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Fish Fauna and their IUCN conservation status of Chessore sub-division of Shamator, Nagaland, India

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ABSTRACT

The present study was conducted to document the fish fauna and their IUCN status of Chessore sub-division of Shamator, Nagaland for a period of one year, from May 2023 - April 2024 covering the targeted areas. The survey reveals the presence of 20 species belonging to 5 orders, 9 families and 15 genera. The order Cypriniformes dominated with 14 species while Anabantiformes, Perciform and Synbranchiformes with 1 species each is the least common. According to IUCN Red-list and habitat studies during different seasons, one species belonging to family cyprinidae is under IUCN-NT category, five species belonging to cyprinidae, channidae and cobitidae is under IUCN-VU while the rest falls under IUCN-LC and Data deficient (DD) category. A primary threat to the fish biodiversity in study area is due to anthropogenic activities and environmental changes.

Keywords: Conservation, *Garra elongata*, Cypriniforms, IUCN-Red list

1. INTRODUCTION

Freshwater fishes are one of the most threatened taxonomic groups (Darwall and Vie 2005) owing to their extreme sensitivity to the quantitative and qualitative alteration of aquatic habits (Kang *et al.*, 2009; Sarkar *et al.*, 2008). Hence, they are frequently employed as a bioindicator to assess the quality of the water.

Ichthyofauna are rich in Indo-chinese, Indo-Malayan and other affinities (Chaudhuri *et al.*, 2003). 11.7% of fish species in the world have been recorded from Indian waters (Dudgeon

et al., 2006) and 295 endemic fish species which are exclusively found in India are listed under IUCN (Chakraborty *et al.*, 2017).

India is considered as a hotspot of freshwater fish diversity and contributes a high number of the world's endemic biological resources (Kottelat and Whitten 1996; Dahanukar *et al.*, 2004).

Fish fauna of India's consists of approximately 2,500 species of fishes, of which 930 freshwater and 1,570 marines are estimated (Pathak and Lavudya 2021). Today, the fish diversity and associated habitats management is of great challenge (Dudgeon *et al.*, 2006). Aquatic ecosystems loss and associated biodiversity has become a global concern (Georges and Cottingham 2001).

Due to inadequate conservation measures, the species are declining rapidly. Use of advance sophisticated fishing gear, fish are being overfished throughout the world, and the expansion of fisheries has been linked to a decline in many fish stocks (Allan *et al.*, 2005).

The World Conservation Monitoring Centre has designated the northeastern region of India as a hotspot for biodiversity. Goswami *et al.*, (2012) has reported 422 freshwater fish species from north east India. Nagaland has unique topography, diverse physiographic features and watershed pattern.

Riverine fishery forms the major aquatic resources of this hilly state and plays a significant role in harbouring natural stocks of the fish fauna. The state has 11 major rivers, viz: Dhansiri, Dikhu, Doyang, Intangki, Meguiki, Milak, Shili, Tizit, Tizu, Tsurang, and Zungki, and 10 minor rivers viz: Arachu, Chathe, Chokla, Dzulakie, Dzuna, Lanyi, Likhimro, Seidzu, Tesuru and Tepuiki that discharge their content to the three drainage system, viz: Brahmaputra, Chindwin and Barak drainages.

Wide range of fishes from various water resources have been documented by notable researchers such as Bendangkokba and Ahmed (2007), Ao *et al.*, (2008), Konyak and Limatemjen (2022) has recorded 64 species, 149 species and 22 species respectively.

Besides, a review of the ichthyofauna of Nagaland, North-East India, by Ezung S. *et al.*, (2020) has identified 197 species. Ichthyologists are relentlessly venturing into the aquatic ecosystems of the Nagaland to conduct in-depth research on the ichthyofauna.

In recent years, new fish discoveries have made additions to the state ichthyofaunal list; namely *Pseudolaguvia vespa* (Praveenraj *et al.*, 2021), *Pethia dikhuensis* (Praveenraj 2022), *Badis limaakumi* (Praveenraj 2023) and *Exostoma sentiyonae* (Shangningam and Limatemjen 2024).

Considering that the rivers in Chessore are unexplored, the current survey was carried out in order to ascertain the fish fauna and assess their IUCN conservation status.

2. MATERIAL AND METHODS

2. 1. Study site

The survey was conducted in Chessore (26°05'28" N and 94°44'50" E) sub-division of Shamator, Nagaland, India.

The major and minor river of Chessore are Langa, Khiukeke, Müksühke and Khiukdangke, Longkhimke, Hühdangke and Alotsühye respectively.

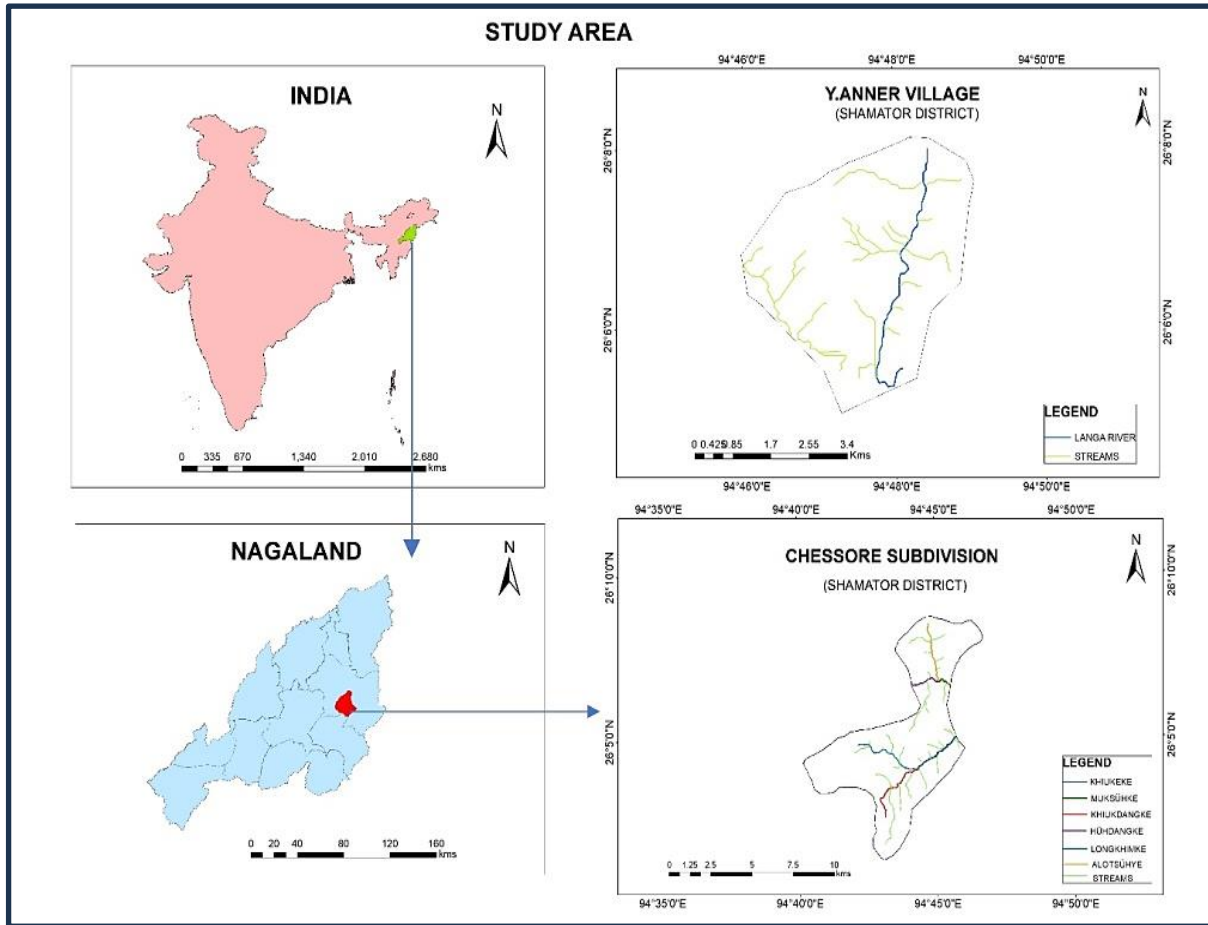


Figure 1. Map showing India, Nagaland and Y. Anner village and Chessore sub-division of the study area.

2. 2. Collection

Exploration of fish fauna were done for a period of one year (May 2023 to April 2024) covering the targeted areas. Specimens were collected with standard gill net, cast net and river diversion methods.

2. 3. Preservation of the specimen

The specimens were preserved in 10% formaldehyde and deposited in the Freshwater and Fish Biology Research Lab, Department of Zoology at Kohima Science College, Jotsoma.

2. 4. Identification

All the morphological characters of the species were noted down and photographed on the spot. The specimens were examined using Zeiss Stemi 508 stereozoom microscope and identified using standard taxonomic keys, FishBase.org and other relevant scientific publications.

3. RESULTS AND DISCUSSION

During the survey, a total of 20 species were identified attributing to 5 orders and 9 families and 15 genera. Among the orders, cypriniformes dominated with 14 species; similar finding were reported by early researchers like Acharjee *et al.*, (2012), Pathak and Lavudya (2021), Konyak and Limatemjen (2022), Khattri (2024); followed by Anabantiformes, Siluriformes, Perciform and Synbranchiforme with 2 species each. On family level, The cyprinidae constituting 55% dominated followed by Nemacheilidae by 10% while Psilorhynchidae, Badidae, Channidae, Cobitidae, Sisoridae, Mastacembelidae and Amblycipitidae by 5% each (Figure 2). According to IUCN Red- list and habitat studies during different seasons, one species belonging to family Cyprinidae is under IUCN-NT category, five species from family Channidae and Cyprinidae is under IUCN-VU category and the rest fourteen species falls under IUCN-LC and Data deficient (DD) category (Table. 1). One of the important discoveries is the report of *Garra elongata*, this record is remarkable yet needed conservation strategies been listed under IUCN-NT in the IUCN Red-List.

Despite the pressure that anthropogenic activities place on the fish fauna, the state's abundant biodiversity resources are reflected in the rapid discovery of several fish species that are new to science. Thus, evaluation and documentation of the reported fish species has become essential for proper implementation and conservation measures. The presence of 1 IUCN-NT fish species, 5 IUCN-VU species from the current survey is extremely concerning. Consequently, there is a critical need for both fish resource exploration and conservation.

Riverine fishes are subjected to various anthropogenic threats, environmental changes and introduction of invasive species. Therefore, we need to focus on identifying the factors that hinders conservation action plan. Further exploratory works are required in order to understand in detail the fish faunal diversity of this important river system.

The details of fish species recorded from the present study site are given in Table 1. The fish nomenclature is based on Fishbase.org and fish status is labelled according to IUCN Red-list (IUCN 2024.1).

Table 1. Systematic list of ichthyofauna of Chessore sub-division under Shamator, Nagaland.

Sl. No	Order	Family	Scientific Name	IUCN status
1	Anabantiforms	Channidae	<i>Channa orientalis</i> (Bloch & J.G. Schneider, 1801)	VU
2	Cypriniformes	Cobitidae	<i>Lepidocephalichthys</i> sp. (Bleeker, 1863)	
3	Cypriniformes	Cyprinidae	<i>Barilius barna</i> (Hamilton, 1822)	LC
4	Cypriniformes	Cyprinidae	<i>Cyprinion semiplotum</i> (McClelland, 1839)	VU
5	Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i> (Linnaeus, 1758)	VU
6	Cypriniformes	Cyprinidae	<i>Devario naganensis</i> (Chaudhuri, 1912)	VU

7	Cypriniformes	Cyprinidae	<i>Garra anandalei</i> (Hora, 1921)	LC
8	Cypriniformes	Cyprinidae	<i>Garra elongata</i> (Vishwanath & Kosygin, 2000)	NT
9	Cypriniformes	Cyprinidae	<i>Garra kempfi</i> (Hora, 1921)	LC
10	Cypriniformes	Cyprinidae	<i>Garra lissorhynchus</i> (McClelland, 1842)	LC
11	Cypriniformes	Cyprinidae	<i>Garra naganensis</i> (Hora, 1921)	LC
12	Cypriniformes	Cyprinidae	<i>Poropunctius</i> sp. (Mukerji, 1933)	
13	Cypriniformes	Cyprinidae	<i>Schizothorax richardsonii</i> (J.E. Gray, 1832)	VU
14	Cypriniformes	Nemacheilidae	<i>Schistura</i> sp. (McClelland, 1838)	
15	Cypriniformes	Nemacheilidae	<i>Schistura</i> sp. (McClelland, 1838)	
16	Cypriniformes	Psilorhynchidae	<i>Psilorhynchus homaloptera</i> (Hora & Mukerji, 1935)	LC
17	Perciform	Badidae	<i>Badis badis</i> (Hamilton, 1822)	LC
18	Siluriformes	Amblycipitidae	<i>Amblyceps mangois</i> (Hamilton, 1822)	LC
19	Siluriformes	Sisoridae	<i>Exostoma berdmorei</i> (Blyth, 1860)	DD
20	Synbranchiforms	Mastacembelidae	<i>Mastacembelus armatus</i> (Lacepède, 1800)	LC

Abbreviations: VU - Vulnerable; LC - Least Concern; DD - Data deficient; NT - Near Threatened



I. *Schistura* sp.



II. *Schizothorax richardsonii*



III. *Cyprinion semiplotum*



IV. *Barilius barna*



V. *Garra kempfi*



VI. *Garra anandalei*

Figure 2. Fishes of Chessore sub-division of Shamator, Nagaland.

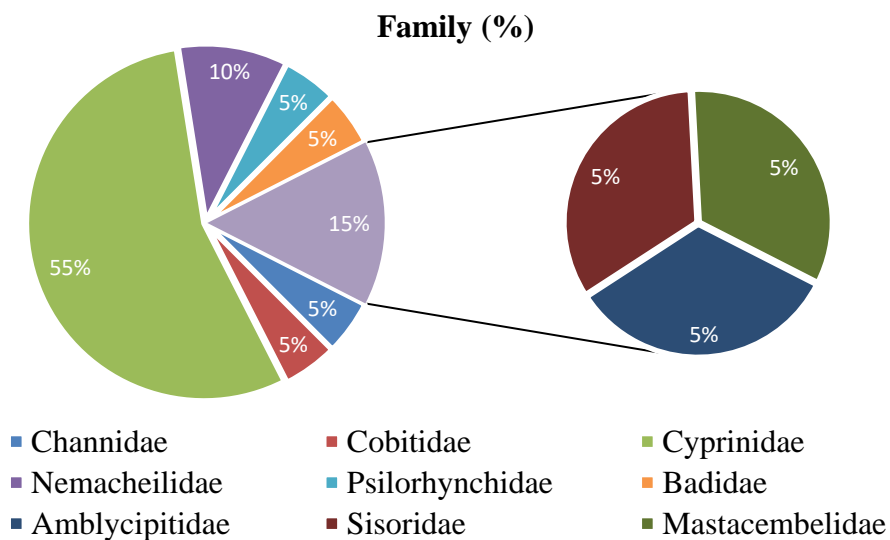


Figure 3. Showing the percentage composition of Fish Fauna of Chessore sub-division of Shamator.

4. CONCLUSION

The present survey of Fish fauna and their IUCN conservation status of Chessore sub-division of Shamator, Nagaland reported a total of 20 variable types of fish species belonging to 5 orders, 9 families and 15 genera (Table 1). The family Cyprinidae family dominated the list with 55% followed by Nemacheilidae 10% while Psilorhynchidae, Badidae, Channidae, Cobitidae, Sisoridae, Mastacembelidae and Amblycipitidae by 5% each (Figure. 3). According to IUCN Red-list, one species belonging to family Cyprinidae is under IUCN-NT category, five species from family Channidae and Cyprinidae is under IUCN-VU category and the rest fourteen species falls under IUCN-LC and IUCN-DD category.

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