

A NEW SPECIES OF GENUS *GARRA* HAMILTON-BUCHANAN (TELEOSTEI: CYPRINIDAE) FROM MANIPUR, INDIA

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web supplement

ABSTRACT

A new cyprinid fish species, *Garra nambulica* is described from the feeder streams of the Nambul River (Chindwin basin) of Manipur, India. The new species has the following combination of characters: head squarish; no proboscis and transverse groove on snout; mental disc length 96.9% (92.8-102.7) its own width; predorsal scales irregularly arranged, its number 16-29 counted along row adjacent to the midline; chest and belly naked; post pelvic region scaled; gill rakers 10; caudal fin with a W-shaped blue black band.

KEYWORDS

Chindwin basin, fish, *Garra nambulica* sp. nov., India, Manipur, Nambul river

Small sized, hill stream inhabiting fishes of the genus *Garra* Hamilton-Buchanan (Cyprinidae: Garrinae) are characterized by the possession of developed sucker-like disc on the under surface just behind the mouth. The fishes maintain themselves against swift currents by clinging to the substratum with the help of their disc and the horizontally placed paired fins, especially the pectorals (Menon, 1964). There are some reports on the occurrence of *Garra* in Manipur and its neighbourhood. The following species have been described from Manipur: *G. abhoyai* and *G. naganensis* by Hora (1921), *G. manipurensis* by Vishwanath and Sarojnalini (1988), *G. litanensis* by Vishwanath (1993), *G. compressus* by Kosygin and Vishwanath (1998) and *G. elongata* by Vishwanath and Kosygin (2000). Vishwanath (1993) also recorded *G. lissorhynchus*, *G. rupecula*, *G. kempfi*, *G. nasuta*, *G. graveleyi* and *G. gotyla*. Menon (1974) treated *G. abhoyai* (Hora) as a synonym of *G. rupecula* (McClelland).

While collecting fresh water fishes of the streams draining to Nambul river, Chindwin basin in Manipur, specimens of *Garra* which do not fit into the so far described species of the genus have been found and are herein described as *Garra nambulica* sp. nov.

MATERIALS AND METHODS

Measurements and counts followed Menon (1964). Predorsal scales are counted along the row adjacent to the irregularly arranged midline scales. Measurements were made with a dial caliper to the nearest 0.1mm and expressed as percentage of standard length (SL) or head length (HL). The type specimens of the new species are deposited in Manipur University Museum of Fishes (MUMF).

Garra nambulica sp. nov.

(Figs. 1-3)

Material examined

Holotype: 3.ii.2004, Ireng lok (stream of Nambul river), Singda village, Manipur, India, 58.5mm SL, coll. H. Joyshree, MUMF 8003.

Paratypes: 2 exs., same as of holotype, 53.8-76.2mm SL, MUMF 8001-8002; 5 exs. 42.9-61.4mm SL, MUMF 8004-8008; all from Conchak lok (stream of Nambul river), Singda village.

Etymology

The species is named after the Nambul River, its type locality.

Diagnosis

Body moderate sized; head squarish; no proboscis and transverse groove on snout; mental disc length 96.9% (92.8-102.7) its own width; predorsal scales 16-29; chest and belly naked; post pelvic region scaled; gill rakers 10; caudal fin with a W-shaped blue black band.

Description

D. ii, 6; P. i, 12; V. i, 6; A. ii, 4; C. 10+9; L. l. 34-35; L. tr. 4/1/3. Predorsal scales 16-29. General appearance of the fish is as shown in Figure 1^w. Body cylindrical and elongated. Head moderately compressed. Snout blunt and squarish, without proboscis and transverse groove. Mental disc well developed, its width almost equal its length and head width. Barbels two pairs, one rostral and one maxillary, both shorter than eye diameter. Dorsal profile straight to slightly convex. Predorsal midline scales arranged unevenly, its number ranging from 19 to 26, anterior ones minute, gradually becoming larger behind (Fig. 2^w). Chest and belly naked, post pelvic region with scales (Fig. 3^w). Dorsal fin origin nearer caudal fin base than snout tip. Caudal fin forked. Vent situated slightly nearer to pelvic fin origin than anal fin origin. Gill rakers 10.

Tubercles on snout and opercular region are arranged as follows: one closely spaced horizontal row below nostrils and another widely spaced row of larger tubercles below, running parallel below eyes and nostrils on each side of head. Preopercle has four vertical rows of closely spaced small tubercles. Upper part of snout anterior to interorbital space has two rows of closely spaced small tubercles and interorbital region with some prominent tubercles.

^w See Figures 1-3 in the web supplement at www.zoosprint.org

Proportional measurements of holotype and paratype (in parenthesis). Head length 22.4% (20.5-24.5) SL; head width 64.1% (56.0-69.5) of head length; head height 62.6% (55.7-75.8) HL; snout length 30.1% (28.6-32.9) HL; eye diameter 19.0% (15.8-25.2) HL; inter orbital space 50.8% (46.2-53.9) HL; disc length 96.9% (92.8-102.7) disc width; body depth 17.7% (16.4-19.5) SL; predorsal length 50.7% (47.1-58.3) SL; pectoral length 84.6% (80.3-91.4) HL; caudal peduncle height 79.9% (70.7-91.5) its length; distance between ventral and anal fin origins 50.5% (47.8-54.4) the distance between ventral and caudal fin base. Distance between vent and anal fin origins 38.5% (34.0-43.4) the distance between ventral and anal fin origins.

Colour in life

Body yellowish-brown. Fins orange. Two to three rows of scales above lateral line in the anterior half of body tinted with orange. A dark spot at the upper angle of the gill opening. Dorsal fin with broad transverse black bar near the free margin. Caudal fin with a 'W'- shaped blue black band.

Colour in formalin

Body dark grey. Yellowish-white ventrally.

DISCUSSION

Menon (1964) grouped *Garra*'s with W-shaped caudal band in *lissorhynchus* complex. Thus the new species, as it has similar band on caudal fin may also be grouped under *lissorhynchus* complex for the time being until further phylogenetic studies are done. The species is similar to *G. lissorhynchus* in having predorsal scale; absence of scales on chest and belly; same number of lateral line scales and gill rakers. However, it differs from the latter in having shallower body, its depth 17.7 (16.4-19.5) vs 20.7 (20.1-21.7) % SL; shorter snout, its length 30.1 (28.6-32.9) vs 34.7 (34.2-35.1) % HL; wider disc, its width 88.3 (83.5-100) vs 85.9 (80.3-93.6) % head width (at eye); shorter disc, its length 96.9 (92.8-102.7) vs 101 (96.1-105.0) % disc width; longer predorsal, its length 50.7 (47.1-58.3) vs 49.4 (46.5-50.7); more predorsal scales, its number (16-29 vs. 11-14); less number of gill rakers 10 vs 12; shorter pectoral fin 84.6 (80.3-91.4) vs 91.9 (86.0-98.6); distance of vent to anal fin origin 38.5 (34.0-43.4) vs 34.7 (31.9-39.2) % distance between pelvic and anal fin origins. The new species also differs from *G. rupecula* in having predorsal scales (vs absent), post-pelvic region scaled (vs absent); shorter disc, its length 96.9 (92.8-102.7) vs 111.9 (97.5-

Table 1. Morphological characters of *Garra nambulica* sp. nov.

	Holotype MUMF 8003 N=1	Paratype MUMF 8001, 02, 04-07 N=6
Standard Length (mm)	68.5	42.9-76.2
In % of Standard length		
Body depth	16.9	17.7 (16.4-19.5) ± 1.4
Head length	20.5	22.9 (20.5-24.8) ± 1.5
Body width at dorsal fin origin	16.2	16.2 (15.3-16.9) ± 0.5
Body width at anal fin origin	10.9	11.3 (10.5-12.2) ± 0.7
Caudal peduncle length	13.8	15.7 (13.8-17.4) ± 1.2
Caudal peduncle height	12.7	12.5 (11.7-12.9) ± 0.4
Dorsal fin base length	11.6	11.6 (10.9-12.2) ± 0.5
Dorsal fin height	18.1	19.2 (17.4-20.4) ± 1.1
Predorsal length	47.1	50.7 (47.1-58.3) ± 2.2
Pectoral fin length	18.8	19.0 (17.2-21.0) ± 1.2
Pelvic fin length	14.4	16.0 (14.4-17.1) ± 1.2
In % of Head length Head width	79.4	75.8 (68.9-79.4) ± 3.4
Head height at occiput	75.8	62.6 (55.7-75.8) ± 7.7
Snout length	32.6	30.1 (28.6-32.9) ± 2.4
Eye diameter	17.0	19.0 (15.8-25.2) ± 3.1
Interorbital space	53.9	50.8 (46.2-53.9) ± 2.7
Disc length	64.5	61.0 (57.2-64.5) ± 2.9
In % of Head width, Disc width	91.0	82.1 (74.6-83.3) ± 4.6
In % of Disc width, Disc length	89.2	98.0 (89.2-105.5) ± 5.4
In % of Caudal peduncle length	91.5	79.9 (70.7-91.5) ± 6.9
Caudal peduncle height		
In % of space V- caudal fin origins	47.8	50.5 (47.8-54.4) ± 2.3
Space V - A origins		
In % of space betn. V & A origins	40.2	48.5 (34.0-43.4) ± 3.4
Space of Vent- A origin		
Counts Predorsal scales	29	16-29
Gill rakers	10	10
Lateral line	34	34-35
Lateral transverse scale	4/1/3	4/1/3
Dorsal fin	II, 6	II, 6
Pectoral fin	I, 12	I, 12
Pelvic fin	I, 6	I, 6
Anal fin II, 4	II, 4	
Caudal fin	19	19
Circumpeduncular scales	16	16
Barbels 2 pairs		

Table 2. Comparison of morphological characters of *Garra nambulica* sp. nov. with related species

	<i>Garra nambulica</i> sp. nov. MUMF-8001-8008 N = 8	<i>G. lissorhynchus</i> MUMF 4163-4166, 8088-8095 N = 12	<i>G. lissorhynchus</i> Menon (1964) N = 33	<i>G. rupecula</i> MUMF 8048-8052 N = 5	<i>G. rupecula</i> Menon (1964) N = 64
SL (mm)	42.9-76.2	58.9-71.9	31.5-73.5	53.8-65.0	20.5-55.5
Body depth as % of SL	17.7 (16.4-19.5)	20.7 (20.1-21.7)	19.7 (15.2-22.5)	18.7 (18.3-19.1)	17.6 (16.2-24.0)
Snout length as % of HL	30.1 (28.6-32.9)	34.7 (34.2-35.1)	51.5 (48.0-58.4)	27.9 (26.0-29.8)	
Disc width as % of head width	82.1 (74.6-83.3)	81.5 (78.8-86.0)	62.5 (52.0-80.0)	80.7 (79.1-82.3)	66.6 (55.5-80.0)
Disc length as % of disc width	98.0 (89.2-105.5)	91.1 (83.7-98.9)	66.6 (55.5-83.3)	97.8 (95.6-100.0)	68.9 (57.1-80.0)
Predorsal scale	16-29	14	11-14	absent	absent
Gill rakers	10	12	7-8	7-9	7-9
Scales behind pelvic fins origin	present	present	present	absent	absent

159.2) % disc width; longer predorsal, its length 50.7 (47.1-58.3) vs 49.5 (41.5-53.4); head height 62.6 (55.7-75.8) vs 57.4 (53.9-63.5); shorter snout, its length 30.1 (28.6-32.9) vs 47.2 (44.2-50.8); gill rakers (10 vs 7-9); distance between vent and anal fin origins 38.5 (34.0-43.4) vs 34.9 (31.5-41.5) % distance between pelvic and anal fin origin.

In *Garra*, shifting of vent forward is considered to be an adaptation to torrential water current and is of systematic significance (Menon, 1964). The present species has more forwardly placed vent than in *G. lissorhynchus* and *G. rupecula*; distance between vent and anal fin origins in distance between ventral and anal fin origins 38.5 (34.0-43.4) vs 34.7 (31.9-39.2) and 34.9 (31.5-41.5). The mental disc is also better developed than the two species under comparison, disc width in % of Head width 88.3 (83.5-100) vs 85.9 (80.3-93.6) and 84.9 (76.3-94.1). Thus, the fish is probably more adapted towards torrential habit.

Differences have been found between the data of Menon (1964) and present examination of specimens of *G. lissorhynchus* and *G. rupecula* collected from Manipur. These variations are mostly on body proportions. In hill streams, fishes face various hardships, i.e., food availability and interspecies competitions. There may be variations in the body proportions depending upon the ecological and physiological conditions of the fish. However, not much variation has been seen in meristic counts and position of vent etc. The observations may be regarded as intraspecific variations.

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ACKNOWLEDGEMENTS

We are thankful to NBFGR (National Bureau of Fish Genetic Resources), Lucknow, for financial assistance through ICAR-NATP.



EVIDENCE OF FISH IN THE DIET OF GREATER FALSE VAMPIRE BAT *MEGADERMA LYRA* IN SRI LANKA

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Being the second largest order of mammals, bats show an array of diverse feeding habits. Although frugivory and insectivory are the commonest forms of diet in majority of the species, some bats are highly specialized in diet *viz.* sanguivory (feeding on blood) and picivory (feeding on fish). Fish eating bats are included in the family Noctilionidae (French, 1997), however members of three other families, *viz.* Vespertilionidae, Megadermatidae and Phlostomidae are also known to feed on fish (Grzimek, 1990). Megadermatids are referred to as typically carnivorous with proven records of fish eating (Advani, 1981), who found upon examination of stomach contents, fish to constitute 10% of the diet of *M. lyra* in India. Bates and Harrison (1997) stated that since *M. lyra* is a semi carnivorous species, which feed on many species of invertebrates as well as vertebrates, this is undoubtedly a high proportion for a particular prey category. This could be due to either high availability of fish in the study area, or scarcity of other prey items, or that fish constituted a consistent food category in the diet of *M. lyra*.

We wanted to examine whether *M. lyra* regularly feeds on fish and if so estimate the proportion of fish in its diet. We studied the diet of *M. lyra* by examining fecal droppings collected from two geographically isolated day roost colonies in Sri Lanka. Both these colonies were single species assemblages, only with the *M. lyra*.

Lawalhena day roost, Baddegama, Southern Province (6°16'N & 80°20'E) -- located in the wet zone this roost site was in an old bungalow and consisted of 80-100 individuals. This is one of the largest colonies recorded for this species in Sri Lanka (Yapa *et al.* 2000). This bungalow is surrounded by a large cultivation of tea, rubber and paddy. Several bats in this colony brought the captured prey to the bungalow and used specific locations as their feeding perches. The faecal pellets were collected randomly in different areas of the bungalow between January 2001 and April 2002. During the entire period of study the house was not occupied (except for brief periods by the researchers).

Lunuwila day roost, North Western Province (7°21'N & 79°53'E) -- located in the intermediate zone this colony was also located in a bungalow and consisted on average only 20 individuals. The bungalow is surrounded by coconut cultivations, home

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Main article in Zoos' Print Journal 20(4): 1832-1834; Manuscript 1228; © Zoo Outreach Organisation; www.zoosprint.org



Image 1. Lateral view of Garra nambulica sp. nov. (paratype, 61.4 mm SL, MUMF 8005)



Image 2. Dorsal view of Garra nambulica sp. nov. showing predorsal scales



Image 3. Ventral view of Garra nambulica sp. nov.

