Original Research Article

Ichthyofaunal diversity of downstream Dikhu river and its tributaries in Mon district of Nagaland, India

Abstract

This study has been undertaken to investigate the diversity of freshwater fish, their present IUCN conservation status and economic value within the downstream of Dikhu river and its tributaries in Mon district between 2019 to 2020. During the survey a total number of 22 fish species belonging to 8 families 16 genera were recorded. The catch lists composition showed the predominance of cyprinidae with 55%, Balitoridae 15%, Bagridae 10% where as Psilorhynchynchidae, Amblycipitidae, Sisoridae, Channidae and Belonidae represented by 5% each. The most significant of the investigation was the finding of endangered (EN) species *Tor putitora*, near threatened (NT) *Nimacheilus manipurenis and* four species *Nemacheilus sikmaeinsis, Barilius barana, Garra lissorhynchus* and *Bagarius yarrelli* as a vulnerable (VU) species of IUCN Red list.

Keywords: *Ichthyofaunal diversity, Dikhu river, Fishes, Species, Conservation.*

1. INTRODUCTION

Ichthyofaunal diversity refers to array of fish species; counting on context and scale, it may be alleles or genotype among the fish population within the aqua regimes (Burton et al., 1992). Fish represent almost half the overall vertebrates described in the world. They will be found in almost all the conceivable aquatic environments. Fish exhibit enormous diversity of shape, size and biology, and within the habitats they occupy Nelson (1984). But rapid growing population and concomitant increases in contrast of natural resources are the supreme challenge for the aquatic resource management (Noss and Peters, 1995; Folkerts, 1997; Cordell et al., 1998 and Melvin et al.,2000).

Nagaland is a mountainous state of the north eastern part of India. The unique topography, diverse physiographic features and water shed pattern of the state play a major significant role in harboring natural stocks of the fish fauna. Varieties of fish fauna have been recorded from the various aquatic resources by worker like (Hora 1936; Kosygin and Vishwanath 1998; Ao *et al*., 2008; Goswami *et al*., 2012). Though there could be many more species distributed in the river/hill streams it appears that no detailed survey has been conducted to document the availability of diversified fish fauna in the various drainage systems of Nagaland. Therefore the present survey was conducted to investigate the fish diversity, IUCN conservation status and economic importance of downstream Dikhu river system.

The Dikhu river has latitude of 26˚59´35``N, longitude of 94˚27´5``E and has a total length of 160 km. It is one of the most prominent rivers of Nagaland which originate from Nuroto Hill area of Zunheboto and passes through Tuensang, Longleng, Mokokchung and Mon districts of the state Nagaland. The Dikhu river is one of the principle tributary of Brahmaputra and the river offered rich fish fauna which include food fishes, ornamental fishes, game fishes etc. The rich fauna is attributed to many reasons, *viz*., the geomorphology, consisting of hills, plateaus and valleys, resulting in the occurrence of a variety of torrential hill streams, rivers, lakes and swamps (Goswami *et al*., 2012)

Comment [Zoysa1]: This section can shift to the methodology under the study site.
Also try to provide a map for study site.

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II. MATERIAL AND METHODS

The documentation of present study was carried out with help of local fishermen having more than decades of experience in fishing technologies. Fish samples were collected through experimental fishing technique with different locally adopted technique, and cast nets, gill nets of various shape and sizes.

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The specimens and the sites of area were photographed and all the essential data like place of collection, number of fish caught, body color, body marking etc were recorded in the field itself. The specimens collected in the Field were kept in 5% formaldehyde as described by Joshi and Sreekumar (2015) and the collected specimens were transported to laboratory of department of Zoology, Kohima Science College, Jotsoma for identification using standard taxonomic reference (Talwar and Jhingran 1991; Ao *et al*., 2008; Jayaram 2010)

Table 1: Systematic list of Ichthyofauna of Dikhu River System.

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Sl.no	Systematic position	Common name	Fins Formula	Economic value	Conservation status (IUCN)
1	**A.ORDER:CYPRINIFORMES** **1.Family: Balitoridae** **I Sub Family: Nemacheilinae**				
	1.Nemacheilus manipurenis (Chaudhuri ,1912)	Mainpur loach	Di6;Pi5;VI6;Ai 5 C18.	Or	NT
	2. *Nemacheilus sikmaeinsis* (Hora,1921)	Sikmai loach	Dii7;Pi9-10;Vi9;Aii 5.	Fd, Or	VU
	3. *Nemacheilus scaturgina* (McClelland,1839)	McClelland loach	D iii 7;Pi9;Vi9;Ai5.	Or	LR-nt
	2**.Family: cyprinidae** **I.Sub family: Rasborinae**				
	1.*Barilius barna* (Hamilton-Buchanan,1822)	Barna baril	Diii6; Pii 12;VI9;Aiii11-12;C18.	Fd, Or	VU

	2. *Barilius vagra* (Hamliton-Buchanan,1822)	Vagra baril	Dii-iii7;P i14-15;Vi7;Aii12;C19.	Fd, Or	LC
	3. *Barilius bendelisis* (Hamilton-Buchanan,1822)	Hamliton's barila	D iii 8; P i 14; V ii 9; A ii 8; C19.	Or	LC
	II.Sub family: Danioninae				
	1.Danio aequipinnatus (McCleland,1839)	Giant danio	Dii7-8;P ii12; Vi9;Aii-iii 13-14;C21.	Or	LR-nt
	2.Danio dangila (Hamilton,1822) McClelland,1843)	Dangila danio	D ii 7; P i 12;Vii 9;Aii 5;C19.	Fd, Or	LC
	III.Sub family: Garrinae				
	1. *Garra lissorhynchus* (McClelland,1843)	Khasi garra	D iii 6; Pi12; Vii8;A ii6;C19.	Fd	VU
	IV.Sub family: Barbinae				
	1.Cyprinius conchonius (Hamilton-Buchanan,1822)	Rosy bard	Diii7-8;Aii-iii 5;Pi18;Vi8;C19.	Fd, Or	LC
	V.**Sub family: Cyprininae**				
	1. Cyprinius chagunio (Hamilton-Buchanan,1822)	Lalputi	Dv8;Pi15;Vi 8; Aiii5; C19.	Fd	LC
	2. *Tor putitora* (HamiltonBuchanan,1822)	Putitor mahseer	D iii8-9;Pi18;Vi8;A ii 5;C19.	Fd, S	EN
	3.*Labeo calbasu* (Hamilton-Buchanan,1822)	Kalbasu	Diii15; Pi16;V i8;A ii5;C19.	Fd, S	LC
	4. *Neolissocheilus hexagonolepis* (McClelland)	Chocolate mahseer	D iv 9;Pi16;Vi8;A iii5;C19.	Fd,S	LC
	3.Family: Psilorhynchynchinae				
	1.Psilorhynchynchus homaloptera (Hora & Mukerji,1935)	Homaloptera minnow	Diii 9;P vii-viii 10; Vii 8; A ii 5; C18.	Fd	LC
2	**B.Order:Siluriformes I.Family : Amblycipitidae**				
	1.Amblyceps mangois (Hamilton-Buchanan,1822)	Indian torrents catfish	Di5-6;P i 6;V i 4;A i 8;C 19.	Or	LR-nt

	II.Family: Bagridae				
	1.Olyra longicaudatus (McClelland,1842)	Himalayan olyra	Dii7;Pi 5;V ii4;Aii16-20;C19.	Or	LC
	2. *Aorichthys aor* (Hamilton-Buchanan,1822)	Long whiskered catfish	Di7-8;Pi18;V i 5;A iii 8;C17.	Fd	LC
	III.Family: Sisoridae				
	1.Bagarius yarrelli (Sykes,1841)	Goonch	Di7;Pi11-14;Vi5;Aii9-12;C19	Fd	VU
	2. Glyptothorax trilineatus (Blyth,1860)	Blyth's glyptothorax	Di6-7;Pi 10; V i 5; A i 10.	Fd, Or	LC
3	**C.Order: Perciformes** **I.Family: channidae**				
	1. *Channa stewartii* (playfair,1867)	Assamese snakehead	Di 38-39;Pi 19;Vi 5;A i28;C17.	Fd, Or	LC
4	**D.Order: Beloniformes** **I.Family: Belonidae**				
	1.Xenentodon cancila (Hamilton-Buchanan,1822)	Freshwater garfish	Di17-19;Pi10 ;V i7;Ai16-18;C15.	Or	LC

Fd: Food; **Or**: Ornamental, **S**: Sport, **EN**-Endangered; **NT**- Near Threatened; **VU**-Vulnerable; **LC;**Least Concern; **LR-nt:** Lower Risk (near threatened),**D**-Dorsal; **V**-Pelvic; **P**-Pectoral; **A**-Anal

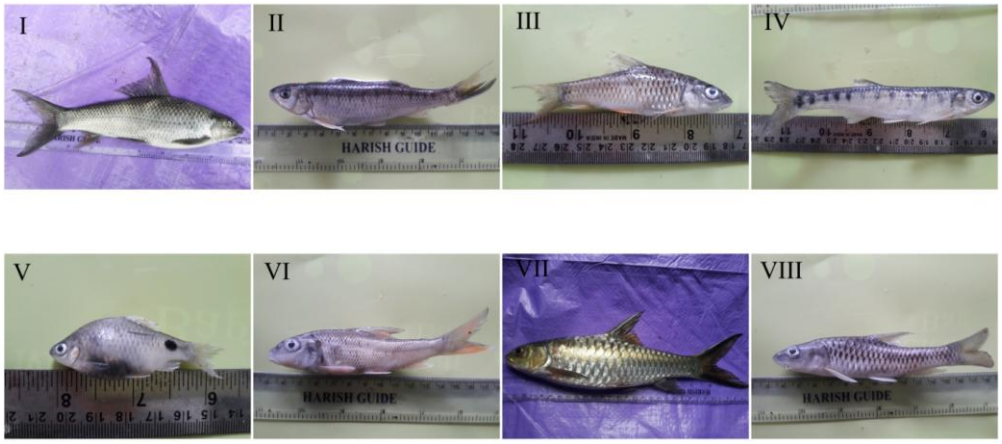

Figure: I. *Labeo calbasu* II. *Barilius barna* III. *Chagunius chagunio* IV. *Barilius vagra* V. *Cyprinius conchonius* VI. *Barilius bendelisis* VII. *Neolissocheilus hexagonolepis* VIII. *Tor putitora*

III. RESULTS AND DISCUSSION

In the present studies a total of 22 species of fishes belonging to 4 orders, 8 families, 6 sub- families, 16 genera were identified from the downstream Dikhu river system. The family Cyprinidae dominated the catch lists with 55%, Balitoridae 15%, Bagridae 10% ~~where as~~whereas ~~,~~Psilorhynchynchidae, Amblycipitidae, Sisoridae, Channidae and Belonidae represented by 5% each. Present surveys recorded the present of one endangered species *Tor putitora* which is one of the important finding, presence of Tor species is significant as this species are placed in endangered in IUCN (3.1) Red List. When *Nimacheilus manipurenis* occupied near threatened (NT) and four species *Nemacheilus sikmaeinsis, Barilius barana, Garra lissorhynchus* and *Bagarius yarrelli* are placed in vulnerable (VU) species.

Diversity of fishes in an aquatic habitat is a indicator of good health and status of that ecosystem and since fish are taxonomically most diverse than other vertebrate (Maitland, 1995~~). Therefore~~). Therefore, documentation and evaluation of their present status of the available fish species is utmost necessity for proper implementation of further conservation measures. From the present survey the serious concern is the presence of 1 fish species endangered and 4 vulnerable species and 1 near threatened species. Nowadays most biologists concern about the importance of biodiversity conservation since, they aware that habitat destruction is the key factors for extinction of species. Thus, there are strongly in need for the conservation as well as exploration for various fish resources available in the study site.

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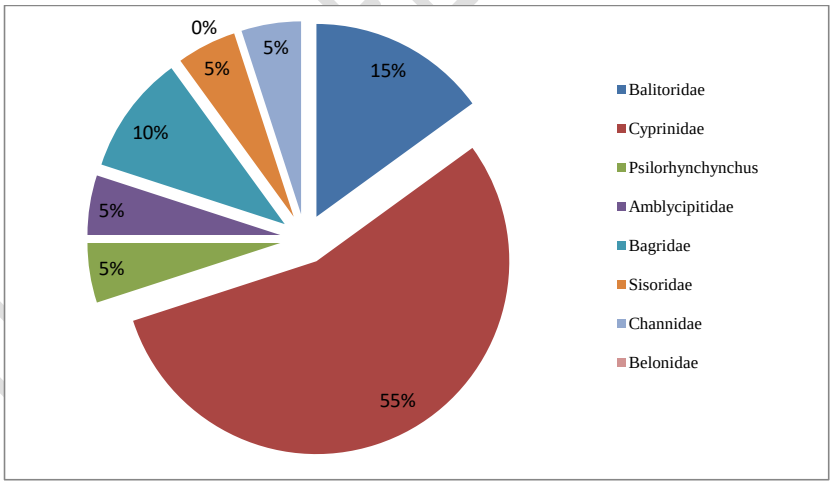

Figure1: Percentage composition of fish families from downstream of Dikhu river system.

III. CONCLUSION

The present work on Ichthyofaunal diversity of the downstream Dikhu river system shows that this particular area is endowed with a variable type of fishes. Most are considered as edible fishes, Ornamental and some are good potential for sport. The study clearly indicated the abundance of the species mostly belonging to the family Cyprinidae and order Cypriniformes . Hence the majority of fishes are belonged to this family. Special attention are in need to focus for protection of those species categorized in endangered (EN), vulnerable (VU) and nearly threatened (NT) of IUCN Red List.

Comment [Zoysa6]: The authors can summaries the total number of fish species including as well here, and also in the abstract section.

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