SYSTEMATIC LIST AND DISTRIBUTION OF FISHES IN MIZORAM, TRIPURA AND BARAK DRAINAGE OF NORTHEASTERN INDIA

Devashish Kar [1] and Nibedita Sen [2]

[1] Department of Life Science, Assam (Central) University, Silchar, Assam, India & President, Conservation Forum, Silchar, Assam, India
[2] Zoological Survey of India, Eastern Regional Station, Risa Colony, Fruit Gardens, Shillong, India
Email: [1] devashishkar@sify.com; [2] nsen_1231@rediffmail.com

Abstract

Extensive ichthyological field survey conducted from 1996 to 2006 in the major rivers of Mizoram, Tripura and Barak drainage (in Assam and partly in Manipur) revealed the occurrence of bewildering diversity of fishes. Of these, the rivers in Mizoram revealed 42 species in river Tuirial, 42 species in river Kolodyne, 31 species in river Karnafuli, 25 species in river Mat, 36 species in river Tlawng, nine species in river Tuirini, 14 species in river Serlui and 23 species in river Tuivai. The rivers in Tripura reflected 28 species in Manu, 22 species in Khowai, 53 species in Gomati, and 22 species in Feni. In Barak drainage, river Barak portrayed 65 species (including collections from the proximity of its origin in Karong, Manipur), river Jatinga 61 species, river Sonai 54 species and river Dhaleswari 32 species. Declaration of 'aquatic sanctuaries' for the conservation of rare and endangered fishes like the mahseers have been strongly suggested in the paper.

Keywords

Barak drainage, fish diversity, hotspot, Mizoram, northeastern India, Tripura

Fish constitutes almost half of the total number of vertebrates in the world. India is one of the megabiodiversity countries in the World (Mittermeier & Mittermeier, 1997). The northeastern region of India has been identified as a hotspot of biodiversity by the World Conservation Monitoring Centre (WCMC, 1998). The hills and the undulating valleys of this area gives rise to a large number of torrential hill streams, which lead to big rivers that finally become part of the Ganga-Brahmaputra-Barak-Chindwin-Kolodyne-Gomati-Meghna system (Kar, 2003).

Icthyofaunal 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 (Yadava & Chandra, 1994), is barely studied. Hora (1921a,b; 1930, 1936, 1937, 1938, 1939, 1940, 1941, 1943, 1951a,b,c; 1953) is one of the pioneer workers on the fishes of northeastern India; Dey (1973) did significant work; Ghosh and Lipton (1982) had reported 172 species of fishes with reference to their economic importance; Sen (1985) reported 187 species of fishes from Assam and its environs; Sinha (1994) compiled a list of 230 species of fishes from northeastern India; Nath & Dey (1997, 2000) recorded 131 species of fishes from the drainages in Arunachal Pradesh alone; and Sen (1982, 1995, 1999a,b; 2000) compiled a comprehensive list of 267 species of fishes from northeastern India. Further, according to Sen (2000), of the nearly 806 species of fishes inhabiting the freshwaters of India (Talwar & Jhingran, 1991), the north-eastern region is represented by 267 species belonging to 114 genera under 38 families and 10 orders, approximately one-third of the Indian freshwater fishes. Sen (2003) updated the list of ichthyofauna of northeastern India. Viswanath (1993), Viswanath & Kosygin (1999, 2000a,b; 2001), Viswanath & Singh (1986), Viswanath & Sarojnalini (1988), Viswanath *et al.* (1987, 1998) made valuable contributions to the ichthyofauna of Manipur. The Conservation Assessment and Management Plan workshop (Molur & Walker, 1998) made valuable contributions to assessing the status of selected fishes of northeastern India.

However, no detailed systematic fish inventory has been available on the ichthyofauna of Mizoram, Tripura and Barak drainage in Assam, except some works done by Barman (1984, 1992, 1994) and pilot surveys done by Kar (2000, 2001, 2002, 2003, 2004, 2005a,b,c,d, 2006; Kar *et al.* 1996, 2002a,b,c). As such, the present communication happens to be the first detailed systematic list of the fishes occurring in the major rivers of Mizoram, Tripura and Barak drainage of Assam based on extensive surveys done from 1996 to 2006.

The surveyed rivers of south Assam, Mizoram and Tripura in northeastern India

The River Barak is the biggest river in southern part of northeastern India constituting the Barak Drainage. Barak is a part of the Ganga-Brahmaputra-Meghna Basin.

Barak originates from Japvo peak in Nagaland (approx. 3353.65m), and flows through Karang village along the Manipur-Nagaland border and drains almost the entire Manipur valley before entering Assam. It flows through the southern part of Assam (thus, forming the Barak valley); and, after traversing through a stretch of about 532km from its origin, the river Barak bifurcates into two (the Surma and the Kushiara) at village Harinagar (Haritikar) at the Indo-Bangladesh border. Both these rivers, after flowing for some distance along the Indo-Bangladesh border, enter Bangladesh and join the Meghna basin before entering the Bay of Bengal.

Barak has a number of tributaries joining it in both its north and south banks. The principal north bank tributaries are the rivers Jiri, Chiri, Madhura and Jatinga; while, the major south bank tributaries include the rivers Sonai, Rukni, Dhaleswari, Ghagra and Tuivai. In addition to these, the river Shingla and the river Longai, both originating from the Mizo hills, join the tiver Kushiara in Barak valley, the former flowing via Sone Beel, the biggest wetland in Assam (Kar, 1990). Also, the river Baleshwar joins river Surma in Barak valley (Fig.1).

Manuscript 1571a; © ZOO; Date of publication 21 February 2007
Received 26 May 2006; Revised received 03 November 2006;
Finally accepted 18 January 2007

Table 1. Details of the surveyed rivers in Mizoram, Tripura and Barak drainage

River and Province	Collection site	Geographical position	Altitude (m MSL)	No. of spp. collected	Total No. of Specimens collected	Date of Collection
River Tuirial in Mizoram	Village: Tuirial	N 23°43'1.7"-E 92°48'10"	161..5	42	394	31.i.1996, 4.vii.1998, 14.ii.1999, 6.x.2000, 20.v.2001, 23.vi.2001, 7.xi.01, 24.iii.2002, 25.x.2002
	Village: Near Tuirial origin	N 23 °42' 38.9"-E 92° 48' 16.9"	338.0			25.x.2002
River KolodyneIn Mizoram	Village : Kawlchaw	N 22°23' 51.9"-E 92° 58.5' 9.9"	158.84	42	229	5.ii.1996, 15.ii.1998, 14.ii.1999, 28.iii.2001, 23.v.2001, 22.vi.2001, 25.i.2002, 23.x.2002
River Karnafuli In Mizoram	Village: Demagiri (Tlabung)	N 22°53' 1"-E 92°28' 9.8"	51.2	32	501	16.i.1996, 24.iv.1998, 10.vii.2000, 20.v.2001 21.vi.2001, 23.i.2002
	Village: Dighlibak	N 22°55' 43.9"-E 92°29'53.9"	67.07			21.x.2002
	Village: Taklabak	N 24 °54' 59.7"-E 92°25' 28.7"	31.7			24.i.2002
River Mat in Mizoram	Village: Mat bridge	N 22°53' 42.3"-E 92°52' 15.7"	464	25	119	4.ii.1996, 6.vii.1998, 16.ii.1999, 20.vi.2000, 20.v.2001, 23.vi.2001, 22.i.2002, 24.x.2002
River Tlawng in Mizoram	Village: Sairong	N 23°48' 36.8"-E 92°39' 9.9"	74.08	36	111	15.vii.1996, 24.2.1998, 22.x.2000, 1.vi.2001, 24.vi.2001, 7xi1.2001, 25.iii.2002, 6.viii.2002, 26.x.2002
	Village: Kamranga	N 23 °55' 9"-E 92° 39' 24.3"	59.75			6.viii.2002
	Village: Venglai	N 23°50' 20.8"-E 92° 39' 55"	66.15			26.x.2002
	Village: Pohlrangkai	N 23°53' 55"-E 92°39' 21.1"	70.12			26.x.2002
River Tuirini in Mizoram	Village: Thingsulthliah	N 23°40' 55.7"-E 92°53' 57.6"	266.46	09	31	18.iv.1996, 22.iv.1998, 20.x.2000, 7.xi.2001
	Village: Tuirini bridge	N 23°40' 55"-E 92°53' 19.1"	260.36			20.ix. 2001, 24.iii.2002, 26.x.2002
River Tuichong in Mizoram	Village: Tuichong	N 22° 54' 57.7"-E 92° 31' 50"	215.8	Not recorded	Not recorded	20.x.2002,
River Serlui in Mizoram	Village: Chemphai	N 24°22' 39.8"-E 92° 47' 4.4"	34.14	14	75	17.iii.1996, 21.iv.1998, 21.x.2000, 29.x.2002
River Tuivai in Mizoram	Village: Ngopa	Not recorded	Not recorded	23	70	30.v.2001
River Monu in Tripura	Village: Chakmabasti at Manughat	N 23° 59' 40.6"-E 91° 59' 29.3"	68.29	28	228	14.xi.2000, 7.ii.2001, 1.ix.2001, 27.x.2001
	Village: Chhamonu	N 23 °51' 21.6"-E 92° 0' 0.2"	88.41			27.x.2001, 8.ii.2003
River Khowai in Tripura	Village: Teliamura	N 23° 50' 34.9"-E 91° 38' 26.6."	54.2	22	67	15.xi.2000, 9.ii.2001, 31.viii.2001, 28.x.2001
	Village: Ganganagar (near origin)	N 23 °46' 43.2"-E 91° 51' 3.9 "	104.26			28.x.2001
River Gomati in Tripura	Village: Udaipur	N 23° 32' 15.8"-E 91°28' 44"	14.45	53	439	9.iv.1999, 15.xi.2000, 10.ii.2001, 30.viii.2001, 29.x.2001
	Village: Amarpur	N 23°31' 47"-E 91° 39' 49.7"	12.5			4.vi.2001, 28.x.2001
	Village: Jatanbari (Nutanbazar)	N 23° 25' 42.8"-E 91°45' 29.8"	16.15			6.vi.2001, 5.ii.2003
	Village: Tirthamukh (Mandirghat)	N 23°30' 59.4"-E 91°39' 48.2"	88.5			5.vi.2001
River Feni in Tripura	Village: Sabrum	N 22°59'59.6"-E 91°44' 3"	39.63	22	54	30.viii.2001, 31.x.2001, 6.ii.2003
	Village: Ravindranagar (Sabrum)	N 22°58' 56.8"-E 91°39' 10.3"	50.60			1.xi.2001
River Barak in Manipur	Village: Kathiko (Karong)	N 25°18'24.7"-E 94°2'48"	1018	65	559	26.x.2004
River Barak in Assam	Village: Narayandahar	N 24°43' 34.1"-E 93°4' 21.7"	31.40			25.x.1996, 28.iv.1998, 17.viii.2000, 3.v.2001, 25.v.2001, 13.i.2002
	Village: Fulertal	N 24°47' 12.9"-E 93° 1' 48.2"	29.3			25.x.1996, 28.iv.1998, 17.viii.2000, 4.ix.2001, 2.xii.2001
	Village: Kaptanpur	N 24° 45' 5.7"-E 92° 54' 47.1"	25.7			12.iv.2002, 14.ix.2002, 26.ix.2002
	Village: Dudhpatil	N 24°50' 48.3"-E 92°45' 42.6"	24.4			28.ix.2001
River Jatinga in Assam	Village: Balachhara	N 24°57' 55.3"-E 92°45' 42.6"	26.2	61	530	26.xi.1996, 17.ii.1998,

River and Province	Collection site	Geographical position	Altitude (m MSL)	No. of spp. collected	Total No. of Specimens collected	Date of Collection
						4.xii.2000, 15.v.2001, 9.xii.2001
	Village: Damchhara	N 25°0' 36.7"-E 92°35' 27"	47.2			19.viii.2001
	Village: Harangajao	N 23° 6' 56.4"-E 92° 51' 54.7"	158.5			9.ii.2002
	Village: Maharajpur Part II (Harangajao)	N 25°7' 3"-E 92°51' 56.3"	164.63			9.ii.2002
	Village: Thaijuari (Harangajao)	N 25° 6' 18.4"-E 92°49' 34.9 "	129.26			9.ii.2002, 15.ii.2002
	Village: Chandpur	N 24°53' 20.1"-E 92° 44' 31"	24.2			4.x.2002
River Sonai in Assam	Village: Jhulanpul	N 24°44' 2.8"-E 92° 53' 47.3"	28.04	54	223	14.iii.1996, 12.v.1998, 17.vii.2000, 2.v.2001, 2.x.2002
	Village: Nagakhal (Moniarkhal)	N 24° 34' 39.3"-E 92°57' 24.3"	39.02			16.xii.2001
	Village: Jarailtola	N 24°51' 20.1"-E 92° 58' 46"	36.89			12.ix.2002
	Village: Moniarkal Bazar	N 24° 34' 36.4"-E 92° 57' 35.2"	25.0			30.v.2001
	Village: Jorkhal (Moniarkhal)	N 24°35' 10.2"-E 92°57' 58.3"	39.93			24.viii.2001, 29.xi.2001
River Dhaleswari in Assam	Village: Gharmura	N 24°16' 39.2"-E 92°31' 8.3"	34.75	31	149	23.v.2001, 26.viii.2001
	Village: Matijuri	N 24° 38' 52.9"-E 92° 36' 40.1"	22.8			20.ix.1996, 2.x.1998, 17.iii.2000, 27.ix.2002

Mizoram

The state of Mizoram (area 21,081km²) is a beautiful terrain (maximum height approx. 2,743.90m) situated in the southern part of northeastern India bordering Bangladesh in the south-west and Myanmar in the east having the Tropic of Cancer passing through it. The major rivers of Mizoram are the Tuirial, Tlawng, Tuirini, Tuivai, Mat, Kolodyne (Kaladan or Chhimtuipui), Tuichong, Karnafuli and Serlui. Of these, the rivers Tuirial, Tlawng, Tuivai and Serlui join the Barak drainage at different points of their course. A small river, called, Tuirini, also joins the river Tuirial. The river Chhimtuipui originates in Myanmar, flows northward along the Indo-Myanmar border for some distance, then, turns south to flow back into Myanmar. The river Mat joins the river Chhimtuipui in Mizoram. The river Karnafuli, after originating from around Marpara region in the Mizoram-Tripura border, flows along the Mizoram-Bangladesh border; and, ultimately, joins the Bay of Bengal in Bangladesh (Fig. 1). The eight major rivers of Mizoram could be categorized under three major drainage systems as mentioned below (Kar, 2006): Rivers Tuirial, Tlawng and Serlui, Barak-Meghna drainage system, Indo-Bangladesh; Tuivai, Mat and Kolodyne, Kolodyne (Kaladan) drainage system, Indo-Myanmar; and, Tuichong and Karnafuli, Tuichong-Karnafuli drainage system, Indo-Bangladesh

Tripura

The province of Tripura is flanked by both hills and plains with four principal rivers, *viz*., Monu, Khowai, Gomati and Feni. In addition to the above, there are other smaller rivers, namely, Howrah, Deo and Muhuri.

Of these, the rivers Monu and Gomati originate from the Longtarai hills while the river Khowai originates from the Atharamura hill ranges. The river Feni is said to have originated from the escarps of the Chittagong hill tracts and flows down by the side of the village Shilachhari along the Indo-Bangladesh border. The river Howrah originates from the Baramura hill ranges (Fig. 1).

The four major rivers could be considered as belonging to four independent basins as given below (Kar, 2006): Manu basin, Khowai basin, Gomati basin, and Feni basin. All these rivers flow into Bangladesh independently.

Methodology

The Survey work spanned from Janary 1996 to January 2006. Fish samples were collected through experimental fishing using cast nets (dia.3.7m and 1.0m), gill nets (vertical height 1.0m-1.5m; length 100m-150m), drag nets (vertical height 2.0m), triangular scoop nets (vertical height 1.0m) and a variety of traps. Camouflaging technique was also used to catch the fishes. Fishes were preserved, at first, in concentrated formaldehyde in the field itself and then in 10% formalin. For identification, systematic list and classification, Jayaram (1999) was followed, while nomenclature was after FishBase (http//www.fishbase.org). Status of some of the fish species in the studied rivers was preliminarily ascertained after Menon (1994) and Molur & Walker (1998). Habitat inventory of the rivers was after Armontrout, (1990) and NBFGR (ICAR) Manual (2000).

Results

The details about the survey indicating river name and province, collection site, geographical position, altitude, date(s) of collection, number of species collected and total number of specimens collected are presented in Table 1. The systematic list of fish species collected along with their occurrence and distribution in different studied rivers with registration number and number of examples are presented in Table 2. River-wise distribution of the number of families and genera of the ichthyo-species in the studied rivers are given in Table 3. Status of some fish species in the studied rivers are listed in Table 4.

Table 2. Systematic list of fishes of Mizoram, Tripura and Barak drainage. The notations with the species indicate the location (in alphabets), AUFM museum number, and number of specimens collect (in paranthesis).

Order: Osteoglossiformes	
Family: Notopteridae	
1 *Notopterus notopterus* (Pallas)	Ka1(2); Tl1(2); Tv1(1); Go1(1); Ba1(3); Dh1(1)
Order: Anguilliformes	
Family: Ophichthidae	
2 *Pisodonophis boro*(Hamilton)	Ba2(3)
Order: Clupeiformes	
Family: Clupeidae	
3 *Tenualosa ilisha* (Hamilton)	Go2(1); Ba3(3); Jn1(1)
4 *Gudusia chapra* (Hamilton)	Ka2(5); Ba4(4); Jn2(4); So1(2)
5 *Securicula gora* (Hamilton)	Ko1(6); Ka3(7); Mt1(4); Tl2(4); Se1(7); Tv2(14); Mn1(3); Kh1(3); Go3(3); Fe1(2); Ba5(8); Jn3(1); Dh2(5)
6 *Salmostoma bacaila* (Hamilton)	Ka4(10); Tl3(3); Tv3(1); Kh2(6); Go4(52); Fe2(2); Ba6(7); Jn4(4); So2(13); Dh3(2)
7 *S. phulo* (Hamilton); Ka 5 (38)	Tl4(2); Tv4(5); Fe3(5)
8 *S. sardinella* (Valenciennes)	Mt2(1)
9 *Salmostoma* sp.	Ka6(76)
10 *Aspidoparia jaya* (Hamilton)	Ko2(6)
11 *A. morar* (Hamilton)	Ko3(30); Se2(3); Mn2(106); Kh3(3); Go5(15); Fe4(1); Ba7(1); Jn5(3); So3(8); Dh4(4)
12 *Barilius bakeri* Day	Tu1(166); Se3(1); Mn3(6); Go6(2); Ba8(5)
13 *B. barila* (Hamilton)	Mn4(1); Ba9(3); Jn6(7); So4(1)
14 *B. barna* (Hamilton)	Tu2(17); Ko4(10); Tl5(2); Mn5(35); Go7(13); Ba10(3); Jn7(10)
15 *B. barnoides* Vinciguerra	Tu3(4); Mt3(7); Tv5(4); Mn6(2); Kh4(15); So5(19)
16 *B. bendelisis* (Hamilton)	Tu4(6); Tl6(2); Tr1(3); Kh5(8); Ba11(11); Jn8(112); So6(1)
17 *B. dimorphicus* Tilak & Hussain	Go8(7)
18 *B. dogarsinghi* Hora	Kh6(3); Ba12(7); Jn9(3); So7(7)
19 *B. shacra* (Hamilton)	Tu5(3); Ko5(3); Se4(3); Tv6(1); Mn7(2); Kh7(1); Ba13(6); So8(4)
20 *B. tileo* (Hamilton)	Tu6(3); Tl7(3); Se5(3); Tv7(2); Jn10(3); Dh5(2)
21 *B. vagra* (Hamilton)	Tu7(14); Ko6(4); Ka7(3); Mt4(2); Tl8(2); Mn8(2); Go9(1); Fe5(2); Jn11(6); So9(2); Dh6(1)
22 *Chela laubuca* (Hamilton)	Tu8(2); Ko7(4); Ka8(29); Mt5(6); Se6(3); Go10(6); Ba14(1); So10(1); Dh7(2)
23 *C. cachius* (Hamilton)	Fe6(1)
24 *Esomus danricus* (Hamilton)	Mt6(1); Tl9(1); Go11(4); Ba15(2); So11(1); Dh8(1)
25 *Devario aequipinnatus* (McClelland)	Tu9(33); Mt7(4); Tr2(5); Kh8(1); Ba16(7); Jn12(27); So12(2)
26 *Devario annandalei* Chaudhuri	Kh9(1)
27 *Danio dangila* (Hamilton)	Jn13(3)
28 *Devario devario* (Hamilton)	Tu10(2); Go12(13); Jn14(10)
29 *Devario naganensis* Chaudhuri	Tu11(21); Ko8(4); Ka9(3); Mt8(18); Tl10(1); Mn9(2); Kh10(2); Go13(4); Fe7(7); Ba17(7); Jn15(2); So13(2)
30 *Rasbora daniconius* (Hamilton)	Mn10(3)
31 *R. rasbora* (Hamilton)	Tu12(6)
32 *Amblypharyngodon mola* (Hamilton)	Go14(12); Fe8(1); Ba18(5); Jn16(1); So14(4); Dh9(1)
33 *Tor mosal* (Hamilton)	Ko9(5); Tv8(1); Jn17(8); So15(1)
34 *T.progenius* (McClelland)	Jn18(1)
35 *T. tor* (Hamilton)	Mt9(5); Tl11(2)
36 *Neolissochilus blythii* (Day)	Mt10(6)
37 *N.hexagonolepis* (McClelland)	Tu13(9); Mt11(11); Se7(4); Mn11(1); Kh11(1); Go15(13); Ba19(4); Jn19(56); So16(1); Dh10(1)
38 *N.hexastichus* (McClelland)	Ko10(5)
39 *Neolissochilus sp*	Tr3(1)
40 *Osteobrama cotio cotio* (Hamilton)	Ko11(3); Ka10(9); Ba20(9); Jn20(2); So17(1); Dh11(6)
41 *Osteobrama sp*	Ka11(57)
42 *Chagunius chagunio* (Hamilton)	Tv9(2)
43 Puntius chola (Hamilton)	Se8(7); Mn12(10); Kh12(3); Go16(24); Fe9(10); Ba21(1); Jn21(5)
44 *Poropuntius clavatus* (McClelland)	Tv10(1)
45 *Puntius conchonius* (Hamilton)	Tu14(27); Ko12(41); Ka12(8); Mt12(32); Tl12(10); Tr4(4); Tv11(9); Mn13(3); Kh13(5); Go17(80); Fe10(5); Ba22(10); Jn22(65); So18(44); Dh12(5)
46 *P. puntio* (Hamilton)	Ko13(4)
47 *Puntius* sp.	Tu15(2)
48 *P. sarana* (Gunther)	Tu16(1); Ko14(2); Mt13(2)
49 *P. sophore* (Hamilton)	Mn14(5); Kh14(3); Fe11(2); Ba23(1); So19(1)
50 *P. ticto* (Hamilton)	Tu17(4); Ko15(2); Tl13(1); Mn15(8); Ba24(2); Jn23(17); So20(9); Dh13(5)
51 *Semiplotus modesftus* (Day)	Ko16(2); Mt14(4)
52 *Cyprinion semiplotum* (McClelland)	Ko17(2)
53 *Cirrhinus cirrhosus* (Bloch)	Mn16(1)
54 *C. mrigala* (Hamilton)	Tl14(1); Mn17(3); Kh15(2); Go18(1); Fe12(1); Ba25(1); Jn24(2); So21(5); Dh14(1)
55 *C. ariza* (Hamilton)	Tl15(2); Go19(7); Jn25(8); So22(7); Dh15(3)
56 *Catla catla* (Hamilton)	So23(1)
57 *Labeo bata* (Hamilton)	Ko18(1)
58 *L. boga* (Hamilton)	Kh16(2); Ba26(1)
59 *L. calbasu* (Hamilton)	Jn26(2); Dh16(50)
60 *L. gonius* (Hamilton)	Jn27(2)
61 *L. pangusia* (Hamilton)	Jn28(6)
62 *L. rohita* (Hamilton)	Ba27(1)
63 *Crossocheilus burmanicus* Hora	Tu18(2); Ko19(2); Ba28(21); Jn29(2)
64 *C.latius* (Hamilton)	Tu19(6); Ko20(6); Mt15(1); Tl16(1); Mn18(2); Go20(2)
65 *Garra annandalei* Hora	Tu20(10); Ko21(2)

66 *G. gotyla gotyla* (Gray)	Tu21(13); Ko22(2); Mt16(1); Tl17(2); Tv12(1); Jn30(9); So24(6)
67 *Garra* sp.	Jn31(4)
68 *G. gravelyi* (Annandale)	Tr5(7)
69 *G. kempi* Hora	Tr6(4)
70 *G. lamta* (Hamilton)	Mt17(1)
71 *G. lissorhynchus* (McClelland)	Tu22(8); Tr7(2); Jn32(1)
72 *Garra* sp.	Ko23(3)
73 *G. naganensis* Hora	Ko24(11)
74 *G. nasuta* (McClelland)	Jn33(1)
75 *G. notata* (Blyth)	Tu23(1)
76 *Garra* sp.	Tr8(1)
Family: Psilorhynchidae	
77 *Psilorhynchus balitora* (Hamilton)	Tu24(7); Ko25(1); Tl18(6); Tr9(4); Se9(21); Mn19(2); Kh17(2); Go21(2); Jn34(9)
78 *P. gracilis* Rainboth	Tu25(1)
Family: Balitoridae	
79 *Balitora brucei* Gray	Tu26(3); Ko26(2); Mt18(1); Mn20(1)
80 *Acanthocobitis botia* (Hamilton)	Tu27(2); Tl19(11); Mn21(5); Go22(9); Fe13(1); Ba29(2); Jn35(8); So25(7); Dh17(2)
81 *Schistura tirapensis* (Menon)	Mt19(1)
82 *Nemacheilus carletoni* (Fowler)	Ba30(5)
83 *N multifasciatus* (Day)	Ko27(1); Mn22(2); Go23(8); Ba31(3)
84 *Schistura scaturigina* (McClelland)	Tu28(6)
85 *Nemacheilus sikmaiensis* (Hora)	Tu29(2)
86 *Schistura vinciguerrae* (Hora)	Tu30(9); Go24(1); Ba32(3)
Family: Cobitidae	
87 *Botia dario* (Hamilton)	Ko28(1); Tl20(5); Se10(4); Ba33(5); Jn36(11); So26(7); Dh18(2)
88 *B. rostrata* Gunther	Tl21(1); Jn37(1)
89 *Pangio pangia* (Hamilton)	Tu31(2); Tl22(1)
90 *Somileptus gongota* (Hamilton)	Mn23(2); Go25(4); Fe14(2)
91 L*epidocephalichthys annandalei* Chaudhuri	Tl23(1); So27(7)
92 *L. guntea* (Hamilton)	Go26(7); Fe15(1); Ba34(18); So28(1)
Order: Siluriformes	
Family: Bagridae	
93 *Rita rita* (Hamilton)	Go27(2); Ba35(66); Dh19(12)
94 *Batasio batasio* (Hamilton)	Ko29(1)
95 *B. tengana* (Hamilton)	Ka13(6)
96 *Mystus bleekeri* (Day)	Jn38(5); Dh20(2)
97 *M. cavasius* (Hamilton)	Ka14(2); Go28(2); Ba36(1); Jn39(6); So29(2)
98 *M. horai* Jayaram	Ka15(1)
99 *M. tengara* (Hamilton)	Go29(1); So30(1)
100 *M. vittatus* (Bloch)	Ka16(8); Se11(4); Mn24(8); Go30(4); Ba37(4); Jn40(8); So31(4)
101 *Sperata aor* (Hamilton)	Ko30(2); Ka17(2); Tv13(1)
102 *S seenghala* (Sykes)	Tu32(2); Ko31(5); Ka18(2); Tl24(1); Kh18(1); Go31(4); Ba38(2); Jn41(2); So32(1); Dh21(3)
Family: Siluridae	
103 *Ompok bimaculatus* (Bloch)	Go32(5); Fe16(1); Ba39(3); Jn42(2); So33(1)
104 *O. pabo* (Hamilton)	Ka19(1)
105 *Wallago attu* (Bloch & Schneider)	Ba 40 (1)
Family: Schilbeidae	
106 *Ailia coila* (Hamilton)	Tu33(4); Ka20(27); Kh19(1); Go33(2); Ba41(4); Jn43(5); So34(2); Dh22(1)
107 *Clupisoma garua* (Hamilton)	Tl25(3); Kh20(1); Ba42(7); So35(1)
108 *Eutropiichthys murius* (Hamilton)	Tu34(3); Tv14(2); Go34(2); Ba43(37); Jn44(2); So36(1); Dh23(3)
109 *E. vacha* (Hamilton)	Tu35(6); Ko32(3); Ka21(3); Go35(1); Ba44(29); Jn45(4); So37(3); Dh24(10)
Family: Amblycipitidae	
110 *Amblyceps mangois*(Hamilton)	Tl26(2); Jn46(1)
Family: Sisoridae	
111 *Bagarius bagarius* (Hamilton)	Ba45(3); Jn47(1); So38(1)
112 *Gagata cenia* (Hamilton)	Ka22(46); Go36(1)
113 *G. gagata* (Hamilton)	Ba46(140); So39(2)
114 *G. sexualis* Tilak	Ka23(89)
115 *Nangra nangra* (Hamilton)	Tu36(1); Ka24(10); Go37(7); Ba47(10); So40(6); Dh25(3)
116 *N. robusta* Mirza & Awan	Go38(2); Ba48(3); Jn48(9)
117 *Gogangra viridescens* (Hamilton)	Tu37(1); Tv15(1); Ba49(16); Jn49(2); Dh26(4)
118 *Erethistes pussilus* Muller & Troschel	Tu38(1); Se12(1); Go39(1); Fe17(2); Ba50(5)
119 *Erethistes hara* (Hamilton)	Ka25(20)
120 *Pseudolaguvia shawi* Hora	Tl27(5)
121 *Glyptothorax cavia* (Hamilton)	Ko33(2); Mt20(1)
122 *G. conirostrae conirostrae* (Steindachner)	Tl28(2)
123 *Glyptothorax* sp.	Mt21(1); Tv16(1)
124 *G. striatus* (McClelland)	Jn50(1)
125 *G. telchitta* (Hamilton)	Tu39(1); Ko34(6); Mt22(3); Se13(4); Tv17(2); Ba51(3); Jn51(2); Dh27(5)
126 *G. trilineatus* Blyth	Tv18(2)

127 *Exostoma berdmorei* Blyth; Go40(1)	Fe18(1)
128 *Pseudecheneis sulcatus* (Mc Clelland)	Ko35(2)
Family: Chacidae	
129 *Chaca chaca* (Hamilton)	Ba52(1); So41(5)
Order: Mugiliformes	
Family: Mugilidae	
130 *Rhinomugil corsula* (Hamilton)	Kh21(1); Go41(1); So42(1)
131 *Sicamugil cascasia* (Hamilton)	So43(3); Dh28(4)
Order: Beloniformes	
Family: Belonidae	
132 *Xenentodon cancila* (Hamilton)	Tu40(1); Ko36(5); Ka26(5); Mt23(5); Tv19(1); Go42(11); Ba53(1); Jn52(5); So44(1)
Order: Cyprinodontiformes	
Family: Aplocheilidae	
133 *Aplocheilus panchax* (Hamilton)	Go43(3); Ba54(1); So45(1)
Order: Sybranchiformes	
Family: Mastacembelidae	
134 *Macrognathus aral* (Bloch & Schneider)	Ba55(1); So46(1)
135 *M. pancalus* Hamilton	Tl29(1); Mn25(2); Go44(4); Fe19(1); Ba56(2); Jn53(2); So47(1)
136 *Mastacembelus armatus* (Lacepede)	Tu41(9); Ko37(3); Ka27(1); Mt24(3); Tl30(4); Tv20(5); Mn26(6); Go45(1); Ba57(5); Jn54(2); So48(2); Dh29(5)
Order: Perciformes	
Family: Chandidae	
137 *Chanda nama* Hamilton	Ko38(22); Ka28(10); Tl31(8); Se14(10); Mn27(1); Go46(63); Ba58(32); Jn55(15); So496); Dh30(2)
138 *Parambassis baculis* (Hamilton)	Go47(3); Jn56(3)
139 *P. ranga* (Hamilton)	Ko39(4); Ka29(12); Tl32(1); Go48(1); Ba59(70); Jn57(1); So50(1)
140 *P. tenasserimensis* Roberts	Ko40(6); Tl33(2); Tv21(2)
Family: Sciaenidae	
141 *Johnius coitor* (Hamilton)	Ka30(4); Ba60(2); So51(2); Dh31(1)
Family: Nandidae	
142 *Badis badis* (Hamilton)	Tu42(7); Ka31(4); Tl34(8); Tv22(7); Go49(1); Ba61(2); Jn58(24); So52(2)
Family: Nandidae	
143 *Nandus nandus* (Hamilton)	Ba62(4)
Family: Gobiidae	
144 *Psammogobius biocellatus* (Val.)	Ko41(1); Go50(4); Fe20(1)
145 *Glossogobius giuris* (Hamilton)	Ko42(11); Ka32(1); Tl35(4); Mn28(4); Kh22(2); Go51(17); Fe21(4); Ba63(15); Jn59(10); So53(6)
Family: Anabantidae	
146 *Anabas testudineus* (Bloch)	Go52(1)
Family: Belontidae	
147 *Colisa lalia* (Hamilton)	Ba(64(1)
148 *Trichogaster chuna* (Hamilton)	Ba65(2)
Family: Channidae	
149 *Channa orientalis* (Schneider)	Mt25(2); Tl36(4); Tv23(4)
150 *C. punctatus* (Bloch)	Go53(2); Fe22(1); Jn60(2); So54(1)
151 *C. striata* (Bloch)	Jn61(2)

Tu - Tuirial; Ko - Kolodyne; Ka - Karnafuli; Mt - Mat; Tl - Tlawng; Tr - Tuirini; Se - Serlui; Tv - Tuivai; Mn - Monu; Kh - Khowai; Go - Gomati; Fe - Feni; Ba - Barak; Jn - Jatinga; So - Sona; Dh - Dhaleswari

Table 3. Riverwise distribution of the number of families and genera of the Ichthyo-species

Province	River	Family	Genus	Species
Mizoram	Tuirial	10	22	42
	Kolodyne	11	27	42
	Karnafuli	13	25	32
	Mat	06	18	25
	Tlawng	14	28	36
	Tuirini	02	06	09
	Serlui	06	12	14
	Tuivai	10	17	23
Tripura	Manu	08	19	28
	Khowai	06	15	22
	Gomati	19	40	53
	Feni	08	18	22
Assam and Manipur (part only)	Barak	19	47	65
	Jatinga	16	36	61
	Sonai	18	39	54
	Dhaleswari	11	26	31

Table 4. Threatened status of some fishes in the studied Rivers

Sl. No.	Ichthyospeices	River in which recorded
1.	*Devario annandalei* Chaudhuri	Khowai
2.	*Tor mosal* (Hamilton)	Sonai
3.	*Tor progenius*(McClelland)	Jatinga
4.	*Puntius orphoides*(Valenciennes)	Tuirial
5.	*Puntius sarana s*(Gunther)	Tuirial
6.	*Labeo pangusia*(Hamilton)	Jatinga
7.	*Garra nasuta* (McClelland)	Jatinga
8.	*Psilorhynchus gracilis*Rainboth	Tuirial
9.	*Balitora brucei*Gray	Tuirial, Mat
10.	*Nemacheilus multifasciatus* (Day)	Barak, Gomati
11.	*Schistura scaturigina*(McClelland)	Tuirial
12.	*Botia rostrata* Gunther	Jatinga
13.	*Mystus tengara* (Hamilton)	Sonai, Gomati
14.	*Bagarius bagarius*(Hamilton)	Barak, Jatinga
15.	*Erethistes pussilus* Muller & Troschel	Barak, Gomati
16.	*Chaca chaca* (Hamilton)	Barak, Sonai
17.	*Rhinomugil corsula* (Hamilton)	Gomati
18.	*Parambassis tenasserimensis*Roberts	Tlawng, Kolodyne
19.	*Johnius coitor* (Hamilton)	Dhaleswari

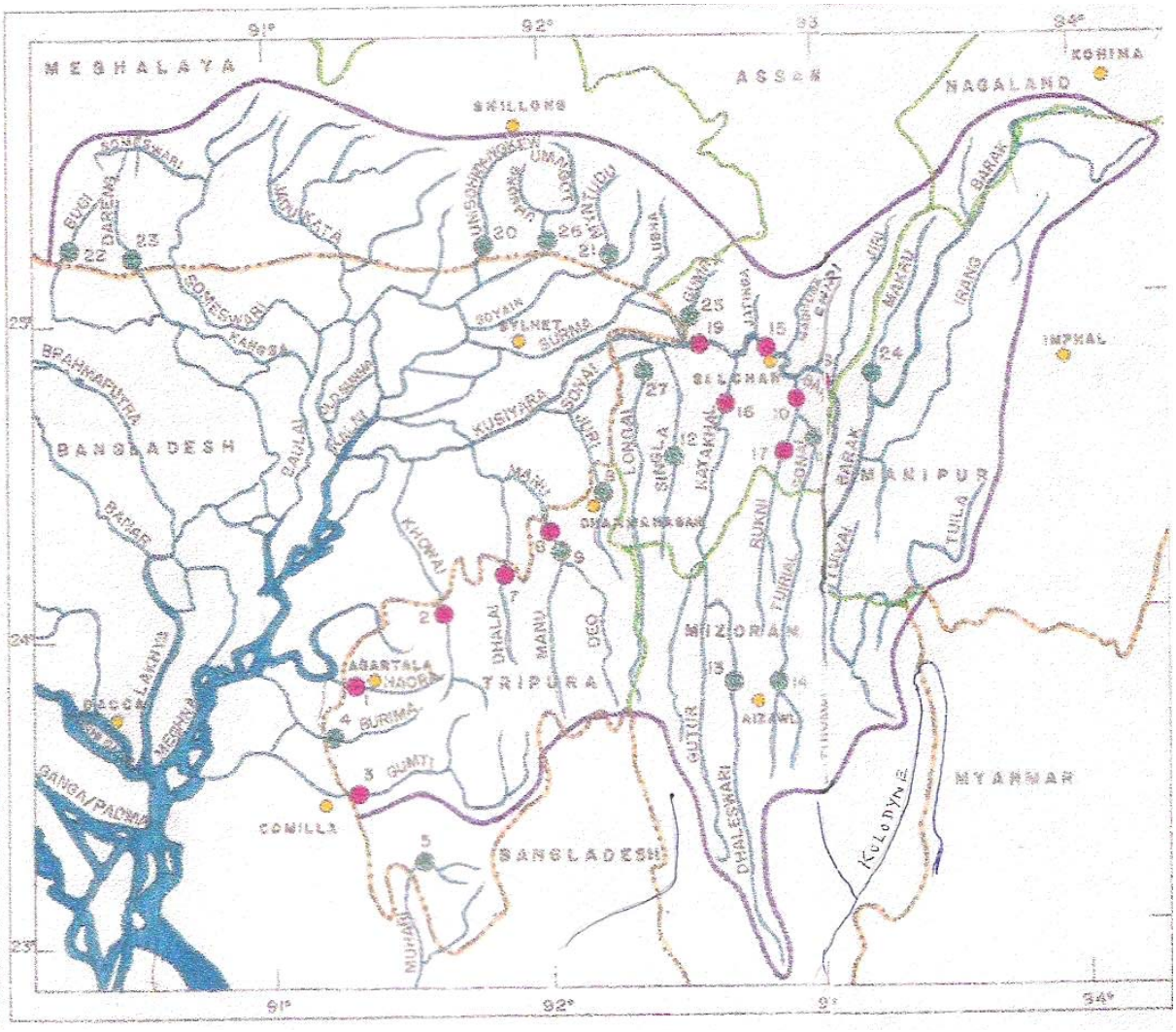

Figure 1. Principal rivers of Barak valley (Assam), Mizoram and Tripura

Discussion

In the present study, the percentage contribution of cyprinids in some of the rivers were found to be as follows: Barak (42.58%), Jatinga (62.91%), Sonai (75.82%), Dhaleswari (6.82%), Tuirial (92.41%) and Gomati (69.03%). Order-wise, the relative abundance of fishes in the said rivers revealed the occurrence of Siluriformes to be highest in river Dhaleswari (21.98%), followed by Barak (17.15%), Sonai (13.27 %), Gomati (11.29%), Jatinga (10.32%) and Tuirial (1.42%). Similarly, occurrence of Perciformes was the highest in Barak (33.89%), followed by Jatinga (22.06%), Gomati (16.77%), Sonai (7.1%), Dhaleswari (4.96%) and Tuirial (2.84%).

The study, further revealed that, almost all the cyprinid fishes are generally distributed in pools, pool edges, backwater pools, riffles and riffle edges. Runs and cascades have been found to be the least preferred habitats for the cyprinids. The edges of the run habitats have been found to be inhabited mainly by *Chanda nama*, *Puntius conchonius* and *Esomus danricus* in river Barak while the cascade habitats are generally colonized by *Labeo pangusia* and *Garra* sp. in river Jatinga. Dammed pools, backwater pools and deep pool edges with bedrock substratum are generally the highly preferred habitats for *Botia dario*, *Danio dangila*, *Devario naganensis*, *Badis badis*, *Puntius conchonius*, *Tor mosal*, *Salmostoma bacaila* and *Cirrhinus ariza* as found in rivers Sonai and Jatinga. *Barilius bendelisis*, *B. dogarsinghi*, *Schistura* spp., *Nemacheilus* spp., are generally abundant in the riffle-type of microhabitats in river Tuirial where the substrata have been found to be mainly dominated by cobbles. Among the cyprinids, *Tor progenius* and *Neolissochilus hexagonolopis* are generally confined to large deep pools in river Jatinga. Nevertheless, species like *Crossocheilus latius*, *Psilorhynchus balitora* and *Balitora brucei* have been recorded generally from the cascade to riffle regions in the upper gradient zones of rheophilic streams.

Declaration of 'aquatic sanctuary' of some portion of certain rivers could be a welcome step for conservation of the endangered fishes like the mahseers. Portions of river Jatinga around village Ditokchhara and portions of river Tlawng around village Venglai could be considered as ideal sites for declaration of aquatic sanctuaries for the conservation of mahseer fishes.

References

Armontrout, N.B. (1990). *Aquatic Inventory*. Bureau of Land Management, Eugene District (USA), 32pp.

Barman, R.P. (1984). A new cobitid fish of the genus Aborichthys Chaudhuri (Pisces: Cobitidae) from India. *Journal of the Bombay Natural History Society* 81(3): 680-683.

Barman, R.P. (1992). New record of a croaker, *Johnius coitor* (Hamilton-Buchanan) (Pisces: Sciaenidae) from Tripura, north-east India. *Journal of the Bombay Natural History Society* 89(1): 135-136.

Barman, R.P. (1994). Fish Fauna of Tripura, north-east India. *Journal of the Bombay Natural History Society* 91(1): 37-46.

CAMP (1998). Report of the Workshop on 'Conservation, Assessment and Management Plan (CAMP) for Freshwater Fishes of India'. Zoo Outreach Organization and NBFGR, 22-26 Sep., 1997 (Lucknow), 156pp.

Dey, S.C. (1973). Studies on the Distribution and Taxonomy of the Ichthyofauna of the hill streams of Kamrup-Khasi-Garo Regions of Assam with special reference to the Functional morphology of some rheophillic Fishes, D.Sc. Thesis, University of Calcutta (India), xi+299pp.

Ghosh, S.K. & A.P. Lipton (1982). Ichthyofauna of the NEH Region with special reference to their economic importance. ICAR Research Complex, NEH Region. *Shillong Special Bulletin* 1: 119-126.

Hora, S.L. (1921a). Fish and Fisheries of Manipur with some observations on those of the Naga Hills. *Records of the Indian Museum* 22: 165-214.

Hora, S.L. (1921b). Indian Cyprinoid fishes belonging to the Genus Garra with notes on the related species from other countries. *Records of the Indian Museum* 22: 633-687.

Hora, S.L. (1930). Ecology, Bionomics and Evolution of torrential fauna with special reference to the organs of attachment. *Philosophical Transactions of the Royal Society of London (B)* 218: 171-282.

Hora, S.L. (1936). Nature of substratum as an important factor in the ecology of torrential fauna. *Proceedings of the National Institute of Science India* 2: 45-47.

Hora, S.L. (1937). Geographical distribution of Indian freshwater fishes and its bearing on the probable land connections beween India and the adjacent countries. *Current Science* 7: 351-356.

Hora, S.L.(1938). A Preliminary note on the spawning grounds and Bionomics of the so-called Indian shad, *Hilsa ilisha* (Hamilton) in the Ganges. *Records of the Indian Museum* 40: 147-158.

Hora, S.L. (1939). The game fishes of India, VIII: The mahseers or the large-scaled barbs of India, I: The putitor mahseer *Barbus (Tor) putitora* (Hamilton). *Journal of the Bombay Natural History Society* 41: 272-285.

Hora, S.L. (1940). Dams and the problem of migratory fishes. *Current Science* 9: 406-407.

Hora, S.L. (1941). The game fishes of India, XIII: The mahseers or the large-scaled barbs of India, 6: The 'jungha' of the Assamese *Barbus (Tor) progenius* McClelland. *Journal of the Bombay Natural History Society* 42: 526-532.

Hora, S.L. (1943). The game fishes of India, XVI: The mahseers or the large-scaled barbs of India, 9: Further observations on mahseers from the Deccan. *Journal of the Bombay Natural History Society* 44 : 1-8.

Hora, S.L. (1951a). Knowledge of the ancient Hindus concerning fish and fisheries of India, 3: Matsyarinoda or a chapter on angling in the Manasollasa by King Somesvara (1127 AD). *Journal of the Asiatic Society Letters* 17: 145-169

Hora, S.L. (1951b). Fish geography of India. *Journal of the Zoological Society of India* 3(1): 183-187.

Hora, S.L. (1951c). Some observations on the palaeogeography of the Garo-Rajmahal gap as evidenced by the distribution of the Malayan fauna and flora to peninsular India. *Proceedings of the National Institute of Science India* 17: 437-444.

Hora, S.L. (1953). Fish distribution and central Asian orography. *Current Science* 22(4): 93-94.

Jayaram, K.C. (1999). *The Freshwater Fishes of the Indian Region*. Narendra Publishing House (Delhi), xvii+551.

Kar, D. (1990). Limnology and fisheries of lake Sone in the Cachar district of Assam (India). *Matsya* 15-16: 209-213.

Kar, D. (2000). Present status of Fish Biodiversity in South Assam and Tripura, pp.80-82. In: Ponniah, A.G. and U.K. Sarkar (eds.). *Fish Biodiversity of North-East India*. NBFGR-NATP Publication No. 2, Lucknow, 228pp.

Kar, D. (2001). Species composition and distribution of Fishes in the rivers in Barak valley region of Assam and the Principal rivers in Mizoram and Tripura in relation to their Habitat parameters. Proceedings of the National Workshop, NATP-ICAR Project Mid-term Review, 1 : Central Marine Fisheries Research Institute, Cochin, 25pp.

Kar, D. (2002). Present status of Biodiversity of Fishes of Barak valley region of Assam with a note on their Management and Conservation, pp.3-10. In: Bhattacharjee, M.K., M. Dattachoudhury and P.B. Mazumder (eds.). Proceedings of the UGC-Sponsored State-level Seminar on Biodiversity of Assam, Session Chairman's Lecture, 30 Jan 2000. Karimganj College, Assam University (Assam), 259pp.

Kar, D. (2003). Fishes of Barak drainage, Mizoram and Tripura, pp.203-211. In: Kumar, A., C. Bohra and L.K. Singh (eds.). Environment, Pollution and Management, APH Publishing Corporation, New Delhi, xii+604pp.

Kar, D. (2004). A Glimpse into the Fish Bioresources of North-East India with a note on their Management, Conservation and

Biotechnological Potential. Proceedings of the (Invited Lecture) DBT-sponsored National Symposium on Biodiversity Conservation and Sustainable Utilisation of Environmental Resources: Tripura University, 10-11 January 2004, 9pp.

Kar, D. (2005a). Fish Genetic Resources and Habitat Diversity of the Barak drainage, pp.68-76. In: Ramachandra, T.V., N. Ahalya and C.R. Murthy (eds.). *Aquatic Ecosystems, Conservation, Restoration and Management.* Capital Publishing Company (Bangalore), xiii+396pp.

Kar, D. (2005b). Fish Fauna of River Barak, of Mizoram and of Tripura with a note on Conservation. *Journal of Freshwater Biology* 16.

Kar, D. (2005c). Fish Diversity in the Major Rivers in Southern Assam, Mizoram and Tripura, pp.679-691. In: Nishida, T., P.J. Kailola and C.E. Hollingworth (eds.). Proceedings of the 2nd International Symposium on GIS and Spatial Analyses in Fisheries and Aquatic Sciences, 2-6 Sep 2002, University of Sussex, Brighton (UK), Vol. 2. Fisheries and Aquatic GIS Research Group, Kawagoe, Saitama (Japan).

Kar, D. (2005d). Sustainability issues of Inland Fish Biodiversity and Fisheries in Barak drainage (Assam), in Mizoram and in Tripura. Proceedings of the International Symposium on Improved Sustainability of Fish Production systems and Appropriate Technologies for Utilisation. Cochin University of Science and Technology, School of Industrial Fish and Fisheries, 1.

Kar, D. (2006). *Fundamentals of Limnology and Aquaculture Biotechnology.* Daya Publishing House (New Delhi), xiv+609pp.

Kar, D., S.C. Dey, S. Kar, R.G. Michael & M. Gadgil (1996). Ichthyoecology, Management and Conservation Fish Resources of Lake Sone in Assam (India). *Tiger Paper* (FAO, UN), XXIII(3): 27-32.

Kar, D., B.A. Laskar, M. Mandal, Lalsiamliana & D. Nath (2002a). Fish genetic diversity and habitat parameters in Barak drainage, Mizoram and Tripura. *Indian Journal of Environment and Ecoplanning* 6(3): 473-480.

Kar, D., B.A. Laskar, D. Nath, M. Mandal & Lalsiamliana (2002b). Tor progenius (McClelland) under threat in river Jatinga, Assam. *Science and Culture* 68(7-8): 211.

Kar, D., B.A. Laskar & D. Nath (2002c). *Tor* sp. (Mahseer fish) in river Mat in Mizoram. *Aquacult* 3 (2): 229-234.

Menon, A.G.K. (1994). Criteria for determining the status of threatened categories of Indian freshwater fishes, pp.1-5. In: *Threatened Fishes of India.* Natcon Publication No. 4 (UP). 384pp.

Mittermeier, R.A. & C.G. Mittemeier (1997). Megadiversity: Earth's Biologically Wealthiest Nation, pp.1-140. In: McAllister, D.E., A.L. Hamilton and B. Harvery (eds.). *Global Freshwater Biodiversity.* Sea Wind, Cemex, Mexico City

Molur, S. and S. Walker (Eds.) (1998). *Report of the workshop "Conservation Assessment and Management Plan for Freshwater Fishes of India".* Zoo Outreach Organisation, CBSG India, Coimbatore, India, 156pp.

Nath, P. & S.C. Dey (1997). *Fish and Fisheries of North-East India Vol. I.* Arunachal Pradesh, 140pp.

Nath, P. & S.C. Dey (2000). Conservation of Fish Germplasm Resources of Arunachal Pradesh, pp.49-67. In: Ponniah, A.G. and U.K. Sarkar (eds.). *Fish Biodiversity of North-East India.* NATP Publication No. 2, NBFGR (Lucknow), xiii+228pp.

NBFGR (2000). *Manual on Habitat Inventory.* National Bureau of Fish Genetic Resources (ICAR) (Lucknow), 27pp.

Sen, N. (1982). Studies on the Systematics, Distribution and Ecology of the Ichthyofauna of Meghalaya and their bearing on the Fish and Fisheries of the State, PhD Thesis, University of Gauhati (Assam), vi+576pp. (Unpublished).

Sen, T.K. (1985). The Fish Fauna of Assam and the neighbouring North-Eastern States of India. *Records of Zoological Survey of India, Occasional Paper No.* 64: 1-216.

Sen, N. (1995). State Fanuna Series 4: Fauna of Meghalaya (Pisces): Part I, Vertebrates, pp.483-606. Zoological Survey of India (Calcutta).

Sen, N. (1999a). On a collection of fishes from Subansiri and Siang districts of Arunachal Pradesh. *Records of the Zoological Survey of India* 97(1): 141-144.

Sen, N. (1999b). Notes on a collection of fishes from Lohit, Tirap and Changlang districts of Arunachal Pradesh. *Records of the Zoological Survey of India* 97(2): 189-204.

Sen, N. (2000). Occurrence, Distribution and Status of Diversified Fish Fauna of North-East India, pp. 31-48. In: *Fish Diversity of North-East India.* Ponniah, A.G. and U.K. Sarkar (eds.). National Bureau of Fish Genetic Resources, ICAR (Lucknow), 228pp.

Sen, N. (2003). Fish Fauna of North-East India with special reference to Endemic and Threatened species. *Records of the Zoological Survey of India* 101(3-4): 81-99.

Sinha, M. (1994). Threatened coldwater fishes of North-Eastern Region of India, pp.173-176. In: *Threatened Fishes of India.* Natcon. Publication No. 4 (UP)., 384pp.

Talwar, P.K. & A.G. Jhingran (1991). *Inland Fishes of India and Adjacent Countries, Vol. I & II.* Oxford and IBH Co., Pvt. Ltd. (New Delhi), 1158pp.

Viswanath, W. (1993). On a collected fishes of genus Garra Hamilton from Manipur, India, with description of a new species. *Journal of Freshwater Biology* 5(1): 59-68.

Viswanath, W. & H.T. Singh (1986). A new species of the genus Puntius Hamilton from Manipur. *Records of the Zoological Survey of India* 83(1&2): 129-134.

Viswanath, W. & L. Kosygin (1999). New sisorid catfish fish of the genus Myerglanis Hora and Silas, 1951 from Manipur, India. *Journal of the Bombay Natural History Society* 96(2): 291-296.

Viswanath, W. & L. Kosygin (2000a). Fishes of the cyprinid genus Semiplotus Bleeker, 1859, with description of a new species from Manipur, India. *Journal of the Bombay Natural History Society* 97(1): 92-102.

Viswanath, W. & L. Kosygin (2000b). *Garra elongata*, a new species of the Sub-family Garrinae from Manipur, India (Cyprinidae: Cypriniformes). *Journal of the Bombay Natural History Society* 97(3): 408-414.

Viswanath, W. & L. Kosygin (2001). Species status of *Poropuntius burtoni* (Mukherjee, 1934), (Cypriniformes: Cyprinidae) with a systematic note on *Poropuntius clavatus* (McClelland, 1845). *Journal of the Bombay Natural History Society* 98(1): 31-37.

Viswanath, W. & C. Sarojnalini (1988). A new cyprinid fish, Garra manipurensis from Manipur, India. *Japanese Journal of Ichthyology* 35(2): 124-126.

Viswanath, W., H.T. Singh, O.S. Singh & M.G. Sharma (1987). First records of freshwater fishes Garra graveleyi and Garra kempi in Manipur. Indian Journal of Fisheries 34(3): 362-364.

Viswanath, W., W. Manojkumar & S. Keishing (1998). First record of Cyprinid fish *Chagunius nicholsi* (Myers) from India. *Journal of the Bombay Natural History Society* 95(2): 255-257.

WCMC (1998). Freshwater Biodiversity: A Preliminary Gobal Assessment. A Document prepared for the 4th Meeting of the Conference of the Practices to the Convention of Biological Diversity, World Conservation Monitoring Centre.

Yadava, Y.S. & R. Chandra (1994). *Some threatened carps and cat fishes of Brahmaputra River System*, pp.45-55. In: Threatened Fishes of India. Natcon. Publication No. 4 (UP), 384pp.

ACKNOWLEDGEMENT

The authors are grateful to the NATP-ICAR World Bank-aided Programme for fianancial assistance.