



Study on Ichthyo-diversity of Krishnai river, Assam, India

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Abstract

Assam, one of the most significant component among all the N.E. states, share about 30% of the region's land area. From the literature it is ascertained that 200 fish species available in Assam belonging to 100 genera under 36 families and 10 orders. An attempt has been made to study the fish fauna found in Krishnai river, Assam. The river is an important tributary of the mighty Brahmaputra. Total 47 species of 17 families (under 06 orders) were identified during the study period. The maximum representation of the fish fauna of Krishnai river is order–Cypriniformes (43% N=20) followed by Siluriformes 34%, N=16), Perciformes (15%, N=07), Symbranchiformes (4%, N=2), Beloniformes and Anguilliformes (each 1.2%, N=1). The present paper deals with an exhaustive list of ichthyofauna, collection locality, scientific name, and their conservation status as per IUCN status.

Key words: *Fish diversity, Krishnai river, Hill stream fish, IUCN.*

I. INTRODUCTION

The northeastern part of India is considered as one of the hot spots of freshwater fish biodiversity in the world (Kottelat 1989)¹. A survey on the ichthyofauna of this region has been carried out by many workers of the last century. De (1910)² recorded 154 species of fishes from eastern Bengal and Assam. Subsequently different workers had undertaken number of studies and reported the presence of a diversified fish fauna in the region. Of the approximately 806 species inhabiting freshwater of India (Talwar and Jhingran, 1991)³, the northeastern India is represented by 267 species (recorded and reported) belonging to 114 genera under 38 families and 10 orders (Sen 2000)⁴. Located between 21.57° to 29.3° north latitude and 84.46° to 97.3° east longitude covering elevation from c. 200 to 900 m. from the sea level, the N.E. region's fish fauna is approximately 33.13% with that of total Indian freshwater fishes. The region has 19,150 km of rivers, 23,972 ha. of reservoirs, 1,43,740 ha of lakes, 40,809 ha of ponds and 2,780 ha of rice-cum-fish culture area. The rich ichthyological diversity has made this hill dominated region of India as paradise for the freshwater fishes inviting global attraction. Assam, one of the most significant components among all the N.E. states, share about 30% of the region's land area. The state is located between latitudes 22° 16' N and longitudes 80° 42' and 97° 12' E. It covers a total area of 78,523 km² covering twenty seven districts. Located at the gateway of the northeast India,

Assam is a land of myths and mysteries. “The land of Red Rivers and Blue Hills”, as is described, has a unique landscape with sprawling tea gardens and unending stretches of paddy fields interspersed with grooves of coconut, areca nuts and banana trees. Assam can be divided into three distinct physical units: the Brahmaputra valley in the north, the Barak valley in the narrow protruding south, and the state’s hilly region separating the two valleys. The mighty Brahmaputra with its numerous tributaries, wetlands and hill streams provides the main source of ichthyofauna in the state. Among the tributaries, the Krishnai river is one of the most important river in the south bank of Brahmaputra river.

The perennial river Krishnai originates from the northern slope of Garo hill ranges at latitude of $25^{\circ}34'00''$ N, longitude of $90^{\circ}25' 58''$ E and altitude 700 m. with a length of about 105 kms. It has 1195 sq. km. of catchment area. The Krishnai river has also two distinct fluvio-geomorphic environments, one in its Meghalayan part and the other in Assam. The Meghalayan part is hilly and the Assam part is on the plains with a good diversity of riverine fishes.

II. STUDY AREA

The study was done in Krishnai river of Assam. The Krishnai river is divided into two parts, depending on river gradient, topography and confluences of other streams or tributaries. The two reaches are upper hill reaches and lower valley reaches. The upper part is in the Garo hills, affords a lucrative habitat for hill stream fishes. The lower part is in the plains of Assam with a habitat of common riverine fishes. The field investigation for collection of fish species and study of fishery, five stations are considered (Fig 1a &1b). They are Rongrong ($25^{\circ}45' 03.6''$ N and $90^{\circ}31' 32.9''$ E), Mendipathar ($25^{\circ}55'16.7''$ N and $90^{\circ}38' 01.5''$ E), Krishnai ($26^{\circ}01' 51.3''$ N and $90^{\circ}40' 22.6''$ E), Domoni ($26^{\circ}04'23.8''$ N and $90^{\circ}45'42.5''$ E) and Dakaidol ($26^{\circ}74.3''$ N and longitude $90^{\circ}43'40.9''$ E).

Fig 1(a)- Map of Krishnai river

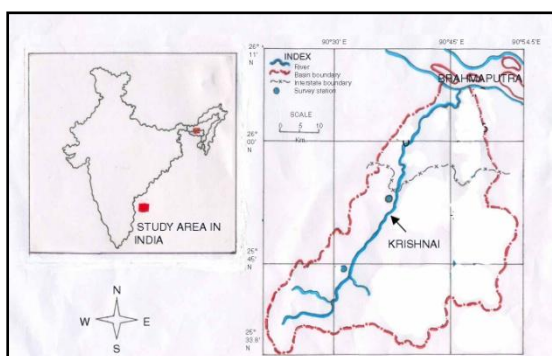


Fig 1(b)- Krishnai river



III. MATERIALS AND METHODS

Collection of fish species were done from different five sites of Krishnai river in different seasons during the period of April 2017 and March 2018. Fishes were collected by indigenous fishing methods such as, Bamboo trap (sepa), and by common nets e.g. Cast net, Gill net and Dip net. Besides collecting fishes through different methods during investigation, some rare fishes were also collected for observation and records. Help from expert fishermen were also taken during the investigation. At the time of collection of fishes, maximum care was taken to keep the external morphology intact for taxonomic studies. After collection fishes were fixed and preserved in 4-5 % formalin solution as described by Ayappan and

Satyamurthi (1960)⁵. For identification, morphometric measurements of fishes were followed (Jayaram 1981)⁶. A dial caliper (Mitutoyo, Japan) was used to measure the minimum length of 0.1 mm. Proportional measurement of the body were expressed percentage wise of standard length (SL) or head length (HL). The fishes were identified using morphometric study, with special reference to Day (1878⁷, 1889⁸), Hamilton-Buchanan (1822)⁹, Jayaram (1981¹⁰, 1991¹¹, 1999¹²), Menon (1987¹³, 1992¹⁴), Menon *et. al.* (2000)¹⁵, Mishra (1976)¹⁶, Nelson (1994)¹⁷, Narendran (2000)¹⁸, Roberts (1994)¹⁹, Pandey (1970)²⁰, Rainboth (1985)²¹, Sen & Dey (1984)²², Tilak & Husain (1981)²³ and Talwar & Jhingram (1991)³.

IV. RESULTS AND DISCUSSION

Total 47 species under 17 families (under 06 orders) were identified during the study period. The maximum representation of the fish fauna of Krishnai river is order–Cypriniformes (43%N=20) followed by Siluriformes 34%, N=16), Perciformes (15%, N=07), Symbranchiformes (4%, N=2), Beloniformes and Anguilliformes (each 1.2%, N=1) [Table 1&2 and Fig 2&3]. Out of these 47 species, 13 nos. of species belongs to family Cyprinidae, 9 nos. belongs to Sisoridae, 4 nos. belongs to Schilbeidae, 3 nos. belongs to Cobitidae family followed by Psilorhynchidae (2), Balitoridae (2), Mastacembelidae (2), Ambassidae (2), Channidae (2) and Anguillidae, Bagridae, Clariidae, Heteropneustidae, Belonidae, Sciaenidae, Nandidae, Gobiidae having (1) in number. Cypriniformes is the most dominant group throughout the River (20 species) and Cyprinidae is the most species rich family (13 species). *Chagunius chagunio*, *Puntius chola*, *Salmophasia bacaila*, *Barilius barna*, *Danio rerio*, *Devario aequipinnatus*, *Crossocheilus latius* are some of the examples. Among food fishes *Chagunius chagunio*, *Labeo calbasu*, *Labeo gonius*, *Puntius chola*, *Pethia ticto*, *Salmophasia bacaila*, *Barilius barna*, *Barilius bendelisis*, *Crossocheilus latius*, *Garra gotyla*, *Cantophrys gongota*, *Sperata aor*, *Ailia coila*, *Clupisoma garua*, *Eutropichthys vacha*, *Bagarius bagarius*, *Glyptothorax trilineatus*, *Clarias batrachus*, *Heteropneustes fossilis* are some important food fishes found in Krishnai river. Ornamental fishes plays an important role in Krishnai river. Major dominant ornamental fishes are *Puntius chola*, *Puntius sophore*, *Salmophasia bacaila*, *Barilius barna*, *Danio rerio*, *Devario aequipinnatus*, *Devario devario*, *Psilorhynchus balitora*, *Acanthocobitis botia*, *Schistura scaturigina*, *Lepidocephalichthys guntea*, *Botia Dario*, *Erethistes pussilus*, *Gagata cenia*, *Gagata gagata*, *Hara hara*, *Pseudochenesis sulcatus*, *Laguvia shawi*, *Xenentodon cancila*, *Macrornathus pancalus*, *Mastacembelus armatus*, *Chanda nama*, *Parambassis ranga*, *Badis badis*, *Channa punctatus*. Out of 47 species, 3 fishes are endangered, which is a matter of concern. Again 18 fishes are vulnerable, 14 fishes are lower risk-near threatened and 01 is lower risk-least concern, 18 are not evaluated while 3 are data deficiency. Out of which 47 species 19 are common to state fauna of Meghalaya and 28 species are common to state fauna of Assam based on ZSI report Sen (2000)²⁴ Shillong, Meghalaya. In the observation of fish diversity, it is inferred that, both the river systems endowed mostly with fresh water riverine fishes.

Table 1: Fish Diversity of Krishnai river.

Order	Family	Scientific Name	IUCN categories
Anguilliformes	Anguillidae	<i>Anguilla bengalensis</i> (Gray)	EN
Cypriniformes	Cyprinidae	<i>Chagunius chagunio</i> (Hamilton-Buchanan)	NE
		<i>Labeo calbasu</i> (Hamilton-Buchanan)	LRnt
		<i>Labeo gonius</i> (Hamilton-Buchanan)	LRnt
		<i>Puntius chola</i> (Hamilton-Buchanan)	Vu
		<i>Pethia ticto</i> (Hamilton-Buchanan)	LRnt
		<i>Salmophasia bacaila</i> (Hamilton-Buchanan)	LRlc
		<i>Barilius barna</i> (Hamilton-Buchanan)	LRnt
		<i>Barilius bendelisis</i> (Hamilton-Buchanan)	LRnt
		<i>Danio rerio</i> (Hamilton-Buchanan)	LRnt
		<i>Devario aequipinnatus</i> (McClelland)	LRnt
		<i>Devario devario</i> (Hamilton-Buchanan)	LRnt
		<i>Crossocheilus latius</i> (Hamilton-Buchanan)	DD
	<i>Garra gotyla stenorhynchus</i> (Jordan)	EN	
	Psilorhynchidae	<i>Psilorhynchus balitora</i> (Hamilton-Buchanan)	NE
	Balitoridae	<i>Acanthocobitis botia</i> (Hamilton-Buchanan)	LRnt
		<i>Schistura scaturigina</i> (McClelland)	Vu
	Cobitidae	<i>Lepidocephalichthys guntea</i> (Hamilton-Buchanan)	NE
		<i>Cantophrys gongota</i> (Hamilton-Buchanan)	LRnt
		<i>Botia dario</i> (Hamilton-Buchanan)	NE
	Bagridae	<i>Sperata aor</i> (Hamilton-Buchanan)	NE
	Schilbeidae	<i>Ailia coila</i> (Hamilton-Buchanan)	Vu
		<i>Clupisoma garua</i> (Hamilton-Buchanan)	Vu
		<i>Eutropichthys vacha</i> (Hamilton-Buchanan)	NE

Siluriformes		<i>Pseudeutropius atherinoides</i> (Bloch)	NE
	Sisoridae	<i>Bagarius bagarius</i> (Hamilton-Buchanan)	Vu
		<i>Erethistes pussilus</i> Muller & Torschel	NE
		<i>Gagata cenia</i> (Hamilton-Buchanan)	NE
		<i>Gagata gagata</i> (Hamilton-Buchanan)	NE
		<i>Glyptothorax telchitta</i> (Hamilton-Buchanan)	LRnt
		<i>Glyptothorax trilineatus</i> Blyth	NE
		<i>Hara hara</i> (Hamilton-Buchanan)	NE
		<i>Pseudochenesis sulcatus</i> (McClelland)	Vu
		<i>Laguvia shawi</i> (Hora)	EN
Clariidae	<i>Clarias batrachus</i> (Linnaeus)	Vu	
Heteropneustidae	<i>Heteropneustes fossilis</i> (Bloch)	Vu	
Beloniformes	Belonidae	<i>Xenentodon cancila</i> (Hamilton-Buchanan)	LRnt
Synbranchiformes	Mastacembelidae	<i>Macrognathus pancalus</i> Hamilton-Buchanan	NE
		<i>Mastacembelus armatus</i> (Lacepede)	NE
Perciformes	Ambassidae	<i>Chanda nama</i> (Hamilton-Buchanan)	NE
		<i>Parambassis ranga</i> (Hamilton-Buchanan)	NE
	Sciaenidae	<i>Johnius coitor</i> (Hamilton-Buchanan)	NE
	Nandidae	<i>Badis badis</i> (Hamilton-Buchanan)	NE
	Gobiidae	<i>Glossogobius giuris</i> (Hamilton-Buchanan)	LRnt
	Channidae	<i>Channa gachua</i> Bloch & Schneider	Vu
<i>Channa punctatus</i> (Bloch)		LRnt	

EN = Endangered, Vu = Vulnerable, LRnt = Lower risk near threatened, LRlc = Lower risk least concern, DD = Data Deficient, NE = Not evaluated

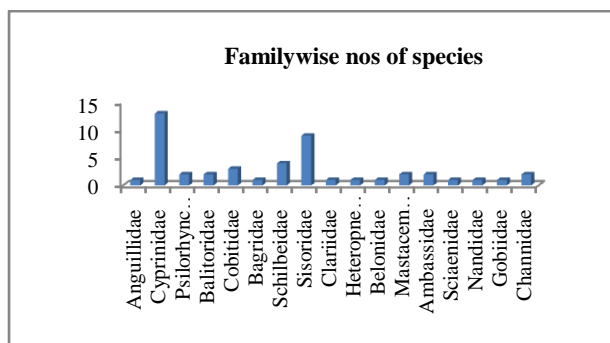


Fig 2- Family wise fish species

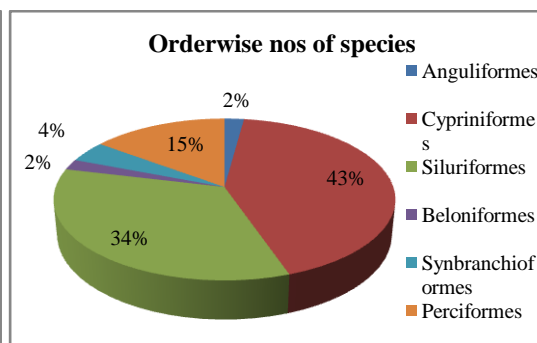


Fig 3- Order wise fish species

Table 2: Food fish and ornamental fish species of Krishnai river.

<p>Food Fish <i>Anguilla bengalensis</i> <i>Chagunius chagunio</i> <i>Labeo calbasu</i> <i>Labeo gonius</i> <i>Puntius chola</i> <i>Pethia ticto</i> <i>Salmophasia bacaila</i> <i>Barilius barna</i> <i>Barilius bendelisis</i> <i>Crossocheilus latius</i> <i>Garra gotyla</i> <i>Lepidocephalichthys guntea</i> <i>Contophris gongota</i> <i>Sperata aor</i> <i>Ailia coila</i> <i>Clupisoma garua</i> <i>Eutropichthys vacha</i> <i>Bagarius bagarius</i> <i>Glyptothorax trilineatus</i> <i>Clarias batrachus</i> <i>Heteropneustes fossilis</i> <i>Xenentodon cancila</i></p>	<p><i>Macrornathus pancalus</i> <i>Mastacembelus armatus</i> <i>Chanda nama</i> <i>Parambassis ranga</i> <i>Johnius coitor</i> <i>Glossogobius giuris</i> <i>Channa gachua</i> <i>Channa punctatus</i></p> <p style="text-align: center;">Ornamental fish</p> <p><i>Puntius chola</i> <i>Pethia ticto</i> <i>Puntius sophore</i> <i>Salmophasia bacaila</i> <i>Barilius barna</i> <i>Barilius bendelisis</i> <i>Barilius tileo</i> <i>Danio rerio</i> <i>Devario aequipinnatus</i> <i>Devario devario</i> <i>Crossocheilus latius</i> <i>Psilorhynchus balitora</i> <i>Acanthocobitis botia</i></p>	<p><i>Schistura scaturigina</i> <i>Lepidocephalichthys guntea</i> <i>Contophris gongota</i> <i>Botia dario</i> <i>Ailia coila</i> <i>Pseudeutropius atherinoides</i></p> <p><i>Erethistes pussilus</i> <i>Gagata cenia</i> <i>Gagata gagata</i> <i>Glyptothorax telchitta</i> <i>Glyptothorax trilineatus</i> <i>Hara hara</i> <i>Pseudochenesis sulcatus</i> <i>Laguvia shawi</i> <i>Clarias batrachus</i> <i>Xenentodon cancila</i> <i>Macrornathus pancalus</i> <i>Mastacembelus armatus</i> <i>Chanda nama</i> <i>Parambassis ranga</i> <i>Badis badis</i> <i>Channa gachua</i> <i>Channa punctatus</i></p>
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V. Conclusion

The Krishnai river has a great prospect for eco-tourism. The hill stream fishes of the river may also provides a good source of entertainment of tourism. Krishnai river is more prominent in capture fishery through the investigation .Local fisher men along the course of river capture fishes for local consumption and some time for economic benefits, when the catch is surplus to their needs. It has been seen that most of the fishes belong to ornamental fish categories. So there is a prospects of ornamental fish trading in the Krishnai river.

REFERENCES

- [1] Kottelat, M. 1989. Zoogeography of the fishes of Indochinese inland waters with an annotated check list. *Bull. Zool. Mus. Amsterdam*, 12 : 1 – 55.
- [2] De, K. C. 1910. *Reports of the fisheries of Eastern Bengal and Assam*, Shillong 11, 78.
- [3] Talwar, P. K. and Jhingran, A. G. 1991. *Inland Fishes of India and Adjacent Countries*, Vol. I & II, Oxford and IBH Publishing Company Pvt. Ltd., New Delhi, 1-1158 pp.
- [4] Sen, N. 2000. Occurrence, distribution and status of diversified fish fauna of North East India, p. 31-48. In A. G. Ponniah and U. K. Sarkar (eds.) *Fish Biodiversity of North East India*. NBFGR. NATP Publ. 2, 228 p.
- [5] Ayappan, A. and Satyamurthi, S.T.1960. *Handbook of Museum technique*, Government of Madras : 1-228.
- [6] Jayaram, K.C. 1981. *The freshwater fishes of India, Pakistan, Bangladesh and Sri Lanka*. A Hand Book. ZSI; Calcutta. PP.475.
- [7] Day, F. 1878. *The fishes of India: Being a natural history of the fishes known to inhabit the seas and freshwaters of India, Burma and Ceylon*. Barnard Quaritch London. Pp. 778.
- [8] Day, F. 1889. *The Fauna of British India, including Ceylon and Burma*. I Taylor and Francis, London. pp. 548.
- [9] Hamilton-Buchanan, F. 1822. *An account of the fishes found in the River Ganges and its branches*. Archibad Constable and Co, Edinburg & London. pp. 405.
- [10] Jayaram, K.C. 1981. *The freshwater fishes of India, Pakistan, Bangladesh and Sri Lanka*. A Hand Book. ZSI; Calcutta. PP.475.
- [11] Jayaram, K.C. 1991. Revision of the genus *puntius* Hamilton from the Indian region (Pisces: Cypriniformes, cyprinidae, cyprininae). *Rec. Zool. Surv. India, Occa. Pap. No.* 135:1-178.
- [12] Jayaram, K.C. 1999. *The freshwater fishes of the Indian region*. Narendra Publ. House, New Delhi. 551 PP. 18 pls.
- [13] Menon, A.G.K. 1987. *The fauna of India and adjacent countries*. Pisces. Vol. IV. Telcostei-Cobitoidea. Pt. I. Homalopteridae. Z.S.I. Calcutta.
- [14] Menon, A.G.K. 1992. *The fauna of India and the adjacent Countries*. A handbook. Z.S.I. Calcutta.
- [15] Menon, A.G.K., Rema Devi, K. & Vishwanath, W. 2000. A new species of *puntius* (Cyprinidae: cyprininae) from Manipur, India. *J. Bombay nat. Hist. Soc.* 97 (2) : pp. 263-268.
- [16] Mishra, K.S. 1976. *The Fauna of India and the adjacent countries pisces III. Telostomi. Cypriniformes : Siluri*. Z.S.I., Calcutta. pp. xxi + 367.
- [17] Nelson. 1994. *Fishes of the world*. 3rd edition. John Wiley and Sons, INC. New York. Pp. 600.
- [18] Narendran, T.C. 2000. The importance of Systematics. *Resonance* 5 (6) : pp. 60-68.
- [19] Roberts, T.R. 1994. Systematic revision of Asain bagrid Catfishes of the genus *Mystus*, *Sensus stricto*, with a new species from Thailand and Cambodia. *Ichthyol. Explor. Reshwaters.*, 35 (3) : pp. 25-35.
- [20] Pandey K.S. 1970. Geological study of the Eocene Rocks of the Garo hills Assam,. India, with special reference to the sedimentology of the limestones. *Ph.D thesis*, Gauhati University. pp.261.
- [21] Rainboth, W.J. 1985. *Neolissochilus*, a new genus of South Asian Cyprinid fishes. *Beaufortia.*, 35 (3) : pp. 25-35.
- [22] Sen and Dey, S.C. 1984. Fish Geography of Meghalaya. *Rec. Zool. Surv. India*, 81(3-4): 299-314.
- [23] Tilak, R. & Husain. 1981. A. On the systematic of Indian fishes of the genus *Lepidocephalus* Blecker with keys to species of the genus and general of the sub-families Botinae and Cobitinae (Cobitidae : Cyprinidae). *Rec. Zoo. Sur. India. Occa. Pap. No.* 32 : pp. 1-42.
- [24] Sen, N. 2000. Occurrence, distribution and Status of Diversified Fish Fauna of North East India. *Fish Biodiversity of North-East India. NBFGR. NATP Publ.* 2, pp. 31-48