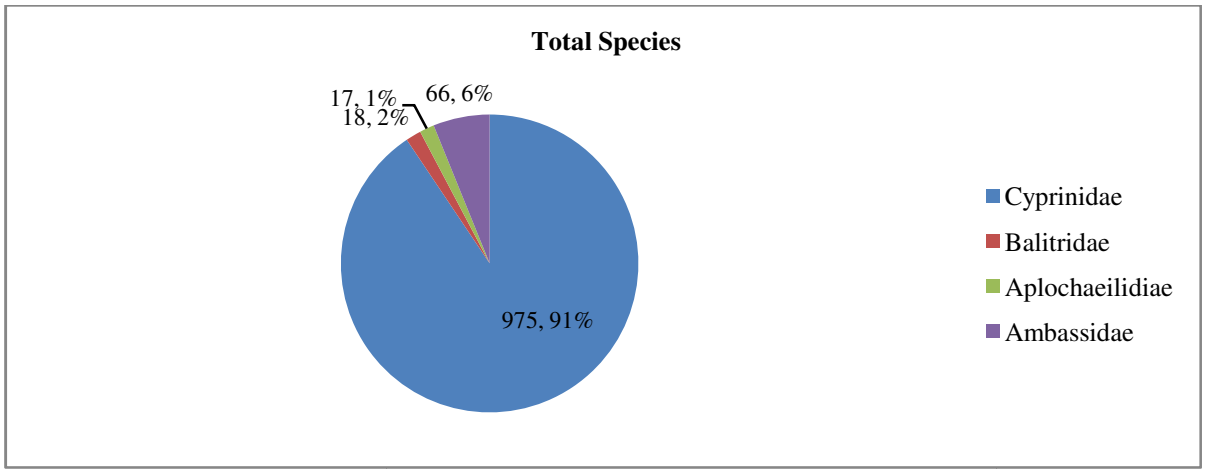

Figure-2b
Pie chart showing the distribution of various families of fish in five tributaries studied

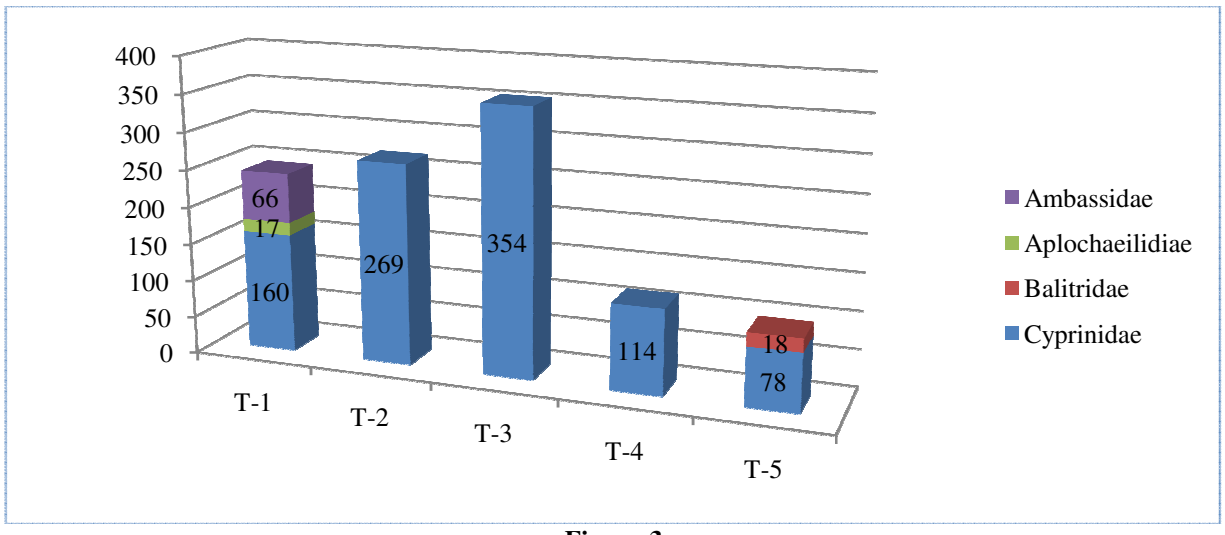

Figure-3
Histogram showing the species abundance with respect to the five different tributaries of Bedti

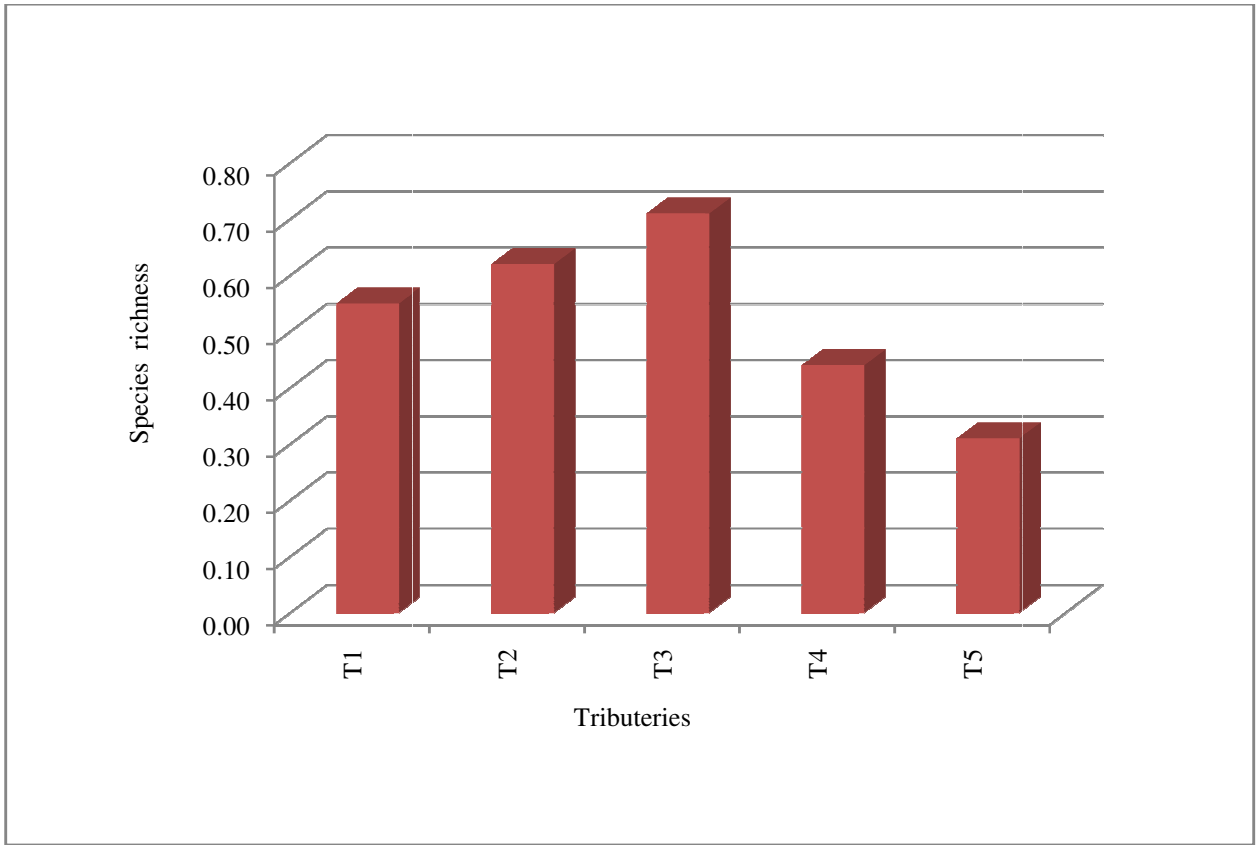

Figure-4
Histogram showing the Simpson diversity index with respect to the five different tributaries of Bedti

As per the Simpsons Diversity Index most diverse fish community was recorded in Pattanahole and Majjigehalla accommodated least diversity. These are depicted graphically in figure 4.

According earlier reports from Daniels and Sreekantha species richness or diversity depends less on the characteristics of a single ecosystem than on the interactions between ecosystems, e.g. transport of living animals across the different gradient zones in the water body[12]. Fish is captured in natural lakes, reservoirs, streams, tributaries, rivers and oceans. However, few species in spite of their great commercial interest have been comprehensively less studied to establish the importance of their distribution for their successful management. It is in this context, this study enlightens the fish species diversity in tributaries of the river ecosystem.

Conclusion

This report indicates fish diversity in the major tributaries of river Bedti of Western Ghats region of Karnataka. According to a study conducted during 2013-2014 it has been revealed that fish diversity and abundance have shown variation in the tributaries based on the human interference. Overfishing and habitat degradation might be the significant factors affecting the fish diversity and richness.

Acknowledgement

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