

A Review on Ichthyofaunal Diversity and Distribution of North-East India

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The present communication reviews the ichthyofaunal diversity of the North-east India. Eastern Himalayas are one of the biodiversity hotspots in India and harbour very diverse fish fauna. The biodiversity richness of the north east India has attracted many taxonomists to explore fishes and have reported different views on the number of fish species from this area. This study compiles all the previous studies and found the ichthyodiversity to be a total of 512 fish species from 128 genera, 40 families and 12 orders. But about 16% of fish diversity in North-East India comes under the threatened category for which proper conservation measures are desirable and about 33% of fishes come under the data-deficient (DD) and not-evaluated (NE) categories and their conservation status needs more attention.

Introduction

North East region is hilly land-locked area lying between 21° 57' & 29° 23' and 87° 58' & 97° 09' and physiographically categorized as Eastern Himalayan, Northeast Hills, Brahmaputra and Barak Valley plains. With five important drainage system; the Brahmaputra, the Barak-Surma-Meghna, the Koladyne, the Chindwin and the Karnaphuli forming fresh water ecosystem of the region, comprising of 19,868 km of rivers, tributaries, 14,338 ha wetlands and lakes, 23,792 ha reservoirs. The hills and undulating valleys of this region imparts are source of torrential hill streams, leading to formation of large rivers and become part of the Ganga-Brahmaputra-Barak-Chindwin-Koladyne-Gomati-Meghna system (Lokeshwor, 2013). The region has a much more sophisticated geomorphic history and pervasive topographic features than the Central Himalayas which facilitated the region's rich biological diversity and ecosystem structure (Vishwanath, 2021).

Endemism is ecological state of a species being unique to a defined geographic location, such as an island, nation, country or other defined zone, or habitat type (Darlington, 1957). The North-eastern region is particularly a hotspot for endemic freshwater biota. The high degree of endemism in this region is thought to have resulted from its long period of isolation and complex evolutionary history, which promoted *in situ* diversification (Darlington, 1957). The Indo-Burma biodiversity hotspot has an amazing freshwater fish fauna, with 1262 recorded species

including 566 endemics accounting for about 10 % of the world total (Tordoff *et al.*, 2012).

Freshwater fishes are one of the most threatened taxonomic groups (Darwall and Vie, 2005) because of high sensitivity to any quantitative and qualitative alterations in their habitat as well as physico-chemical parameters. The North-eastern region of India is considered to be one of the hotspots of freshwater fish biodiversity in the world (Ramanujam *et al.*, 2010). A great number of species have been reported from most of the North-eastern states. Out of a total of 2500 species of fish in India, 930 are confined to freshwaters, belonging to 326 genera, 99 families and 20 orders (Talwar and Jhingran, 1991). North-eastern states of India are rich in fish resources as evident from the reports of Talwar and Jhingran (1991), Acharjee *et al.* (2012) and Vishwanath (2021). Therefore, an attempt was made to note the fish species occurrence, distribution and also to add further information on the fish species diversity of North-Eastern part of India.

Fish Diversity of North-east India and Endemism

The freshwater of the Himalayas and Indo-Burma are highly diverse (Allen *et al.*, 2010). Significant contribution on the systematics and fisheries of the river basin of northeast India includes work of Talwar and Jhingran (1991), Menon (1999), Vishwanath (2021).

Dey (1984) made systematic account of the ichthyofauna of the Northeast India and listed 123 fish species from this region. A total of 177 Cyprinid species

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belonging to 2 families, 4 subfamilies and 27 genera are so far reported from the inland waters of India. Out of which 43 species are considered of great economic importance. Menon (1999) listed 446 primary freshwater species under 33 families and 11 orders from the India. Of the primary freshwater species 68% are constituted by the Cyprinoids, 18% by Siluroids while 14% by other groups. Nelson (2006) reported 27,977 fish species under 4,494 genera, 62 orders and 515 families.

Yadava and Chandra, (1994) reported that ichthyofaunal studies of the northeast region of India, which has elements of the Indo-gangetic region and to some extent, elements of the Myanmarese and South-Chinese regions, is scarcely studied. Kottelat & Whitten (1996) also estimated the Brahmaputra-Irrawaddy to contain 200 species of fish.

Sen (2003) reported 291 species belonging to 38 families and 12 orders; of which 35 species were identified as endemic species in different states of northeast India. Vishwanath (2012) reported about 300 fish species under more than 100 genera and 30 families. He listed candidates of aquarium fishes belongs to groups nemacheilides, Cobitids, Psilorhynchids, Sisorid cat fishes, badids, danionins and also the genera of cold-water fishes viz, *Tor*, *Neolissochilus*, *Schizothorax*, *Labeo*, *Cirrhinus*, *Semiplotus*, *Poropuntius*, *Barilius*, *Raiamas*, *Danio*, *Garra*, *Pterocryptis*. Goswami (2012) reported and recorded 442 fish species from North East India, belonging to 133 genera and 38 families. The maximum diversity observed for family Cyprinidae with 154 species.

Acharjee *et al.* (2012) studied on Ichthyofaunal diversity of Dhansiri River, Dimapur, Nagaland, India. Das *et al.*, (2014) studied on fish diversity and drainage analysis of river Siang, East Siang District of Arunachal Pradesh. This study reveals revealed the presence of 82 species of fishes belonging to 8 orders, 24 families and 53 genera. Species representing the order Cypriniformes dominated the ichthyofauna while those representing Tetradontiformes are in less number.

Brahmaputra river system form lucrative fields of Ichthyological importance in northeast India. Several workers have studied the River Brahmaputra and its tributaries in Assam. Baishya *et al.* (2016) recorded 52 small indigenous fish species under 15 families and 33 genera in the upper reach of Brahmaputra.

The most recent work on the compilation of the fish species reported from this region was carried out by Vishwanath (2017) studied the Diversity and conservation status of freshwater fishes of the major rivers of northeast India and reported 318 fish species under 113 genera and 36 families. A total of 229 species are in the Brahmaputra drainage, 103 in the Chindwin, and 27 in the Kaladan. He mentioned 27 species endemic to the Brahmaputra basin as well as 41 species endemic to the Chindwin drainage. Dey *et al.*, 2021 reported a total of 117 fish species from 12 selected sites of the Kameng river basin. Cyprinids represented the dominant group with 45 species. *Garra annandalei*, *G. quadratiostris*, *Neolissochilus hexagonolepis* and *Schizothorax richardsonii* were the most dominant species.

In last five years explosion of literature on taxonomic research of new species discovered has been witnessing from this region. Some of the publication on the description of new species from the rivers of NE region includes, *Schistura rebuw* (Choudhury *et al.*, 2019); *Mustura subhashi* (Choudhury *et al.*, 2021); *M. daral* (Rameshori *et al.*, 2021). Description of so many new species reflects the undiscovered rich biodiversity of the region as many lotic water bodies have not been completely explored because most of the rivers are located in inaccessible mountainous terrain with dense forest cover.

Conclusion

Besides the probable importance of this system, we have found a gap of information regarding the list of fish fauna in the drainage systems of the states of NE, India. In recent years many new species have been described from this region suggesting the importance of water bodies of NE, India. An extensive study on the taxonomy and biology of the freshwater fishes in India has been achieved. The study highlights the need to explore fish fauna of the major river system of North-East India at regular intervals to build a comparable database that might be utilized by the stakeholders for research, planning and management activities. Also, adequate information on the biology and distribution of species for accurate assessment is lacking. Fresh water ecosystems are especially vulnerable to human activities. Effective conservation measures should be taken in order to stop anthropogenic activities as well as habitat degradation by involving local people, making them aware of the

potential ichthyofaunal hub of freshwater fishes in the north-eastern region of India.

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