African Journal of Fisheries Science Vol. 2 (6), pp. 107-127, June, 2014. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Cross-examination on taxonomic status, economic importance, geographical distribution, present status and prevailing threats of Fish varieties, Himalayan and Indo Burma biodiversity hotspots zones of North East India

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Accepted 01 May, 2014

The paper lists 422 fish species from north east India, belonging to 133 genera and 38 families. The maximum diversity is observed in the family Cyprinidae, which is represented by 154 species. Families Anguillidae, Engraulidae, Chacidae, Aplocheilidae, Syngnathidae, Sciaenidae, Osphronemidae, Ophichthidae, Pristigastiridae and Tetraodontidae are represented by a single species each. The habitat, economic importance, distribution (within Northeast India) and threat criteria are listed. The names of the species are corrected after following the new nomenclature. The list includes plain, torrential and estuarine, as well as exotic species. The species are listed from findings of the documented references that have been known till December, 2011. The threats criteria have been finalised from the IUCN & NBFGR reports and physical verification of the habitat, in different seasons and the existing natural and anthropogenic hazards that prevail. It has been found that the fish diversity of these hotspots faces serious threats which would lead to a catastrophic loss of our biodiversity. Further, this survey shows that the north eastern region of India contains more than 62.81% of total freshwater fish available in the country, as against the 667 freshwater species reported. The findings provide 48 endangered, 69 near threatened, 103 vulnerable, 153 least concerned, 23 data deficient and 26 not evaluated species from the list. The different natural and anthropogenic threats are evaluated. The impact of the different threats and the present conservation status of the fish fauna from the north eastern region of India raises several questions regarding their sustainance as well as the need for a future environmental impact analysis.

Key words: Fish diversity, fish geography, fish conservation status, natural and anthropogenic hazards, digitized map of Himalayan and Indo- Burma biodiversity hotspots zone.

INTRODUCTION

North east India, comprising eight states, namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura provide unique ecological variations. The diversity within the freshwater ecosystems in this region, forming part of the Himalayas and Indo-Burma are both highly diverse and of great regional

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importance in terms of the livelihood and the economic importance of the people living around it (Allen et al.,2010). Accordingly, the relationships between the biodiversity and human well-being is interrelated and is being promoted increasingly through the concept of ecosystem services provided by the species (MEA, 2005; McNeely and Mainka, 2009) The diversity 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. Another important factor is the tectonic setting in the Indo-China sub region caused by the collision of the Indian, Chinese and Burmese plates, resulting in the formation of the mighty Himalayas and Indo-Burman ranges.

This region is drained by the Ganga river system in the north and northeastern part of Bengal, the Brahmaputra system in Assam, Meghalaya, Tripura and some parts of Mizoram, Manipur and Nagaland. The eastern part of Manipur, including the central plain, and Nagaland is drained by the Chindwin river system, while the southern part of Mizoram, by the Koladyne river system.

Northeast India forms a part of two of the 34 biodiversity hotspots listed by Conservation International, the Himalayas and Indo-Burma (Roach, 2005). The Himalayas are the home of the world's highest mountains and deepest gorges.

The mountains rise abruptly, resulting in a diversity of ecosystems. Indo-Burma, also called Indo-China bioregion, includes portions from eastern India to Vietnam, the whole of Arunachal Pradesh and Assam, north of the Brahmaputra, and Sikkim belong to the Himalayas, while Mizoram, Assam, south of the Brahmaputra, Meghalaya, Nagaland and Manipur belong to the Indo-Burma region (Myers et al., 2000). Kottelat and Whitten's (1996) map of biodiversity hotspots also covers areas of northeast India. Since the pioneering work of Hamilton (1822), more than 75 research papers have been published and more than 100 species of fishes have been described anew from this region. Many eminent ichthyologists have contributed to the descriptions.

The present study focuses on the status and diversity of the freshwater fish species of the north eastern region of India, part of the two hotspot region, viz. Indo-Burma and Himalayan hotspots (CEPF, 2005). The study also highlights the importance of the Indo-Burma region in its aquatic fauna diversity, inspite of only 5% of its natural habitat remaining and holding more people than any other hotspot (Indo-Burma Biodiversity Hotspot, 2007). Moreover, the unique assemblage of the aquatic biota and threatened and endemic in this region is not only a global priority for conservation, but also determines the distribution of the biota.

The region, northeast India, is distinctive in having certain endemic genera of fishes, viz., *Aborichthys*, *Akysis*, *Badis*, *Bangana*, *Chaca*, *Conta*, *Erethistoides*, *Erethistis*, *Exostoma*, *Myerglanis*, *Olyra*, *Parachiloglanis*, *Pareuchiloglanis*, *Pseudecheneis* and *Pseudolaguvia*. In the present study, we report the occurrence of 422 species after a critical analysis of earlier reports.

MATERIALS AND METHODS

Available literature of the fish fauna of northeast India was studied. Systematic arrangement and distribution of fishes were followed after Vishwanath et al. (2007). In the case of catfishes, a systematic arrangement of families and genera cited by Ferraris (2007) was followed. IUCN and NBFGR (Lakra et al., 2010; Viswanath et al., 2010) proposed threat criteria of species was considered. Further, the habitat, of the fish or the group was analyzed from the physical verification of the geographical localities as well as the concerned natural and anthropogenic threats. 35 different references cited in introduction were considered in preparing the list. In the present investigation, a total of 35 references were considered in the preparation of the entire list from the various states (Ao et al., 2008; Bagra et al., 2009; Barman, 1989, 2002; Biswas and Sugunan, 2008; Darshan et al., 2010; Das and Biswas, 2008; Jayaram, 2010; Kar and Sen, 2007; Karmakar, 2006; List of Fishes of Tripura, 2007; Nath and Dey, 2000; Nath and Dey, 2008; Ramanujan, 2005; Rema and Indra, 2009; Sarkar and Ponniah, 2000; Sen, 1995, 1999, 2000, 2003, 2007, 2009; Sinha, 1994, 2010; Tamang, 1992, 1993; Tamang et al., 2007; Vishwanath et al., 2007; Yadava and Chandra, 1994; Lakra et al., 2010; CAMP, 1997; Daniels, 2001; Das, 1994; Jayaram, 2008; Menon, 1999; Ponniah, 1994).

Information on the habitat and economic importance was collected from fishermen and local fish retailers. Further, the names of the fishes were confirmed from the website: www.Fishbase.org and www.calacademy.org/research/ichthyology/catalog (Froese and Pauly, 2010). However, in the present check list, the present status of threatened, endangered etc were determined for the physical verification of the prevailing threats caused by both natural and anthropogenic hazards.

The present status of the species was emphasized by the availability of the species, their distribution, reproduction performance (on the availability of the spawns, fries and fingerlings in their concerned habitat) and the prevailing situation and hazards. It may be mentioned that almost all the concerned habitat of the fish fauna of this region face several hazards, both anthropogenic and natural. We have, in our earlier reports (Goswami, 2005; Goswami et al., 2007), explained the hazards. The conservation status of the fish population was analysed as per the NBFGR's citation- 2010 (Lakra et al., 2010). However, the whole list was further re-examined on the basis of existing or prevailing natural and anthropogenic threats in different habitats of the fishes.

RESULTS

The identified species are listed against the concerned families along with their habitat, economic importance, distribution within north east India and other parts. Conservation status, as discussed earlier, and threats are shown in Table 1. A total of 422 species belonging to 39 families have been identified (Table 1). Altogether, 35 references were consulted in documenting the list as shown below. In Table 1, the list of fish with their families, habit, habitat, economic importance, distribution, present status and threats are shown. The food habits, habitat and specific ecological niche such as demersal, pelagic and bentho-pelagic and pelagic-neritic status are shown

along with food habits and habitat.

DISCUSSION

The paper reports 422 fish species from North East India, belonging to 133 genera and 38 families, including its commercial value, such as food fish, ornamental fish, available in the different states of north eastern India and other countries have been described (Tables 1, 2 and 3). Maximum diversity is observed in the family Cyprinidae which is represented by 154 species. Families Anguillidae, Engraulidae, Heteropneustidae, Chacidae, Aplocheilidae, Syngnathidae, Sciaenidae, Osphronemidae, Ophichthidae, Pristigastiridae and Tetraodontidae are represented by a single species each. Some of the fishes having greatest adaptation to hill stream mode of life as described by Hora (1944) are found in the region. They are: *Psilorhynchus, Garra, Glyptothorax, Pseudocheineis, Pseudolaguvia, Myerglanis, Exostoma, Erethistes, Parachiloglanis, Pareuchiloglanis*.

Many other species are considered to be widely distributed. The morphology between the species of two different drainage systems was once regarded as variable forms of one species. Earlier, fish taxonomy was often based on limited sample sizes and poorly preserved specimens. Failure to interpret the reason for observed variability may be ontogenic, geographic, intra or interspecific; taxonomists conservatively concluded for intraspecific variability. Fish taxonomy is now to be based carefully, taking these points into consideration.

In view of the richness of species diversity and endemicity in this twin biodiversity hotspot region, the Himalaya and Indo-Burma, all the available species need careful assessment. Several attempts have been made by ichthyologists to explore the piscifauna of the region, but the available data is far from complete. This is due to the lack of extensive survey works in this area, particularly in the interiors of the hills because of difficult topography, inaccessibility and lack of proper language communication. Hundreds of species probably still await discovery, as sampling of the habitats of species, can be difficult, due to lack of types. Earlier works were mostly based on limited sample sizes and poorly preserved specimens. Attempts have been made to identify collections from different parts of northeast India. There are three distinct fauna: Indian, constituted by the species of Indian drainages, the Irrawaddy and Salween; Southeast Asian, by those of the Chao Phraya, Mekong and Sunda Islands and the Chinese, by those of China and the Red River. The affinity and interrelationships of species have been related with longitudinal river valleys, inter-basin connections, geological history, etc. (Kottelat, 1989; Daniel, 2001). In order to take up a successful conservation programme, an evaluation of the degree of threats to the species is essential. It is important that identification of species should be correct and conservation measures should reach the target species. A study of the rich fauna of the region lies in the discovery and the survey of the fauna. An attempt to take up conservation of taxa is the need of the hour.

In the present report, an attempt has been made to use the new nomenclature along with the family status. Mention may be made that both *Clarias magur* and *Heteropneustes fossilis* have been listed under family Claridae (Ng and Kottelat, 2008; Ferraris, 2007). The north eastern region of India provides unique aqua bodies (NEC, 2008) with the main river systems, their tributaries, hill streams, connected wetlands. These aquabodies provide a lucrative occurrence of various species of freshwater fish. Some of the species of estuarine habitats such as *Tenualosa ilisha*, *Rhinomugil corsula, Johnius coitor* which migrate to the Brahmaputra river system for breeding, are also available. Further, the occurrence of the pipe fish *Microphis deocata* belonging to the family Syngnathide, is of unique occurrence, since other species or genus of the same family is found in the Bay of Bengal, that is, in a marine habitat. The species mentioned are trapped within the Himalayan ranges during the process of the continental drifting or elevation of Himalayas. The Brahmaputra river system has the highest waterflow of 1.95 lakh km, of which 81,424 km^2 is in Arunachal Pradesh. The Teesta is another long river flowing through Sikkim. All these water bodies are blessed with warm and cold water and furnish a wide range of habitat. In the present report, it may be mentioned that several species from Arunachal Pradesh are not finally reported, which might require further clarification (Nath et al., 2000). There are several species of Myanmar origin and in this respect we can cite the example of (i) Noadhing river rising from the Patkai range which separates Myanmar and Arunachal Pradesh. This clearly shows that Arunachal Pradesh and Myanmar had a well connected drainage system. Further, the report of the occurrence of *Bhavania arunachalensis* (Nath et al., 2008) is an evidence of the dispersal of the South Indian element, which supports the findings of Pascoe (1919) and Pilgrim (1919). Similarly, (ii) the connection between Manipur and Myanmar has been well established by the occurrence of several species of Irrawad fauna, the drainage pattern of Mizoram appearing to be parallel. Most of the rivers flow either northwards or southwards, showing Malayan affinity, and are related to the fauna of Thailand, China, Sumatra and Java (Hora, 1944; Jhingran and Talwar, 1991).

There are two characteristics of the river systems of North East India: whereas the Brahmaputra and Teesta river systems are provided with rain and snow melted water, the Barak and Chindwin systems are only rain-fed rivers. The geological and meteriological conditions are sharply different from each other. A digitised map has also been drawn showing the Himalayan and Indo-Burma biodiversity hotspot zones and the north eastern states of

Table 1. Fish fauna of North East India, their taxonomic status, food habit, habitat, economic importance, distribution and their present status.

Family	Species	Food Habit/Habitat	Economic importance	Distribution (within NE)	Distribution (other parts)	Present status	Threats
Notopteridae	1.*Chitala chitala*	C/R,WL(D)	Fd	Wide	Pak, Bd, Myn	EN	NT, AT
	2. *Notopterus notopterus*	O/R, WL(D)	Fd	Wide	Ind, Pak, Np, Bd, Myn, SE Asia, Thai.	EN	NT, AT
Anguillidae	3.*Anguilla bengalensis*	O/R,WL, Str.(BP)	Fd	Wide	Bd, Bh, Ind, Pak, SrL, Np, Malay Archipelago, East Indies.	EN	NT, AT
	4.*Gonialosa manmina*	C/R, WL, Str(P)	Fd	A, Ap	W.Beng, Bd, Pak, SrL	VU	AT
	5.*Gudusia chapra*	O/R, B, P(P)	Fd	Wide	Bd, Np, Pak, Malay, Myn	VU	NT, AT
Clupeidae	*6. Gudusia variegata*	O/R, B, P(P)	Fd	A, Ap, Sk	N. India, Myn	DD	NK
	7. Nematalosa nasus	O/Fw, Bw(P)	Fd, Or	A, Ap, Tr	Ind, SrL, Bd, Chn, Pak, Myn, Iraq, Viet.	DD	NK
	8. *Tenualosa ilisha*	O/R, L(P-N)	Fd	A, Mn, Tr	Bd, Chn, Myn, Pak, SrL.	VU	NT, AT
Engraulidae	9. *Setipinna phasa*	C/R, Str(P)	Fd, Or	A, Ap, Mn, Mg	Ind, Bd, Myn, Pak	LC	AT
Cyprinidae	10.*Amblypharyngodon mola*	H/R, Str(BP)	Fd, Or	Wide	Bd, Myn, Np, Pak, SrL	LC	NT
	11. *Aspidoparia jaya*	C/R, Str(BP)	Fd, Or	A, Ap, Mz, Sk, Tr	Ind, Bd, Np.	VU	NT, AT
	12. *Aspidoparia morar*	C/R, Str(BP)	Fd, Or	A, Ap, Mn, Mz, Ng, Sk, Tr	Bd, Iran, Myn, Np, Pak, Thai	VU	NT
	13. *Aspidoparia ukhrulensis*	O/R, Str(BP)	Fd, Or	Mn	Myn	DD	NK
	14. *Bangana dero*	O/R, Str(BP)	Fd	A, Ap, Mn, Mg, Mz, Ng, Sk	Bd, Myn, Np, Pak, Chn, SrL.	VU	NT, AT
	15. *Bangana devdevi*	O/R, Str(BP)	Fd	A, Mn, Ap	Np, Bd, SrL, Myn, Chn, Thai.	LC	NT, AT
	16. *Barilius barila*	O/R, Str(BP)	Fd, Or	A, Mn, Mg, Mz, Ng, Sk, Tr	Bd, Myn, Np	VU	NT, AT
	17. *Barilius barna*	O/R, Str(BP)	Fd, Or	Wide	Np, Bd, Myn	VU	NT, AT
	18. *Barilius bakeri*	O/R, Str(BP)	Fd, Or	A, Mz, Tr	UP, Kerela.	VU	NT, AT
	19. *Barilius barnoides*	O/R, Str(BP)	Fd	A, Mz, Ng, Tr	Bihar, W.Beng, Myn	DD	NK
	20. *Barilius bendelisis*	O/R, Str(BP)	Fd, Or	Wide	Bd, Np, Pak, SrL	VU	NT, AT
	21. *Barilius chatricensis*	O/R, Str(BP)	Fd, Or	As, Mn	Myn	LC	NT
	22. *Barilius dimorphicus*	O/R, Str(BP)	Fd	As, Tr	Kerala	DD	NK
	23. *Barilius dogarsinghi*	O/R, Str(BP)	Fd, Or	A, Ap, Mn, Ng, Tr	Myn	EN	NT
	24. *Barilius gatensis*	O/R, Str(BP)	Fd	Mn, Tr	Myn	LC	NT
	25. *Barilius ngawa*	O/R, Str(BP)	Fd, Or	Mn, Tr	Myn	LC	NT
	26. *Barilius radiolatus*	O/R, Str(BP)	Fd, Or	Mz, Tr	India, Bd, Pak	LC	NK
	27. *Barilius shacra*	O/R, Str(BP)	Fd, Or	A, Ap, Mg, Mz, Ng, Sk, Tr	Bd, Np.	VU	NT, AT
	28. *Barilius tileo*	O/R, Str(BP)	Fd, Or	A, Ap, Mn, Mz, Mg, Ng, Sk,	Bd, Np, Pak, Myn	VU	NT
	29. *Barilius vagra*	O/R, Str(BP)	Fd, Or	Wide	Afg, Bd, Myn, Np, Pak, SrL	VU	NT
	30. *Barilius lairokensis*	O/R, Str(BP)	Fd	Mn	Myn	LC	NT
	31. *Brachydanio albolineatus*	O/R, Str(BP)	Or	Mg	Myn, Malay Archipelago.	LC	NK

Table 1. Continued.

	32. *Brachydanio choprai*	O/R, Str(BP)	Or	Mg	Myn	LC	NK
	33.*Brachydanio nigrofasciatus*	O/R, Str(BP)	Or	Mg	Myn	LC	NK
	34. *Brachydanio shanensis*	O/R, Str(BP)	Or	Mg	Myn, Thai	LC	NK
	35. *Brachydanio sondhii*	O/R, Str(BP)	Or	Mg	Myn	LC	NK
	36. *Chagunius chagunio*	O/R, Str(BP)	Fd, Or	Wide	Bd, Myn, Np, Pak, SrL,Thai	EN	NT, AT
	37. *Chagunius nicholsi*	O/R, Str(BP)	Fd, Or	A, Mn, Ng	Myn	LC	NT
	38. *Chela cachius*	O/R, Str(BP)	Fd, Or	A, Ap, Mn, Mg, Ng, Sk, Tr	Bd, Myn, Np, Pak	LC	NT
	39. *Chela laubuca*	O/R, Str(P)	Fd, Or	A, Ap, Mg, Mn, Mz, Ng, Tr	TN, W.Beng, MH, Bd, Pak, Myn, Np, SrL, Malay Peninsula, Sumatra	DD	NK
	40. *Chela fasciatus*	H/R, Str(P)	Fd, Or	Mn	S. India, Bd	LC	NT
	41. *Chela khujairokensis*	H/R, Str(BP)	Fd	Mn	Myn	LC	NK
	42. *Ctenopharyngodon idella*	H/R, Str, L, WL(D)	Fd	Wide, Cult	Wide	NE	Ex.CS
	43. *Cirrhinius ariza*	O/R, WL(BP)	Fd	A, Mz, Tr	Bd	LC	NK
	44. *Cirrhinius cirrhosus*	O/R(BP)	Fd	As, Tr	Rivers of Peninsular India	VU	AT
	45. *Cirrhinus mrigala*	O/R, P, WL, L(BP)	Fd	Wide	Bd, Myn, Np, Pak	VU	NT, AT
	46. *Cirrhinus reba*	O/R, P, WL(BP)	Fd	A, Ap,Mn, Mg, Mz, Ng, Tr	Bd, Myn, Np, Pak, Thai	VU	AT
	47. *Crossocheilus burmanicus*	O/R, Str(BP)	Fd, Or	A, Ap, Mn, Mz, Ng	Chn, Myn, Thai.	VU	NT, AT
	48. *Crossocheilus latius*	O/R, Str(BP)	Fd, Or	Wide	Bd, Myn, Np, Pak	VU	NT
Cyprinidae	49. *Cyprinion semiplotum*	O/R, Str(BP)	Fd, Or	A, Ap, Mn , Mz, Mg, Ng, Sk	Myn, Np	VU	NT
	50. *Cyprinus carpio*	O/R, P, WL, L(BP)	Fd	Wide	Wide	NE	Ex.CS
	51 *Danio dangila*	C/R, Str(BP)	Or	Wide	Bd, Bh, Myn, Np	VU	NT, AT
	52. *Danio rerio*	C/R, Str(BP)	Or	Wide	Bd, Np, Pak	VU	NT, AT
	53. *Danio jaintianensis*	C/R, Str(BP)	Fd	A, Mg	Muwi-Stream	VU	AT
	54. *Devario annandalei*	C/R, Str(BP)	Or	Tr	Myn, Mekong basin	LC	NK
	55. *Devario acuticephala*	C/R, Str(BP)	Or	Ap, Mn, Ng	Myn	EN	NT, AT
	56. *Devario aequipinnatus*	C/R, Str(P)	Or	A, Ap, Mn, Mg, Ng, Sk, Mz, Tr	Bd, Myn, Np, SrL, Thai	LC	NT, AT
	57. *Devario assamensis*	C/R, Str(BP)	Or	A, Ap	Bd	LC	NT
	58. *Devario anomalus*	C/Fw(P)	Or	A	Bd	VU	NK
	59. *Devario devario*	C/R, Str, WL, L(BP)	Or	A, Ap, Mg, Mn, Mz, Ng,Sk, Tr	Bd ,Myn, Np, Pak, Thai	NT	NT, AT
	60. *Devario horai*	C/R, Str, WL(BP)	Or	A, Ap, Sk	Bd, Myn, Thai	NT	NT, AT
	61. *Devario naganensis*	C/R, Str(BP)	Or	A, Mn, Mg, Mz, Ng, Sk, Tr	Myn	VU	AT
	62. *Devario regina*	C/R, Str(P)	Or	A, Mn	Myn, Thai, Malaya	LC	NT
	63. *Devario yuensis*	C/R, Str(BP)	Or	A, Mn	Myn, Bd	LC	NT
	64. *Esomus danricus*	O/R, Str(BP)	Or	Wide	Bd, Myn, Np, SrL, Pak	VU	AT
	65. *Garra abhoyai*	H/R, Str(BP)	Or	Mn	Myn	DD	NK
	66. *Garra Rupecula*	H/R, Str(BP)	Fd, Or	A, Ap, Mn, Mg, Mz, Ng	Myn, Thai	LC	NT
	67. *Garra annandalei*	H/R, Str(BP)	Or	A, Ap, Mn, Mg, Mz, Ng, Sk	Bd, Myn, Np	LC	NT

Table 1. Continued.

	68. *Garra compressus*	H/R, Str(BP)	Or	Mn	Myn	LC	NT
	69. *Garra elongate*	H/R, Str(BP)	Or	Mn	Myn	LC	NT
	70. *Garra flavatra*	H/R, Str(BP)	Fd, Or	Mn	Myn	DD	NK
	71. *Garra gotyla*	H/R, Str(BP)	Fd, Or	Wide	Bd, Myn, Np, Pak	VU	NT
	72. *Garra gravely*	H/R, Str(BP)	Or	Mn, Mz	Pak, Bd, Myn	DD	NK
	73. *Garra kempi*	H/R, Str(BP)	Or	A, Ap, Mn, Mg, Mz, Ng	Myn, Np	VU	NT
	74. *Garra kalpangii*	H/R(BP)	Or	A, Ap	NK	NK	NK
	75. *Garra lamta*	H/R, Str(BP)	Or	Wide	W.Ghats, Myn, Np, Pak	VU	NT
	76. *Garra mcclellandi*	H/R, Str(BP)	Or	Ap, Mn, Mg, Mz, Ng, Sk	Myn, Np	LC	NT
	77. *Garra notata*	H/R, Str(BP)	Or	Mz, Ng	MH, Myn	LC	NT
	78. *Garra lissorhynchus*	H/R, Str(BP)	Fd, Or	A, Ap, Mn, Mg, Mz, Ng, Sk	Np	VU	NT
	79. *Garra litanensis*	H/R, Str(BP)	Or	Mn, Sk	Myn, Np	NT	NT, AT
	80. *Garra manipurensis*	H/R, Str(BP)	Or	A, Mn, Mz	Myn	NK	NT, AT
	81. *Garra naganensis*	H/R, Str(BP)	Or	A, Ap, Mn, Mg,, Mz, Ng	Myn	VU	NT
	82. *Garra nambulica*	H/R, Str(BP)	Or	Mn	Myn	LC	NT, AT
	83. *Garra nasuta*	H/R, Str(BP)	Or	A, Ap, Mn, Mg, Mz, Ng, Sk	Chn, Myn, Viet	LC	NT
	84. *Garra paralissorhynchus*	H/R, Str(BP)	Or	Mn	Chn, Myn, Viet	NE	NK
Cyprinidae	85. *Gibelion catla*	H/R, P, L, WL(BP)	Fd	Wide	Bd, Np, Pak, Myn	VU	NT, AT
	86. *Gymnocypris dobula*	H/R(BP)	Fd	A	Chn	VU	NK
	87.*Gymnocypris scleracanthus*	H/R(BP)	Fd	A	Chn	VU	NK
	88. *Horalabiosa joshuai*	H/R(D)	Fd	A	W.Ghats, TN	VU	NT
	89.*Hypophthalmichthys molitrix*	H/R, L(BP)	Fd	Wide, Cult	Wide	NE	Ex.CS
	90. *Hypophthalmichthys nobilis*	H/R, L(BP)	Fd	Wide	Wide	LC	Ex.CS
	91. *Labeo ariza*	H/R, Str, L(BP)	Fd	Wide	Bd, Pak	VU	NT, AT
	92. *Labeo angra*	H/R, L, P(BP)	Fd	A, Mn, Mg, Ng, Sk, Tr	Bd, Myn, Np, Pak	NT	NT, AT
	93. *Labeo bata*	H/R, L, P(BP)	Fd	Wide	Bd, Myn, Np, Pak	LC	NT, AT
	94. *Labeo boga*	H/R, L(BP)	Fd	Wide	Bd, Myn, Np, Pak	LC	NT, AT
	95. *Labeo calbasu*	H/R, L, WL(D)	Fd	Wide	Bd, Myn, Np, Pak, South Chn, Thai	LC	NT, AT
	96. *Labeo dyocheilus*	H/R, L(BP)	Fd	Wide	Bd, Np, Pak	VU	NT, AT
	97. *Labeo fimbriatus*	H/R, L, P, WL(BP)	Fd	Wide	Myn, Np, Pak	LC	NT, AT
	98. *Labeo gonius*	H/R, L, P, WL(BP)	Fd	Wide	Ind, Afg, Bd, Bh, Myn, Np, Pak	VU	NT, AT
	99. *Labeo nandina*	H/R, L, Str(BP)	Fd	A, Tr, Mn, Mg	Bd, Myn, W.Beng	EN	NT, AT
	100. *Labeo pangusia*	H/R, L, Str(BP)	Fd	Wide	Bd, Myn, Np, Pak	VU	NT, AT
	101. *Labeo rohita*	H/R, L, P(BP)	Fd	Wide	Bd, Myn, Np, Pak, SrL	LC	NT, AT
	102. *Megarasbora elanga*	H/R, Str(D)	Fd	Ap	W.Beng, Bd, Np	VU	NT, AT
	103. *Neolissochilus blythii*	H/R, Str(BP)	Fd	Mn, Mz	Myn	LC	NK

Table 1. Continued.

Cyprinidae	104.*Neolissochilus hexagonolepis*	H/R, Str(BP)	Fd	Wide	W.Beng, Bd, Chn, Viet, Np, Myn, Thai, Pak, Malaya, Sumatra,	VU	NT, AT
	105.*Neolissochilus hexastichus*	H/R, Str(BP)	Fd	A, Ap, Mn, Mg, Mz, Ng,Sk	N.India, Myn	LC	NT
	106.*Neolissochilus paucisquamata*	C/R, Str(BP)	Fd	Mn	Myn, Thai	LC	NK
	107. *Neolissochilus stracheyi*	C/R, Str(BP)	Fd	Mn	Myn, Thai, Laos	DD	NK
	108. *Oreichthys cosuatis*	C/R, Str(BP)	Or	A, Ap, Mg, Sk	S.India, Bd, Thai, Pak	DD	NK
	109. *Osteobrama belangeri*	C/R, L(BP)	Fd	Mn	Chn, Myn, Yunan	EN	AT, NT
	110. *Osteobrama cotio*	C/R, Str, WL(BP)	Fd	Wide	N.India, Chn, Bd, Myn, Np, Pak	NT	NT, AT
	111. *Osteobrama cunma*	C/R, Str, L, WL(BP)	Fd	Mn	Myn	VU	NT, AT
	112. *Osteobrama feae*	C/R, Str, L(BP)	Fd	Mn	Chn, Myn	LC	NT, AT
	113. *Puntius ater*	C/R, Str(P)	Or	Mn	Myn	VU	NT,AT
	114. *Puntius bizonatus*	C/R, Str(BP)	Or	Mn	Myn	LC	NK
	115. *Puntius chelynoides*	C/R, Str , WL(BP)	Or	A, Mn	Myn	EN	NT,AT
	116. *Puntius chola*	C/R, Str, L(BP)	Or	Wide	Bd, Myn, Np, Pak, SrL	VU	AT
	117 *Puntius conchonius*	C, O/R, Str(BP)	Or	Wide	Ind, Afg, Bd, Np, Pak	VU	NT, AT
	118. *Puntius filamentosus*	C,O/R, Str(BP)	Or	A, Ap, Mn, Mg, Ng, Tr	Ind, Bd, Myn, Pak, SrL, Thai.	VU	NK
	119. *Puntius fraseri*	C,O/R, Str(BP)	Or	A	Ind, Pak, Np, Bd	LC	NT
	120. *Puntius gelius*	C/R, Str(BP)	Or	A, Mg, Mz, Tr	Ind, Bd, Np, Pak	LC	NT
	121. *Puntius yuensis*	C/Fw(BP)	Fd	Mn	Chindwin, Ind	VU	AT
	122. *Puntius guganio*	C/R, Str, L, WL(BP)	Or	A, Ap,Mg	Ind, Bd	LC	NT
	123. *Puntius jayarami*	C/R, Str(BP)	Fd	Mn	Myn	EN	NT, AT
	124. *Puntius javanicus*	C/R, Str(BP)	Fd	Mn, Tr	Indonesia, Thai, Myn, Viet.	NE	CS
	125. *Puntius khugae*	C/R, Str(P)	Fd, Or	Mn	Myn	NE	NT, AT
	126. *Puntius manipurensis*	C/R, Str, C/L, WL(BP)	Or	Mn	Myn	EN	NT, AT
	127. *Puntius meingangbii*	C/R, Str(BP)	Or	Mn	Myn	LC	AT
	128. *Puntius ornatus*	C/R, Str(BP)	Or	A, Mn	Myn	LC	NT
	129. *Puntius phutunio*	C/R, Str, L, WL(BP)	Or	A, Mg, Mn	Ganga, Bd, Myn, Pak	NK	NT, AT
	130. *Puntius puntio*	C/R, Str(BP)	Or	Mn, Mz	Bd, Myn, Ganga	NK	NT
	131. *Puntius sarana*	C/R, Str, WL(BP)	Fd	Wide	Afg, Bd, Pak, Myn, Np	VU	NT, AT
	132. *Puntius shalynius*	C/R, Str(BP)	Or	A, Ap, Mn, Mg, Ng	Afg, Pak, Np, Bd, Bh	VU	NT, AT
	133. *Puntius stoliczkanus*	C/R, Str, L, WL(BP)	Or	Mn	Myn, Thai, Laos	VU	NT
	134. *Puntius sophore*	C,O/R, Str, L, WL(BP)	Or	Wide	Ind, Bd, Chn, Myn, Np, Pak, SrL	NK	NT, AT
	135. *Puntius terio*	C/R, Str, WL(BP)	Or	A, Mn, Mg, Mz, Ng, Tr	Bd, Myn, Pak,	NK	NT, AT
	136. *Puntius ticto*	C,O/R, Str, L, WL(BP)	Or	Wide	Ind, Bd, Myn, Np, Pak, SrL, Thai	NK	NT, AT
	137. *Poropuntius burtoni*	C,O/R, Str(BP)	Fd, Or	Mn	Pak, Np, SrL, Bd, Myn, Thai	VU	AT
	138. *Poropuntius clavatus*	C,O/R, Str(BP)	Fd, Or	Wide	Myn	EN	NT, AT
	139. *Raiamas bola*	C,O/R, Str, L(D)	Fd Or,	A, Ap, Mn, Mg, Ng, Sk	N.India, Bd, Np, Myn	VU	AT
	140. *Raiamas guttatus*	C,O/R, Str, L(BP)	Fd, Or	Mn, Ng, Sk	Combodia, Myn, Malay, Np, Thai	VU	NT, AT

Table 1. Continued.

	141. *Rasbora daniconius*	C, O/R, Str(BP)	Or	Wide	Ind, Np, Malaya, Myn, Bd, Pak, SrL.	LC	NT
	142. *Rasbora ornatus*	C, O/R, Str(BP)	Or	Mn	Myn	LC	NT
	143. *Rasbora rasbora*	C, O/R, Str(BP)	Or	Wide	Bd,Myn,Pak, Thai	LC	NT
	144. *Schizothorax progastus*	C, O/R(BP)	Fd	A, Ap, Sk	Bhutan, Np, Tibet	VU	NT
	145. *Schizothorax richardsonii*	C/R, Str(D)	Fd, Sport	A, Ap, Mn,Mz, Ng,Sk	Afg, Bh, Np, Myn, Pak	VU	NT, AT
	146. *Schizopyge esocinus*	C/R, Str(BP)	Fd	A, Ap, Sk	Np, Myn, Pak	NT	NT
	147. *Schismatorhynchos nukta*	C/R, Str(BP)	Fd	A, Ap, Tr	S.India.	DD	NK
	148.*Schizopygopsis stoliczkae*	C/R, Str(BP)	Fd	Ap	Afg, Chn, Myn, Indus, Pak	DD	NK
	149. *Salmophasia bacaila*	C/R, Str, WL(BP)	Fd, Or	Wide	Deccan, Bd, Myn, Np, Ganges, Pak.	DD	NT
	150. *Salmophasia clupeoides*	C/R, Str(BP)	Fd	A, Tr	Ind, Myn	LC	NK
	151. *Salmophasia acinaces*	C/R, WL(BP)	Fd	Ng	MH, TN, W.Ghats, W.Beng	DD	NK
Cyprinidae	152. *Salmophasia sardinella*	C/R(BP)	Fd	Mz	W. Bengal, Or, Bd, Myn	DD	NK
	153. *Salmophasia sladoni*	C/R(BP)	Fd	Ap, Mn	Myn	DD	NK
	154. *Salmophasia phulo*	C/R, P, WL(BP)	Fd, Or	A, Ap, Mn, Mg,Mz,Tr	Ind, Bd, Pak	LC	NT
	155. *Securicula gora*	C/R, Str(P)	Fd, Or	A,Ap, Mg, Mz, Sk, Tr	Bd, Np, Pak, India	LC	NT
	156. *Semiplotus manipurensis*	C/R, Str(BP)	Fd	Mn	Bd, Myn	LC	NT, AT
	157. *Semiplotus modestus*	C/R, Str(BP)	Fd	Mn, Mz	Myn	EN	NT
	158. *Semiplotus semiplotus*	C/R, Str(BP)	Fd	A, Ap, Mn,Mg, Mz, Tr, Sk.	Myn, Np	VU	NT, AT
	159. *Tor progeneius*	O/R, Str(BP)	Fd	A, Ap, Mn, Ng, Sk	Np	EN	NT, AT
	160. *Tor putitora*	O/R, Str(BP)	Fd	Wide	N India, Afg, Bd, Pak, Myn, Np	EN	NT, AT
	161. *Tor chelynoides*	O/R, Str(BP)	Fd	A, Ng, Mg	Pak	LC	NT, AT
	162. *Tor mosal*	O/R(BP)	Fd	A, Mn, Mz, Sk, Tr	Myn	EN	NT, AT
	163. *Tor tor*	O/R, Str(BP)	Fd	Wide	Bd, Np, Pak	EN	NT, AT
	164.*Psilorhynchoides arunachalensis*	O/R, Str(BP)	Or	A, Ap	N.India	NK	NT, AT
	165. *Psilorhynchus balitora*	O/R, Str(D)	Or	Wide	N.India, W.Beng, Bd, Myn, Np	VU	NT, AT
	166. *Psilorhynchus gracilis*	O/R, Str(D)	Fd	Ap, Mn, Mz, Sk.	Bd, Np	NK	NT, AT
Psilorhynchidae	167.*Psilorhynchus homaloptera*	O/R, Str(D)	Fd	Wide	Ind, Np, Myn, Tibet	VU	NT, AT
	168.*Psilorhynchus microphthalmus*	O/R, Str(D)	Fd	Mn	Myn	NK	NT, AT
	169. *Psilorhynchus sucatio*	O/R, Str(D)	Or	A, Ap, Mg,Mz, Ng, Tr	W.Beng,Bd, Myn,Np	LC	NT, AT
	170. *Aborichthys garoensis*	O/R, Str(D)	Or	Ap, Mg	Bd, Np	NK	NT, AT
	171. *Aborichthys elongatus*	O/R, Str(D)	Or	A, Ap, Mg, Sk	W.Beng, Myn	LC	NT, AT
	172. *Aborichthys kempi*	O/R, Str(D)	Or	A,Ap, Mg, Mz	Myn	VU	NT, AT
Balitoridae	173. *Acanthocobitis botia*	O/R, Str(D)	Or	A, Ap, Mn, Mg, Mz, Ng, Tr	Ganga, Chn, Pak, Thai, Myn	VU	NT, AT
	174.*Acanthocobitis zonalternans*	O/R, Str(D)	Or	Ap, Mn, Ng	Myn, Thai	DD	NK
	175. *Balitora brucei*	O/R, Str(D)	Or	Wide	W.Beng, Myn, Np, Bd, Bh	VU	NT, AT

Table 1. Continued.

	176. *Balitora burmanica*	O/R, Str(D)	Or	Mn, Ng	Myn, Thai	VU	NT, AT
	177. *Balitora cavia*	O/R, Str(D)	Or	Mz	Myn, Thai	DD	NT
	178. *Homaloptera modesta*	O/R, Str(D)	Or	Mn	Myn, Thai	NK	NT
	179. *Homaloptera rupicola*	O/R, Str(D)	Or	Mn, Ng	Bd, Myn	LC	NT, AT
	180.*Mesonoemacheilusreticulofasciatus*	O/R, Str(BP)	Or	A, Mg, Ng	NK	DD	NK
	181.*Neonoemacheilus assamensis*	O/R, Str(D)	Or	A, Mn	Myn	DD	NK
	182.*Neonoemacheilus labeosus*	O/Str(D)	Or	A	Myn, Np, Thai.	VU	NT
	183.*Neonoemacheilus morehensis*	O/R, Str(D)	Or	Mn	Myn	LC	NT
	184.*Neonoemacheilus peguensis*	O/R, Str(D)	Or	Mn	Myn	LC	NT
	185.*Nemacheilus barapaniensis*	O/Str(BP)	Or	Mg	Myn	LC	NT
	186. *Nemacheilus carletoni*	O/R, Str(BP)	Or	A, Sk	Beas river, Kangra valley	EN	NT, AT
	187. *Nemacheilus pavonaceus*	O/R, Str(D)	Or	A, Ap, Sk	Np	VU	NK
	188. *Nemacheilus rupecula*	O/R, Str(BP)	Or	A, Ap	NK	VU	NK
	189. *Nemacheilus tikaderi*	O/R,Str(D)	Or	Ap	Myn, Np	EN	NT
	190. *Physoschistura elongata*	O/R, Str(BP)	Or	A, Ap, Mg,Tr	Bd, SrL	EN	NT
	191. *Scistura arunachalensis*	O/R, Str(BP)	Or	Ap	Not Known	EN	NT
	192. *Schistura beavani*	O/R, Str(BP)	Or	A, Ap, Mg, Mz, Ng, Sk	Myn, Np, Bh	EN	NT
	193. *Schistura chindwinica*	O/R, Str(BP)	Or	A, Mn	Myn	EN	NT
Balitoridae	194. *Schistura cincticauda*	O/R, Str(BP)	Or	Ap, Mn, Mg	Myn, Thai	EN	NT
	195. *Schistura corica*	O/R, Str(BP)	Or	A,Ap, Mg, Mz, Sk	Bd, N.India, Np, Pak.	LC	NT
	196. *Schistura devdevi*	O/R, Str(BP)	Or	Ap, Mn, Mg, Sk	Np	EN	NT, AT
	197.*Schistura kangjupkhulensis*	O/R, Str(BP)	Or	A,Ap, Mn, Ng, Sk	Myn	VU	NT
	198. *Schistura khugae*	O/R, Str(BP)	Or	Mn	Myn	LC	NK
	199. *Schistura manipurensis*	O/R, Str(BP)	Or	A, Ap, Mz, Mn, Ng,	Myn	VU	NT, AT
	200. *Schistura minutus*	O/R, Str(D)	Or	Mn	Myn	NK	NK
	201. *Schistura montanus*	O/R, Str(D)	Or	A,Mg	HP, Bd	EN	NT
	202. *Schistura multifasciatus*	O/Str(BP)	Or	Wide	Bh, Np	VU	NT
	203. *Schistura nagaensis*	O/R, Str(BP)	Or	Ap, Mn, Ng	Myn	EN	NT, AT
	204. *Schistura papulifera*	O/Str(D)	Or	Mg	Bd	LC	NT
	205. *Schistura prashadi*	O/R, Str(BP)	Or	Ap,Mg, Ng, Mn	Myn	LC	NT, AT
	206. *Schistura reticulata*	O/R, Str(D)	Or	A,Ap, Mn,Mg	Myn	EN	NT
	207. *Schistura savona*	O/R, Str(BP)	Or	A, Ap,Mn, Mg, Mz, Ng, Sk, Tr	N. India, Bd, Myn, Np	LC	NT
	208. *Schistura scaturigina*	O/R, Str(BP)	Or	Wide	N.India, Myn, Np	LC	NT
	209. *Schistura sikmaiensis*	O/R, Str(BP)	Or	A,Ap, Mn, Mg, Mz,Ng,Sk	Myn, Np	EN	NT, AT
	210. *Schistura singhi*	O/Str(BP)	Or	A, Ng	Myn	LC	NT
	211. *Schistura sijuensis*	C/R, Str(BP)	Or	Mg, Ng	Bd, Bh, Ind, Pak	VU	NT, AT
	212. *Schistura tigrinum*	C/R, Str(D)	Or	A, Mn	Myn	LC	NT

Table 1. Continued.

	213. *Schistura tirapensis*	C/R, Str(BP)	Or	Ap, Mz	NK	NK	NK
	214. *Schistura inglisi*	C/R, Str(D)	Or	A	Bd	VU	NK
	215. *Schistura reticulofasciata*	C/R, Str(BP)	Or	A, Mn	Bd	VU	AT
	216. *Schistura vinciguerrae*	C/R, Str(BP)	Or	A, Mn, Mz, Ng, Tr	Bd, Bh, Ind, Pak, Sr, Myn, Np, Chn	EN	NT, AT
	217. *Triplophysa gracilis*	C/R, Str(D)	Or	Sk	Ind, Chn, Pak	LC	NK
	218.*Acantopsis multistigmatus*	C/R, Str(D)	Fd, Or	Mn	Myn	LC	AT
	219.*Acantopsis choirorhynchos*	C/R, Str(D)	Or	A, Mn	Myn, viet, Java, Malaya, Borneo, Sumatra, Thai	LC	NT
	220. *Botia almorhae*	C/R, Str(D)	Or	Ap,Ng, Sk	N. India, Bd, Np, Pak	EN	NT
	221. *Botia Dario*	C/R, Str(D)	Or	Wide	Ind, Myn, Bd, Np, Pak	VU	NT, AT
	222. *Botia histrionica*	C/R, Str(D)	Or	A, Mn, Mg, Ng	Myn	VU	NT, AT
	223. *Botia lohachata*	C/R(D)	Or	A, Mg	Bd, Np, Pak	EN	NT, AT
	224. *Botia rostrata*	C/R(D)	Or	A, Ap, Mg, Mz, Ng, Tr	Bd	VU	NT, AT
	225.*Lepidocephalichthys arunachalensis*	C/R, Str(D)	Or	Ap, Sk	Np	LC	NT, AT
	226.*Lepidocephalichthys berdmorei*	C/R, Str(D)	Or	**A**,Ap, Mn, Mg, Ng, Tr	Chn, Bd, Myn, Malay, Thai	EN	NT, AT
	227.*Lepidocephalichthys guntea*	C/R,Str(D)	Or	Wide	Bd, Np, N.India, Myn, Thai, Pak.	VU	AT
	228.*Lepidocephalichthys irrorata*	C/R, Str(D)	Or	A, Mn, Mg, Ng	Bd, Myn	VU	NT, AT
	229.*Lepidocephalichthys manipurensis*	C/R, Str(BP)	Or	Mn	Myn	NK	NT, AT
	230.*Lepidocephalichthys annandalei*	C/R, Str(D)	Or	A, Ap, Mn, Mz, Mg, Ng, Tr.	Bd, N.Beng	LC	NT
	231.*Lepidocephalichthys menoni*	C/R, Str(D)	Or	A, Ap, Mg	Ganges, Bd, Np	LC	NT
	232.*Lepidocephalichthy scaudofurcatus*	C/R, Str(D)	Or	A, Mg	Doon Valley, UP.	LC	NK
Cobitidae	233.*Neoeucirrhichthys maydelli*	C/R, Str(D)	Or	A,Ap	Np	LC	NT
	234. *Pangio pangia*	C/R, Str, WL(D)	Fd	A,Mn, Mg, Mz, Ng, Sk.	Bd, Beng, Myn, Indonesia.	VU	NT, AT
	235. *Pangio longipinnis*	C/R, Str(D)	Fd	Mn	Bd, Myn, Np	LC	NK
	236. *Syncrossus berdmorei*	C/R, Str(D)	Or	Mn	Myn	EN	NT, AT
	227.*Lepidocephalichthys guntea*	C/R,Str(D)	Or	Wide	Bd, Np, N.India, Myn, Thai, Pak.	VU	AT
	228.*Lepidocephalichthys irrorata*	C/R, Str(D)	Or	A, Mn, Mg, Ng	Bd, Myn	VU	NT, AT
	229.*Lepidocephalichthys manipurensis*	C/R, Str(BP)	Or	Mn	Myn	NK	NT, AT
	230.*Lepidocephalichthys annandalei*	C/R, Str(D)	Or	A, Ap, Mn, Mz, Mg, Ng, Tr.	Bd, N.Beng	LC	NT
	231.*Lepidocephalichthys menoni*	C/R, Str(D)	Or	A, Ap, Mg	Ganges, Bd, Np	LC	NT
	232.*Lepidocephalichthy scaudofurcatus*	C/R, Str(D)	Or	A, Mg	Doon Valley, UP.	LC	NK
	233.*Neoeucirrhichthys maydelli*	C/R, Str(D)	Or	A,Ap	Np	LC	NT
	234. *Pangio pangia*	C/R, Str, WL(D)	Fd	A,Mn, Mg, Mz, Ng, Sk.	Bd, Beng, Myn, Indonesia.	VU	NT, AT
	235. *Pangio longipinnis*	C/R, Str(D)	Fd	Mn	Bd, Myn, Np	LC	NK
	236. *Syncrossus berdmorei*	C/R, Str(D)	Or	Mn	Myn	EN	NT, AT
	237. *Somileptus gongota*	C/R, Str(D)	Or	A,Ap, Mg, Ng, Sk, Tr	N.India,Bd, Myn, Np	VU	NT

Table 1. Continued.

Bagridae	238. *Batasio batasio*	C/R, Str(D)	Or	A,Ap,Mn,Mg Mz, Tr	N.Beng, Bd, Np	NK	NT
	239. *Batasio fasciolatus*	C/R, Str(D)	Fd, Or	A, Ap, Sk	W.Beng, Bd, Np	LC	NT
	240. *Batasio niger*	C/R, Str(BP)	Fd, Or	Mn	Myn	NT	NT
	241. *Batasio spilurus*	C/R, Str(D)	Fd, Or	A, Ap	Not Known	LC	NT, AT
	242. *Batasio tengana*	C/R, Str(BP)	Fd, Or	A, Ap, Mn, Mz, Mg, Sk	N.India, Bd, Np, Myn, Malaya, Thai.	LC	AT
	243.*Chandramara chandramara*	C/R, Str(D)	Fd, Or	A, Ap, Mg	Bd, Np	VU	NT, AT
	244. *Hemibagrus menoda*	C/R, Str(D)	Fd	A, Mz	Deccan, Bd, Myn	EN	NT, AT
	245.*Hemibagrus microphthalmus*	C/R, Str(D)	Fd	Mn	Myn, Thai	EN	NT, AT
	246. *Hemibagrus peguensis*	C/R, Str(D)	Fd	Mn	Myn	LC	AT
	247. *Mystus armatus*	C/R(D)	Fd	Mn, Ng	Bd, Myn	VU	NT, AT
	248. *Mystus bleekeri*	C/R, L, WL(D)	Fd, Or	Wide	N India, Bd, Myn, Np, Pak, Sumatra.	VU	NT, AT
	249. *Mystus cavasius*	O/R, Str, WL, L(D)	Fd, Or	Wide	Myn, Bd, Np, Pak, Thai, SrL.	VU	AT
	250. *Mystus falcarius*	C/R, Str(D)	Fd, Or	Mn	Myn	LC	AT
	251. *Mystus horai*	C/R, Str(D)	Fd, Or	Mz	Pak:Indus river	NK	NK
	252. *Mystus montanus*	C/R, Str(D)	Fd, Or	A, Ap, Mg	Ind, Bd, Np	VU	AT
	253. *Mystus pulcher*	C/R, Str(D)	Fd, Or	Mn	Myn	LC	NT
	254. *Mystus rufescens*	C/R, Str(D)	Fd, Or	Mn	Myn, Bd, N.India, Np, Pak, SrL, Thai	LC	AT
	255. *Mystus tengara*	C/R, Str(D)	Fd, Or	Wide	N.India,Bd, Pak, Myn, Sr, Java	LC	NK
	256. *Mystus vittatus*	C/R, Str(D)	Fd, Or	Wide	N.India, Bd, Myn, Np, Pak, SrL, Thai	LC	AT
	257. *Olyra kempi*	C/R, Str(D)	Or	A,Ap,Mn, Mg, Ng, Tr	Bd, Myn	VU	AT
	258. *Olyra longicaudata*	C/R, Str(D)	Or	A, Ap, Mg, Ng, Sk, Tr	W.Beng, Bd, Myn	VU	AT
	259. *Olyra horae*	C/R, Str(D)	Or	A, Mn, Mg, Ng	Myn	LC	NK
	260. *Olyra burmanica*	C/R, Str(D)	Fd	Ng	Bd, Myn, Np, Pak, SrL	LC	NT, AT
	261. *Rama rama*	C/R, Str(D)	Fd	A, Mg	N.Bihar Bd, Myn, Np, Pak, SrL	LC	NT, AT
	262. *Rita rita*	C/R, L(D)	Fd	A, Ap, Mn, Tr,Sk	N.India, Afg, Bd, Np, Pak, Myn, Yunan	VU	AT
	263. *Sperata acicularis*	C/R, Str(D)	Fd	Mn	Myn	VU	AT
	264. *Sperata aor*	C/R, L, WL(D)	Fd	A,Ap, Mn, Mz, Ng, Sk, Tr	N.India, Bd, Myn, Np, Pak,	VU	AT
	265. *Sperata seenghala*	C/R, L, WL(D)	Fd	A, Ap, Mn, Mg, Mz, Ng, Tr	Ind, Afg, Bd, Chn, Np, Pak	VU	AT
Siluridae	266. *Ompok bimaculatus*	C/R, Str, WL(D)	Fd	Wide	Ind,Bd, Myn, Indo-Austria, Chn, Malaya, SrL, Thai, Viet.	EN	AT
	267. *Ompok pabda*	C/R, Str, WL(D)	Fd	Wide	Ind, Afg, Pak, Np, Bd, Myn	VU	NT, AT
	268. *Ompok pabo*	C/R, L, WL(D)	Fd	A,Ap,Mg, Mz	Afg, Bd, Java,Myn, Np, Pak, SE Asia	EN	AT
	269. *Pterocryptis barakensis*	C/R, Str(D)	Fd	Mn	Bd, Np, Myn	LC	AT
	270. *Pterocryptis berdmorei*	C/R, Str(D)	Fd	A, Mn, Mg, Ng	Java, Myn, Np	LC	NT, AT
	271. *Pterocryptis indicus*	C/R, Str(BP)	Fd	Ap, Ng	N.India	LC	NT
	272. *Pterocryptis afghana*	C/R, Str(D)	Fd	A, Ap, Ng	N.India, Afg, Pak	LC	NT

Table 1. Continued.

	273. *Pterocryptis torrentis*	C/R, Str(D)	Fd	Ap	N.India, Myn, Thai	LC	NT
	274. *Pterocryptis gangelica*	C/R, Str(D)	Fd	Ap, Mn, Sk	W.Beng, Bd, Myn	NK	AT
	275. *Wallago attu*	C/R, L, WL(D)	Fd	Wide	Pak, Bd, Myn, Np, SrL, Thai, Viet	VU	NT, AT
Schilbeidae	276. *Ailia coila*	C/R, L, WL(P)	Fd	A, Ap, Mn,Mz, Mg,Sk, Tr	Bd, Pak, Np	VU	NT, AT
	277. *Ailia punctata*	C/R, L(D)	Fd	A, Mn, Mg,Mz	Bd, Pak	VU	NT, AT
	278. *Clupisoma garua*	C/R, L, WL(D)	Fd	Wide	Ind, Bd, Pak, Myn, Np	VU	NT, AT
	279. *Clupisoma montana*	C/R, L, WL(D)	Fd	A, Ap, Sk, Tr	N-India, Np	VU	NT, AT
	280 *Eutropiichthys vacha*	C/R, L, WL(P)	Fd	Wide	Bd, Pak, Myn, Np, Thai, SrL	VU	NT, AT
	281. *Eutropiichthys murius*	C/R, L, WL(D)	Fd	Wide	W.Beng, Bihar, Bd, Np, Pak	NT	NT, AT
	282. *Neotropius atherinoides*	C/R, L(D)	Fd	A, Ap, Mg, Sk, Tr	Bd, Np, Pak	LC	NT, AT
	283. *Silonia silondia*	C/R, L, WL(D)	Fd	A, Sk, Tr	N.India, Pak, Bd, Np, Myn.	VU	NT, AT
Pangasiidae	284. *Pangasius pangasius*	C/R, L, WL(BP)	Fd	A, Mn, Tr, Sk	Bd, Pak, Myn, Thai, Java, Malaya.	VU	NT, AT
	285. *Pangasius sutchi*	C/R, L, WL(BP)	Fd	Tr	SE.Asia: Malaysia, Thai	NK	Ex. CS
Amblycipitidae	286. *Amblyceps apangi*	C/R, Str(D)	Or	A, Ap	Bd, Np, Pak	VU	NT, AT
	287.*Amblyceps arunachalensis*	C/R, Str(D)	Or	A,Ap	Bd, Np, Myn, Pak, Thai	VU	NT, AT
	288. *Amblyceps laticeps*	C/R, Str(BP)	Or	A	Bd	LC	NT
	289. *Amblyceps cerinum*	C/R, Str(P-N)	Or	A	Bd	NE	NK
	290. *Amblyceps mangois*	C/R, Str(BP)	Or	Wide	Np, Bd, Myn, Thai, Pak, Laos	EN	NT, AT
	291. *Amblyceps torrentis*	C/R, Str(BP)	Or	Mn	Bd	NK	NT
	292. *Amblyceps tuberculatum*	C/R, Str(BP)	Or	Mn	Myn	LC	NT
Akysidae	293. *Akysis manipurensis*	C/R, Str(D)	Or	Mn	Myn	VU	NT, AT
	294. *Akysis prashadi*	C/R, Str(BP)	Or	Mn	Myn	LC	NT, AT
Sisoridae	295. *Bagarius bagarius*	C/R(BP)	Fd	A, Ap, Mn, Mg, Mz,Tr, Sk	Ind, Bd, Myn, Thai, Malaya, Viet	VU	NT, AT
	296. *Bagarius yarrelli*	C/R(D)	Fd	A, Ap, Mn, Ng	Bd, Myn, Np, Pak, Thai, Java, Laos, Viet	EN	NT, AT
	297. *Exostoma barakensis*	C/R, Str(BP)	Or	A, Mn	Bd, Myn	LC	NT
	298. *Exostoma berdmorei*	C/R, Str(D)	Or	Ap, Mn, Ng, Tr	Myn, Np	LC	NT
	299. *Exostoma labiatum*	C/R, Str(D)	Or	Ap, Mn, Mg, Ng	Bd, Chn, Myn	LC	NT
	300. *Exostoma stuarti*	C/R, Str(D)	Or	Ap, Mn, Ng	Myn	LC	NT
	301. *Exostoma vinciguerrae*	C/R, Str(D)	Or	Mn, Ng	Myn	LC	NT
	302. *Gagata cenia*	C/R, Str(D)	Or	Wide	Bd, Myn, Ganga, Np, Pak	NT	AT
	303. *Gagata gagata*	C/R, Str(D)	Or	A, Tr	Np, Bd	NT	AT
	304. *Gagata gasawyuh*	C/R, L, WL(BP)	Or	Mn	Myn	LC	AT

Table 1. Continued.

	305. *Gagata sexualis*	C/R, L(D)	Or	A, Mg, Mz	Bd	NT	NT, AT
	306. *Glyptosternon maculatum*	C/R, Str(D)	Or	A, Ap, Ng, Sk	Chn, Np, Tibet	LC	NT
	307. *Glyptothorax annandalei*	O/R, Str(BP)	Or	Ap, Mn, Sk	Ind, Bd, Myn, Np	LC	NT
	308. *Glyptothorax botius*	O/R, Str(D)	Or	A, Ap, Mn, Sk	N. India, Myn, Np	LC	NT
	309. *Glyptothorax saisii*	O/R, Str(BP)	Or	Ap, Ng	N.India	NK	NK
	310. *Glyptothorax conirostris*	O/R, Str(BP)	Or	Ap,Mg ,Mz, Sk, Tr	N.India, Chn, Pak	LC	NT
	311. *Glyptothorax brevipinnis*	O/R, Str(BP)	Or	Ap	N.India	VU	NT
	312. *Glyptothorax cavia*	O/R, Str(BP)	Or	Wide	Bd, Myn, Np, Pak	EN	NT, AT
	313. *Glyptothorax coheni*	O/R, Str(BP)	Or	A, Ap, Ng	Jharkhand	LC	NT
	314. *Glyptothorax sinensis*	C/R, Str(BP)	Or	Ap, Mn, Mz, Ng, Sk	Chn, Myn, Np	LC	NT
	315.*Glyptothorax platypogonides*	C/R, Str(BP)	Or	A, Ap, Mn, Mz , Ng,	Bd, Bhutan, Myn, Np, Sumatra, Pak, Thai.	VU	NT, AT
	316. *Glyptothorax chindwinica*	C/R, Str(D)	Or	Mn	Myn	VU	NT
	317. *Glyptothorax granulus*	C/R, Str(D)	Or	Mn	Myn	LC	NT
	318.*Glyptothorax manipurensis*	C/R, Str(D)	Or	Mn, Ng, Sk	Bd, Myn	LC	NT
	319. *Glyptothorax ngapang*	C/R, Str(D)	Or	Mn	Myn	LC	NT
	320. *Glyptothorax striatus*	C/R, Str(BP)	Or	A, Ap, Mg, Mz, Sk	Np	VU	NT
	321.*Glyptothorax pectinopterus*	C/R, Str(BP)	Or	A, Ap, Mn	Ind, Np, Pak	VU	NT
	322. *Glyptothorax telchitta*	C/R, Str(BP)	Or	A, Ap, Mn, Mz, Mg, Ng, Tr	Bd, SE Asia, Np, Pak	VU	NT
Sisoridae	323.*Glyptothorax ventrolineatus*	C/R, Str(D)	Or	Mn	Myn	LC	NT
	324. *Glyptothorax indicus*	C/R, Str(BP)	Or	Ap, Ng, Sk	N.India, Np	NT	NT
	325 *Glyptothorax gracilis*	C/R, Str(BP)	Or	Ap,Sk	Np	LC	NT
	326. *Glyptothorax trilineatus*	C/R, Str(BP)	Or	A, Mn, Mz, Ng, Sk	Pak, Myn, Thai	LC	NT
	327.*Glyptothorax chimtuipuiensis*	C/R, Fw(D)	Fd	Mz	NK	NK	NK
	328. *Gogangra viridescens*	C/R, Str(D)	Or	A, Ap, Mn, Mg, Mz.	Ganga, Myn	LC	AT
	329. *Myersglanis jayarami*	C/R, Str(D)	Or	Mn, Ng	Myn	LC	AT
	330. *Nangra assamensis*	C/R, Str(D)	Or	A, Ap, Sk	Bd	LC	AT
	331. *Nangra nangra*	C/R, Str(D)	Or	Wide	N.India, Bd, Np, Pk	NK	NK
	332. *Nangra robusta*	C/R, Str(BP)	Or	A, Tr	Pak	LC	NK
	333. *Oreoglanis setiger*	C/R, Str(BP)	Or	A, Ap	NK	NK	NK
	334. *Parachiloglanis hodgarti*	C/R, Str(D)	Or	A, Ap, Mg, Sk	W.Beng, Bd, Np	LC	NT
	335.*Pareuchiloglanis kamengensis*	C/R, Str(BP)	Or	Ap	Bd, Np	EN	NT
	336.*Pseudecheneis crassicauda*	C/R, Str(D)	Or	Sk	Ganges, Np	NE	NT
	337. *Pseudecheneis sulcata*	C/R, Str(D)	Or	Wide	W.Beng, Bd, Np	VU	NT
	338.*Pseudecheneis ukhrulensis*	C/R, Str(D)	Fd, Or	Mn	Myn	VU	NT, AT
	339. *Pseudecheneis sirenica*	C/R, Str(D)	Fd, Or	A, Ap	Bd	NT	NT
	340.*Pseudecheneis koladynae*	C/R, Str(D)	Fd, Or	Mz	NK	NE	NK
	341. *Sisor barakensis*	C/R, Str(D)	Or	Mn	NK	EN	NT

Table 1. Continued.

	342. *Sisor chennuah*	C/R, Str(D)	Or	A	NK	EN	NK
	343. *Sisor rabdophorus*	C/R, Str(D)	Or	A, Ap, Mn, Ng	N.India, Bd, Pak	EN	NT, AT
	344. *Conta conta*	C/R, Str(D)	Or	A, Ap,Mn, Mg, Mz, Ng	Bd	NK	NT
	345. *Conta pectinata*	C/R, Str(D)	Or	A, Ap	Not Known	LC	NT
	346. *Erethistes horai*	C/R, Str(D)	Or	Wide	Not Known	LC	NT
	347. *Erethistes pusillus*	C/R, Str(D)	Or	A, Ap, Mn, Mz, Ng, Tr	N.India, Bd Myn	LC	NT
	348. *Erethistoides montana*	C/R, Str(D)	Or	A, Ap,Tr	Not known	LC	NT
	349. *Erethistoides sicula*	C/R, Str(D)	Or	A, Sk	N.India, Np	LC	NT
	350. *Erethistes hara*	C/R, Str(D)	Or	Wide	N.Beng, Bd, Myn, Np	LC	NT
Erethistidae	351. *Erethistes jerdoni*	C/R, Str(D)	Or	Wide	N.India, Bd, Np	LC	NT
	352. *Erethistes serratus*	C/R, Str(D)	Or	Mn	Myn	LC	NT
	353. *Pseudolaguvia ferula*	C/R, Str(D)	Or	A, Ap, Mg	W.Beng, Np	LC	NT
	354. *Pseudolaguvia inornata*	C/R, Str(D)	Or	A, Ap, Mg	Bd	LC	NT
	355. *Pseudolaguvia muricata*	C/R, Str(D)	Or	A, Ap, Mg	Bd	LC	NT
	356. *Pseudolaguvia ribeiroi*	C/R, Str(BP)	Or	A, Ap, Mg,Tr, Sk	N.India, Myn , Np	LC	NT
	357. *Pseudolaguvia shawi*	C/R, Str(BP)	Or	A, Ap, Mn, Mg, Mz, Sk	N.Beng, Bd, Np	LC	NT
	358. *Pseodolaguvia spicula*	C/R, Str(D)	Or	As, Mz	Surma-Meghna: India, Bd	NK	NK
	359. *Clarias magur*	C/R, L, WL(D)	Fd	Wide	Bd, Myn, SrL, S.Asia	VU	NT, AT
Clariidae	360. *Clarias gariepinus*	C/R, L, WL(BP)	Fd	Wide	Africa, Middle East, SE.Asia.	NE	Ex. CS
	361. *Heteropneustes fossilis*	O/R, L, WL(D)	Fd	Wide	Bd, Myn, Np, Pak, Laos, SrL, Thai.	VU	AT
Chacidae	362. *Chaca chaca*	C/R, L, WL(D)	Or	A, Ap, Mn, Sk, Mg, Tr	Bihar, Bd, Np	EN	NT, AT
Mugilidae	363. *Rhinomugil corsula*	H/R, Str(P)	Fd, Or	Wide	Bd, Np, Myn	VU	NT, AT
	364. *Sicamugil cascasia*	H/R, Str(D)	Or	A, Ap, Mn, Mg, Tr	Pak, Bd, SrL	VU	NT, AT
Belonidae	365. *Xenentodon cancila*	C/R, Str(P-N)	Or	Wide	Pak, Bd, Myn, Np, Thai	VU	AT
	366. *Strongylura strongylura*	C/Bw(P-N)	Or	Wide	Chn, Pak, Thai, SrL	LC	NK
Aplocheilidae	367. *Aplocheilus panchax*	O/R, Str, L, WL(BP)	Or	A, Mn, Mg, Tr	N.India, Bd, Myn, Pak, Thai	LC	NK
Syngnathidae	368. *Microphis deocata*	O/R, Str(D)	Or	A, Ap	N.Beng, Bd, Np	VU	NT
	369. *Monopterus albus*	C/WL(D)	Fd	A,Ap, Mn, Mg, Ng	Bd, Myn, Malaya, Chn, Japan, SE Asia	LC	NK
Synbranchidae	370. *Monopterus cuchia*	C/WL(D)	Fd	Wide	Bd, Pak, Myn, Np	VU	NT, AT
	371. *Monopterus hodgarti*	C/R, Str(D)	Fd	A, Mn	Bd, Myn	LC	NT
	372. *Ophisternon bengalense*	C/R(D)	Fd	Mn, Sk	W.Beng, Bd, SrL	LC	NT

Table 1. Continued.

Mastacembelidae	373. *Macrognathus aral*	C/R, L, WL(BP)	Fd	Wide	Bd, Pak, Myn, Np, SrL	VU	NT, AT
	374.*Macrognathus morehensis*	C/R, L, WL(D)	Fd, Or	Mn	Myn	VU	NK
	375. *Macrognathus pancalus*	C/R, L, WL(BP)	Fd, Or	A, Ap, Mn, Mg, Mz, Ng, Tr	Bd, Myn, Pak	NT	NT, AT
	376. *Mastacembelus armatus*	C/R, L, WI(D)	Fd, Or	Wide	Myn, Pak, SrL, Np, Thai, Chn, Malaya	VU	NT, AT
	377. *Pillaia indica*	C/R, Str(D)	Or	A, Ap, Mg	Bd, Myn, Np, Pk, SrL	LC	NT, AT
	378. *Garo khajuriai*	C/R, Str(D)	Or	A, Mg	Bd	LC	NT
Chandidae	379. *Chanda nama*	C/R, L, WL(BP)	Or	Wide	Myn, Pak, Np, Bd	LC	NT, AT
	380. *Parambassis baculis*	C/R, L, WL(D)	Or	Wide	Nep, Bd	LC	NT
	381. *Parambassis lala*	C/R, Str(D)	Or	A, Mn, Tr	Beng, Myn	LC	NT
	382. *Parambassis ranga*	C/R, L, WL(D)	Or	Wide	Bd, Myn, Pak, SE Asia	LC	NT, AT
	383.*Parambassis tenasserimensis*	C/R, L(D)	Or	Mz	Tenasserin basin, Myn	LC	NK
Scianenidae	384. *Johnius coitor*	C/R, L, WL(D)	Fd	Wide	Bd, Myn	NK	NK
Nandidae	385 *Badis assamensis*	C/R, Str(BP)	Or	A, Ap, Mn	Myn	NK	NT
	386. *Badis badis*	C/R, Str(BP)	Or	Wide	Bd, Myn, Nep, Pak	NK	AT
	387. *Badis blosyrus*	C/R, Str(BP)	Or	A	Not Known	LC	AT
	388. *Badis chittagongis*	C/R, Str(BP)	Or	Mz, Tr	Bd	NK	NT
	389. *Badis ferrarisi*	C/R, Str(BP)	Or	Mn	Myn	LC	AT
	390. *Badis kanabos*	C/R, Str(BP)	Or	A	Not Known	NK	AT
	391. *Badis tuivaiei*	C/R, Str(P)	Or	A, Mn	Not Known	LC	AT
	392. *Nandus nandus*	C/R, Str(BP)	Or	Wide	Bd, Np, Myn, Pak Thai, Australia	NK	AT
Cichlidae	394.*Oreochromis niloticus niloticus*	H/R, L, Farms(BP)	Fd	Wide, Cult	Pak, SrL, E.Africa	NK	Ex. CSc
Gobidae	395. *Apocryptes bato*	C/Fw(D)	Fd	Mn,Tr	N.India, Bd, Myn	LC	NK
	396. *Glossogobius giuris*	C/R, L, WL(BP)	Fd	Wide	Bd, Myn, Np, Pak, SrL, Japan	NT	AT
	397. *Psammogobius biocellatus*	C/L(BP)	Fd	Mz, Tr	Chilka lake, Indo Pacific, South Africa	DD	NK
Anabantidae	398. *Anabas testudineus*	C/R, L, WL(D)	Fd	Wide	Bd, Pak, Myn, SrL, SE Asia	VU	AT
	399. *Anabas cobojiu*	C/R, Str(BP)	Fd	Ng	Not known	DD	NK
Salmonidae	400. *Salmo trutta fario*	C/R, Str(D)	Fd	Sk.	Pak, S.Africa, Australia.	NK	Ex.NE
	401. *Oncorhynchus mykis*	C/R, Str, L(BP)	Fd	Ap	N.America, Japan, Alaska	NK	Ex.NE

Table 1. Continued.

Belontidae	402. *Ctenops nobilis*	O/R, L, WL(BP)	Or	A, Sk	N.Beng, Bh, Bd, Np	NK	NK
	403. *Polyacanthus fasciatus*	C/R, L, WL(BP)	Or	Wide	W.Beng, Bd, Myn, Pak, Np	NK	AT
	404. *Polyacanthus lalius*	C/R, L, WL(BP)	Or	A, Mn, Ng, Tr	Bd, Pak, Borneo	NK	NT
	405. *Polyacanthus sota*	C/R, L, WL(BP)	Or	A, Mn, Mg, Ng, Sk, Tr.	Bd, Myn	NK	AT
	406. *Trichogaster chuna*	C/R, L, WL(BP)	Or	A	Bd, Np	NK	AT
	407. *Trichogaster labiosus*	C/R, L, WL(BP)	Or	A, Ap, Mn	Myn	NK	NT
Osphronemidae	408. *Osphronemus goramy*	O/R, WL (BP)	Or	Wide	Wide	LC	NK
Channidae	409. *Channa amphibeus*	C/R, L, WL(BP)	Fd	A, Ap	N.Beng, Bhutan	EN	NT
	410. *Channa aurantimaculata*	C/R, L, WL(BP)	Fd	A	N.Beng, Bd	EN	NT, AT
	411. *Channa barca*	C/R, L, WL(BP)	Fd	A, Mg, Ng, Tr	Bd, SE Asia	EN	NT, AT
	412. *Channa bleheri*	C/R, L, WL(BP)	Fd	A	SE Asia	EN	NT, AT
	413. *Channa gachua*	C/R, L, WL(BP)	Fd	Mn	Myn, Pak, SrL SE Asia	EN	NT
	414. *Channa marulius*	C/R, L, WL(BP)	Fd	Wide	Pak, Bd, Np, Chn, Myn, Thai, SrL	VU	NT, AT
	415. *Channa punctatus*	C/R, L, WL(BP)	Fd	Wide	Chn, SrL, Pak, Np, Bd, Myn, Afg	NK	NT, AT
	416. *Channa stewartii*	C/R, L, WL(BP)	Fd	Wide	Np, Myn	LC	NT
	417. *Channa striata*	C/R, L, WL(BP)	Fd	Wide	Pak, Malay, Myn, SrL, Bd, Np, Thai, Ch.	NK	NT, AT
	418. *Channa orientalis*	C/R, L(BP)	Fd	Wide	Afg, Bd, Iran, Myn, SrL, Thai, Pak	NK	NT
	419. *Channa hatcourtbutleri*	C/R(P)	Fd	Mn	Myn	NK	NT
Ophichthidae	420. *Pisodonophis boro*	C/R, L(D)	Fd	A	Bd, Chn	NE	NT
Pristigasteridae	421. *Ilisha melastoma*	C/R, L(P-N)	Fd	A	Myn, Pak, SrL, Thai, Malaya, Viet	DD	NK
Tetraodontidae	422. *Tetraodon cutcutia*	O/R, WL(D)	Or	A, Ap, Mn, Mg, Tr	Bd, Myn, SrL, Malaya.	NK	AT, NT

Abbreviations: A, Assam; Ap, Arunachal Pradesh, AP, Andhra Pradesh; Beng, Bengal; Ind, India; Mg, Meghalaya; Mn, Manipur; Mz, Mizoram; MH, Maharashtra; MP, Madhya Pradesh; Ng, Nagaland; N.Beng, North Bengal; N.Bihar, North Bihar; N.India, North India; Or, Orissa; Sk, Sikkim; S.India; South India; Tr, Tripura; TN, Tamil Nadu; UP, Uttar Pradesh; W .Beng, West Bengal; W.Ghats; Western Ghats; Afg, Afganistan; Bd, Bangladesh; Bh, Bhutan; Chn, China; E.Africa; East Africa; Myn, Myanmar; Md East, Middle East; Np, Nepal; Pak, Pakistan; SE Asia, South East Asia; SrL, Sri Lanka; S.Africa, South Africa; Thai, Thailand; Viet=Vietnam; AT, anthropogenic threat; NT, natural threat; DD; data deficient; NE, not evaluated; LC, least concern; NT, near threatened; VU, vulnerable; EN, endangered; NK, not known; Ex. CSc, exotic culture in system; Cult, culture; Fd, food fish, Or, ornamental fish; Str, stream; P, pond; R, river; L, lake; WL, wetland; Str, stream; Bw, brackishwater; Fw, freshwater; O, omnivorous; C, carnivorous; H, herbivorous; P, pelagic, BP, benthopelagic, D, demersal, P-N, pelargic-neritic.

India (Figure 1). In Figure 2, the the north eastern states (8 states) bearing both Himalayan and Indo-Burma biodiversity hotspots zones are shown.

Several exotic species (*Cyprinus carpio, Ctenopharyngodon idella, Puntius gonionotus, Hypophthalmichthys molitrix, Hypophthalmichthy nobilis, Oreochromis mossambicus, Clarias gariepinus*) and the recent intrusion of *Piatractus brachypomus* (local name, Paku/ Rupchada) etc. are available in different regions of the Brahmaputra and Barak river systems. The capture of *C. gariepinus* from different wetlands and tributaries is a vital issue, with reference to their occurrence and establishment of their habitat. Every year, a large number of *C. carpio, C. idella, H. molitrix, H. nobilis* with gravid females are captured from the different wetlands of Assam

Table 2. Number of fishes identified from different families from North Eastern States.

Family	No. of species
Notopteridae	2
Anguillidae	1
Clupeidae	5
Engraulidae	1
Cyprinidae	154
Psilorhynchidae	6
Balitoridae	48
Cobitidae	20
Bagridae	28
Siluridae	10
Schilbeidae	8
Pangasiidae	2
Amblycipitidae	7
Akysidae	2
Sisoridae	49
Eresthistidae	15
Claridae	3
Chacidae	1
Mugilidae	2
Belonidae	2
Apocheilidae	1
Syngnathidae	1
Synbranchidae	4
Mastacembelidae	4
Chaudhuridae	2
Chandidae	5
Scianidae	1
Nandidae	8
Cichlidae	2
Gobiidae	3
Anabantidae	2
Salmonidae	2
Belontidae	6
Osphronemidae	1
Channidae	11
Ophichthidae	1
Pristigasteridae	1
Tetraodontidae	1

during mid-January, for the celebration of different festivals. It may be noted that there is a large number of *P. brachypomus* which comes in everyday through the Bangladesh border to the markets of north eastern states as well as to the other parts of the country. Further, it has been known that the same fish are being bred in some neighbouring countries, and farmers from India are interested in introducing their own farming system.

All these species are food fish, except for a few like *Chaca chaca, Badis badis, Sisor (S. barakensis, S. rabdophorus, S. chennuah)* and *Tetraodon*. Special attention has been focused on how to conduct an extensive survey for documentation on the occurrence of various species, identification of habitat, abundance, and conservation status of fish biodiversity. With the growing need of meeting the demand, there is an intensive culture of major carps along with several species of minor carps. Attempts have been made to diversify the introduction of locally available commercially viable species such as murrels, chital, cat fish (*Wallago*, *Chitala, Ompok*, *Mystus* etc). Regulation and management of the culture of exotic species is a major issue, where these species escape during the floods from the culture ponds and establish their home in natural aqua bodies such as wetlands, reservoirs etc. It is a serious threat that hatcheries of several varieties of illegally introduced species such as *C. gariepinus*, *H. nobilis*, *Tilapia*, *Pangasius sutchi*, etc. are being encouraged by the farmers. Further, hatcheries produce hybrids of various species of both major and minor carps, owing to the breeding of several species together. Natural hybrids already exist in the aquabodies. All the aforementioned factors act as serious threats to the original germplasm.

We have verified the threats that have been encountered (Goswami, 2000, 2005; Goswami et al., 2007). It is noteworthy that natural hazards such as floods, earthquakes, frequent changes in the river course, glacial water discharge, erosion, cloud burst, natural discharge of both organic and inorganic elements, and diseases provide immense threats to the fish population. Man-made threats such as pollution, river embankments, sand digging and hydro power dam also cause serious threats in the entire north eastern area. Some chemicals or inorganic elements such as fluoride and arsenic are sources of poision. It has been known that arsenic is a poisonous element and there are important studies on the effects and occurrence of arsenic in fish (Maheshwari et al., 2010). Certain areas of the north eastern region of India are already marked as arsenic prone areas (Patowari, 2011). Large areas of both the Brahmaputra and Barak Valley are suffering from arsenic poisioning, containing more than 50 ppmb amount of arsenic, which is above the permissible level. Although arsenic usually occurs in underground water, the leasing out of same in the surface water is very common. Arsenic and fluoride may be regarded as hydrogeological calamities (Maheshwari et al., 2010, Patowari, 2011). There is a series of man-made or anthropogenic hazards which directly affect the fish population. The discharge of a large quantity of xenobiotics, pesticides, weedicides etc in various agricultural programmes, and in the tea industry constitute a sizeable amount of the in both soil and water. There is continuous use of plant poisions for fishing in some regions of Meghalaya and Arunachal Pradesh (Goswami et al., 2007). It has been found that there are oil spills in the upper reaches of the Brahmaputra basin. This is because of the different

Table 3. Statewise fish individual number and their uses as both food and ornamental fish.

State	Total no. of fish	Food fish	Ornamental fish
Assam	311	131	180
Arunachal Pradesh	271	112	159
Meghalaya	231	95	136
Manipur	325	142	183
Mizoram	202	97	105
Nagaland	210	94	116
Sikkim	194	95	99
Tripura	199	101	98

Figure 1. A digitised map showing the Himalayan and Indo-Burma biodiversity hotspot zones and the North Eastern states of India.

activities of oil explorations and direct contact of the crude oil, slugs with water and soil. The unplanned construction of embankments for preventing floods causes the loss of habitat, breeding ground and migration of fish. Several hydroelectric dams have already been constructed, or are under construction. Unplanned construction might cause the destruction of habitat, breeding ground and migration for the rich diversity of fishes of the north eastern states of India and the rheophilic fish fauna in particular. The issue of the development of a fish ladder, which is a major issue in the construction of dams, has not been seriously

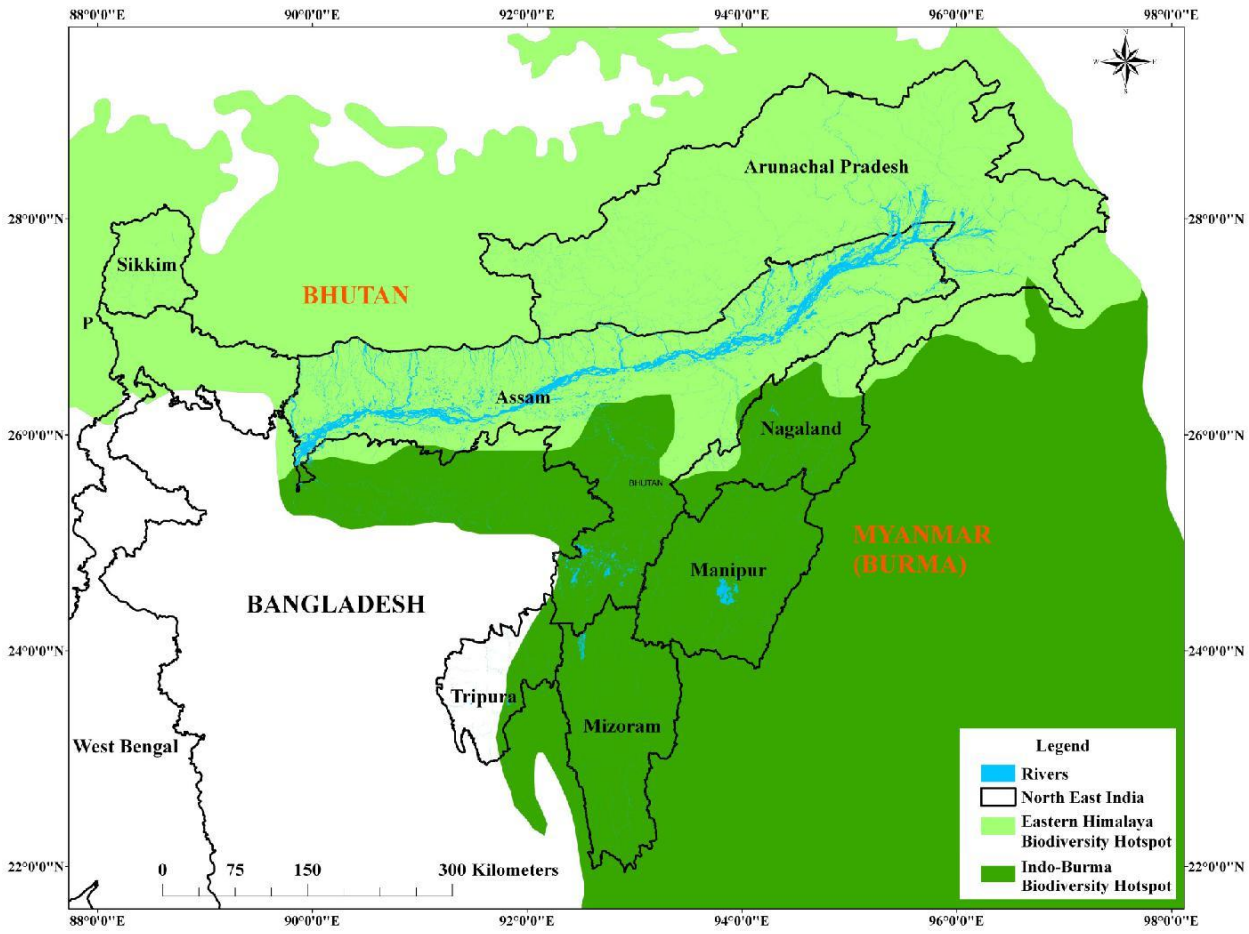

Figure 2. The the north eastern states (8 states) bearing both Himalayan and Indo-Burma biodiversity hotspots zones.

considered. 718 dams (Assam Tribune, 2010) are proposed to be constructed. This might be a serious threat and its further effects cannot be visualized. A series of threats has been discussed in our reports in 2007 (Goswami et al., 2007). The recent threats from the construction of hydro electric dams on the Teesta, Brahmaputra river system, in rivers of Arunachal Pradesh and in Manipur are some of the on going problems. The major river system of Arunachal Pradesh is under consideration for the construction of hydro electric power dams. Irregular water discharges as well as uncontrolled flow are creating large scale deaths to the fries and fingerlings of various species of fish. The present water sources of north eastern states covering the different ecosystem have been described in Table 4.

A recent finding (Bhattarcharjee et al., 2008) has focused that lime samples collected from the north east region of India has shows the presence of a high proportion of radionucleides of uranium, thorium and actinides series emitting gamma rays, this is a serious concern regarding its effects on the fish fauna. The presence of limestone is abundant in the north eastern states and its contamination of the aqua bodies is widespread. Considering all these factors, it has been concluded that the habitats of the fishes mentioned are under threat either from natural or anthropogenic interferences, starting from the work of Nelson (2006), who estimated 27977 valid species and later 3250 (Kottelat and Whitten, 1996; Rema and Indra, 2009). Although there are various reports on the number of freshwater species, the recent work of Rema and Indra (2009) has reported 667 species from 35 families, 149 genera. From the present report, it has been found that out of 667 species, 422, that is, 62.81% are available in the north eastern region of India.

Several species require a critical revision. It may be mentioned that *Anabus cobijius* (Ao et al., 2008), a species reported from Nagaland requires a thorough examination. *Micropis deocata* is found only in the Assam Himalayas. There is no report of its occurrence in the plain rivers, although its other related genus is found in the sea or in estuaries. There is no report of its migration into the Brahmaputra river system, and it is found in a few rivers of Arunachal Pradesh. Considering all these issues

Table 4. Water resourses of North-East India.

State	Rivers/streams (km)	Beels/lakes (ha)	Tanks/ponds (ha)	Paddy/fields (ha)	Other suitable water (ha)
Arunachal Pradesh	2000	2500 + cold water	1000	2800	700
Assam	4820	100000	20000	20000	1517
Manipur	2000	40000	5000	40000	10000
Meghalaya	5600	394	1944	5000	3000
Mizoram	1748	32	1800	1560	-
Nagaland	1600	215	2000	10000	-
Sikkim	900	-	-	-	-
Tripura	1200	240	11038	-	-
Total	19868	143381 +110	42752	79360	15217

and the present studies of the different habitat, an on the spot physical verification following the IUCN Red list system illustration and criteria adopted by NBFGR – 2010, the fish species have been assessed and the conservation criteria determined.

The effect of climate change in parts of the Eastern Himalayas could trigger a sequence of events posing serious threats to the biodiversity of fish, in particular in Sikkim, Arunachal Pradesh and Assam. The glacial lakes outburst flood (GLOF) in the mountains has already caused harm to communities in the recent past, and there is a clear possibility that more such events could occur. It has been shown that a number of GLOF events have taken place in Nepal, Bhutan and India. As global temperatures rise, the possibility of Himalayan lakes releasing enormous amounts of melted water has emerged as a serious concern in vulnerable areas. During their retreat, the glaciers leave behind huge volumes of water in the form of lakes. Some of these have weak or unstable walls surroundings them, which can burst, leading to an outflow of the water. In the downstream areas, anything adjacent to such surges of water can be washed away within a short span of time (Das, 2010). This is a major natural threat for the rheophic fish population of Bhutan, Sikkim, Assam and Arunachal Pradesh.

In the present study, no attempt has been made on the survey of the species belonging to Bhutan. The political boundaries of north eastern states of India which are zones of biodiversity hot spots have been considered.

However, more studies would be required to map the threats in detail, together with and their long -term impact. Since a large number of species are facing serious threats, a thorough study on the biology, propagation and habitat suitability for sustenance should be pursued, amore concepts and policies empowered to this region.

ACKNOWLEDGEMENTS

Thanks are due to various funding agencies (ICAR, NBFGR) for their support, as well as national institutes such as ICAR, Zoological Survey of India. We are indebted to Prof. P. J. Pandian, National Professor, Madurai Kamraj University, Madurai, India who was instrumental as the guiding force for the preparation of this manuscript. During the survey, a large number of fisherfolk helped us in gathering information. Thanks are due to Dr. (Mrs) R. Devi, Zoological Survey of India, Chennai, India; Dr. R. P. Barman, Zoological Survey of India, Kolkata, India; M. Thapa, Dr. L. Ally, Sikkim, India: Dr. D.N. Das and Dr. Daniels Maize, Rajiv Gandhi University, Arunachal Pradesh; Dr. W. Vishwanath and K. Geeta Kumari Department of Life Sciences, Manipur University, Canchipur, Imphal-795010, Manipur, India (who helped in this research scheme and contributed for a large number of fish in the present list); Dr. Solanki, Mizoram University, Mizoram India; Dr. R. Saha,College of Fisheries, Central Agricultural University, Tripura; Dr. M.R Sinha, Advisor Fishery Govt. of Tripura India; Mr. R. Nath and Dr. (Mrs) S. Kharbuli, Department of Aquaculture, St. Anthony's College, Shillong, India; Dr. S. Ramanujan, and Dr. N. Saha, Department of Life Sciences, North Eastern Hill University, Shillong India, Dr W. S. Lakra and Dr. U. K. Sarkar, NBFGR – ICAR, Lucknow, India; Dr Dilip Kumar, CIFE – ICAR, Mumbai, India; Dr. B. K. Bhattcharjee, CIFRI – ICAR, Guwahati, India. We thank Dr. Uma Ramakrishnan, NCBS, TIFR-Bengaluru, India and Professor M. R. S. Rao President, JNCASR DBT- Bengaluru, India (for collaraborating in the different aspects of DNA finger printing); and Professor C. N. R. Rao, Linus Pauling Professor of JNCASR DBT, Bengaluru, India for his active interest towards the biodiversity of the North Eastern part of the country. North Eastern Council, Shillong, Govt. of India. We thank Dr. P. K. Sarma, a geographer with Aaranyak, for his help in designing the digitized map of the two biodiversity hotspots zones of north eastern regions showing the Himalayan and Indo-Burma zones. Thanks are due to Dr. Bibhav Talukder and Ms. Purnima Devi of "Aaranyak", for their co-operation and encourangement. We have consulted and interacted with several NGOs, wildlife

scientists, ecologists, freshwater fish biologists from different parts of the world, Fisheries Departments, and Forest and Environment Departments of the Govt. of India and the State Govt. We are grateful to all of them for their pro-active interest and generous cooperation.

REFERENCES

Allen DJ, Molur S, Daniel BA (Compilers) (2010). The Status and Distribution of Freshwater Biodiversity in the Eastern Himalaya. Cambridge, UK and Gland, Switzerland: IUCN, and Coimbatore, India: Zoo Outreach Organisation.

Ao S, Dey SC, Sarmah SK (2008). Fish and Fisheries of Nagaland. Department of Fisheries, Government of Nagaland, Kohima, Nagaland, p. 234.

Bagra K, Kadu K, Sharma KN, Laskar BA, Sarkar UK, Das, DN (2009). Ichthyological survey and review of the checklist of fish fauna of Arunachal Pradesh, India. Check list, 5(2):330-350.

Barman RP (1989). On a small collection of fish from Mizoram, India. J. Bombay Nat. Hist. Soc., Bombay 86(3):463-466.

Barman RP (2002). State Fauna Series 7: Fauna of Tripura Part – 1: Pisces: Freshwater fishes: 191–320 text. Figs. 118 Zool. Survey of India.

Bhattarcharjee D, Endo S, Tamaker K, Ohtaki M, Sakaguchi A, Yamamoto M, Golikov V, Hoshi M (2008). Radionuclides detected in lime samples consumes with tobacco and betl nuts by people of north east India where head and neck cancer (HNSCC) is prevalent. Indian J. Rad. Res. 5(1-2):49-56.

Biswas BK, Sugunan VV (2008). Fish Diversity of Brahmaputra River System in Assam, India. J. Inland Fish. Soc. India 40(1):23-31.

CAMP (1997). Conservation assessment and management plan workshop for freshwater fishes of India, National Bureau of Fish Genetic Resources, Lucknow and Zoo Outreach Organization, Coiambatore.

CEPF (2005). Ecosystem Profile: Eastern Himalayas Region. Critical Ecosystem Partnership Fund. Available at: http:// www.cepf.net/Documents/final.ehimalayas.ep.pdf

Daniels RJR (2001). Endemic fishes of the Western Ghats and the Satpura Hypothesis. Curr. Sci. Bangalore 81:240-244.

Darshan A, Anganthoibi N, Vishwanath W (2010). Redescription of the striped catfish Mystus carcio (Hamilton) (Siluriformes: Bagridae). Zootaxa 2475:48-54.

Das JN, Biswas SP (2008). A hand book of ornamental fishes of the Brahmaputra Basin. EBH Publishers (India), Guwahati, p. 106.

Das P (1994). Strategies for Conserving Threatened Fishes in Nature Conservation, Muzaffarnagar. In Threatened Fishes of India, edited by P.V Dehadradri, P. Das and S.R Verma. Natcon Publ. 4:307-310.

Das PK (2010). Glacial lukes emerge as series threats. The Assam Tribune Guwahati, 72(200):13.

Ferraris JrCF (2007). Checklist of Catfishes, recent and fossil (Osteichthys: Siluriformes), and catalogu`e of siluriform primary types. Zootaxa 1418:1-628.

Fishes Fauna of Tripura (2007). Government of Tripura, Fishery Department Publ. 1:33.

Froese R, Pauly D (eds.) (2010). FishBase. World Wide Web electronic publication. www.fishbase.org, version (07/2006. Cited 18 April).

Goswami UC (2000). Establishment of exotic fishes in natural water bodies of North East India. *In*: Ponniah, A.G & Sarkar, U.K. (eds.). Fish Biodiversity of North East India, NBFGR, NATP Publ. 2:150-154.

Goswami UC (2005) Constrain analysis in propagation and conservation of freshwater fish germplasm resources of north east India. Nat. Conserv. Publ. 9:103-111.

Goswami UC, Viswanath W, Jayaram KC, Datta MJS (2007). Fish fauna of north east India: Natural and anthropogenic hazards. In: Goswami, U.C. Natural and anthropogenic hazards on fish and fisheries, edited by U.C.Goswami, Narendra Publicaton House, Delhi, pp. 21-46.

Hamilton FB (1822). An account of the fishes found in the river Ganges and its branches. Edinburgh & London. Fishes Ganges: i-vii + 1-405, Pls, pp. 1 -39.

Hora SL (1944). Structural modifications in the fish of mountain torrents. Rec. Indian Mus., Calcutta 24:31-61.

Jayaram KC (2008). Fundamentals of Fish Taxonomy. Narendra Publ. House, Delhi, p. 174.

Jayaram KC (2010). The Freshwater Fishes of the Indian Region. 2nd Edition. Narendra Publ. House, Delhi, pp. 625.

Jhingran AG, Talwar PK (1991). Inland Fishes of India and Adjacent Countries. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi. 1, 2.

Kar D, Sen N (2007). Systematic List and Distribution of Fishes in Mizoram, Tripura and Barak Drainage of Northeastern India. Zoos' Print J. 22(3):2599-2607

Karmakar AK (2006). Fauna of Sikkim, State Fauna Series, 9(Part-1):185-214.

Kottelat M (1989). Zoogeography of the fishes of Indochinese inland waters with an annoted check-list. Bull. Zool. Mus. Amsterdam, 12:1-55.

Kottelat M, Whitten T (1996). Freshwater biodiversity in Asia with special reference to fish: World Bank Technical paper No. 343: The world bank, Washington DC, p. 59.

Lakra WS, Sarkar UK, Gopalakrishnan A, Kathivelpandian A (2010). Threatened Freshwater Fishes of India, NBFGR, Lucknow, pp. 1 -20.

Maheshwari R, Rani B, Singh U (2010). Arsenic toxicity: A hydrogeological calamity Asrobios. VIII(8), pp. 18-22.

McNeely JA, Mainka SA (2009). Conservation for a New Era. IUCN - International Conservation Union, Gland, Switzerland.

MEA (2005). Ecosystems and Human Well-Being: A Frameworkfor Assessment. Millennium Ecosystem Assessment. IslandPress, Washington DC, USA.

Menon AGK (1999). Check list – Freshwater fishes of India. Rec. Zool. Survey, India, Occasional Paper No. 175, ZSI Publ., Calcutta, p. 366.

Myers N, Mittermeier RA, Mittermeier CG, da Fonseca GAB, Kent J (2000). Biodiversity hotspots for conservation priorities. Nature 403:853-858.

Nath P, Dey SC (2000). Fish and fisheries of North Eastern India (Arunachal Pradesh), Narendra Publ. House, Delhi, p. 217.

Nath P, Dey SC, Dam D, Das DN (2008). Fishery of Arunachal Pradesh (India): A potential hub in North-East Region. In: Fish Genetic Resources, Edited by Dr.W .S.Lakra, Dr. A.K. Singh and Dr. P.C. Mahanta. Narendra Publishing House, Delhi, pp. 73-82.

Nath S, Dey SC (2008). The ecology and fisheries of Barak river system of India. Narendra Publ. House, Delhi, p. 192.

Ng HH, Kottelat M (2008). The identity of *Clarias batrachus* (Linnaeus, 1758), with designation of a neotype (Teleostei: Clariidae). Zool. J. Linn. Soc., pp. 725-732.

North Eastern Council (2008). Ten years perspective plan: Water resources of North East India.

Pascoe EH (1919). Early history of the Indus Brahmaputra and Ganges. Q. J. Geol. Soc. 75:136.

Pilgrim GE (1919). Suggestion concerning the history of drainages of northern India. J. Asiat. Soc. Bengal, 15:81.

Ponniah AG (1994). Categorisation of India's Threatened Fishes. *In* Threatened Fishes of India, edited by P.V Dehadradri, P. Das and S.R Verma. Natcon Publ. 4:365-377.

Ramanujan SN (2005). Biodiversity of aquatic fauna of Mizoram: The present scenario. Aquatic Biodiversity in India: The Present Scenerio. Daya Publ. House, New Delhi, pp. 61-80.

Rema DK, Indra TJ (2009). Check List of the Native Freshwater Fishes of India. Southern Reg. Centre Zool. Surv. India, pp. 1-24.

Roach J (2005). Conservationists name nine new biodiversity hotspots. National Geographic news, February 2, 2005.

Sarkar UK, Ponniah AG (2000). Evaluation of North East Indian Fishes for their Potential as Cultivable, Sport and Ornamental Fishes along with their Conservation and Endemics Status. *In:* Ponniah, A.G and Sarkar, U.K. (Eds.). Fish Biodiversity of North East India. NBFGR, NATP Publ. 2:11-30

Sen N (1995). Pisces. State Fauna Series 4: Fauna of Meghalaya: Zool. Survey India 1:483-606.

Sen N (1999). On a collection of fishes from Subansiri and Siang districts of Arunachal Pradesh. Rec. Zool. Surv. India, 97(1):141-144.

Sen N (2000). Occurrence, distribution and status of diversified fish fauna of North East India. *In:* Ponniah, A.G. & Sarkar, U.K. (Eds.).

Fish Biodiversity of North East India. NBFGR, NATP Publ. 2:31-48.
Sen N (2003). Fish fauna of North East India with special reference to endemic and threatened species. Rec. Zool. Surv. India, 101(3-4): 81-99.
Sen N (2007). Description of a new species of Brachydanio Weber and De Beaufort, 1916 (Pisces: Cypriniformes: Cyprinidae) from Meghalaya, North East India with a note on comparative studies of other known species. Rec. Zool. Surv. India, 107(4):27-31.
Sen N (2009). New records of *Horalabiosa joshuai* Silas (Pisces: Cypriniformes: Cyprinidae) form North East India. Rec. Zool. Surv. India 109(2):21-22.
Sinha M (1994). Fish genetic resources of the northeastern region of India. J. Inland Fishery Soc. India 26(1):1-19.
Sinha M (2010). Fish and Fisheries of North Eastern States of India, Narendra Publ. House, Delhi.
Tamang P (1992). Systematics, distribution and ecology of the Ichthyo species of Sikkim and their bearing on the fish and fisheries of the state. Ph. D thesis, Gauhati University.
Tamang P (1993). Panda, Fish geography of Sikkim, 1(2):19.
Tamang L, Chouduhry S, Choudhury D (2007). *Balitora brucei* (Gray) and *Glyptothorax telchitta* (Hamilton), two new reports for Arunachal Pradesh, India. J. Bombay Nat. Hist. Soc. Bombay, 104(2), May-August, 229-230.
The Assam Tribune (2010). 718 Dams coming up in Arunachal Pradesh, 72 (180), July 4th, p. 1.
Vishwanath W, Lakra WS, Sarkar UK (2007). Fishes of Northeast India. National Bureau of Fish Genetic Resources, Lucknow, India, p. 264.
Yadava YS, Chandra R (1994). Some Threatened Carps and Catfishes of Brahmaputra River System. *In Threatened Fishes of India*, edited by P.V Dehadradri, P. Das and S.R Verma. Natcon Publ. 4:45-55.