

Garra biloborostris, a new labeonine species from north-eastern India (Teleostei: Cyprinidae)

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Abstract

Garra biloborostris, a new labeonine species is described from the Kanamakra River of the Brahmaputra River basin in Assam. It can be distinguished from its congeners of northeast India in having a unique combination of the following characters: a proboscis represented by two separate and slightly elevated arch-shaped lobes, each lobe with three acanthoid tubercles on its anterodorsal marginal aspect; bulgy lateral surface of the snout giving a lobe like appearance; a prominent knob-like transverse lobe with 10–16 small- to medium-sized acanthoid tubercles; 30+3 lateral line scales; 8½ branched dorsal fin rays; and 5½ branched anal fin rays.

Key words

Labeoninae, *Garra*, taxonomy, new species, Brahmaputra River, Assam.

Introduction

Cyprinid genus *Garra* HAMILTON, 1822 includes elongate, small- to medium- sized, bottom dwelling fish species which are distributed from Borneo and southern China to Sub-Saharan Africa through Middle East Asia and Arabian Peninsula (ZHANG & CHEN, 2002) and are usually found in the fast flowing rivers and streams where they adhere themselves against swift current by clinging to substratum, mainly by means of their suction disc but also by the horizontally placed paired fins, especially the pectorals (MENON, 1964). The genus is characteristic in having a modified lower lip forming a mental adhesive disc whose posterior margin is discontinuous with the mental region. The crescentic anteromedian fold of the mental adhesive disc is similar to or wider than the width of the central callous pad and the lateral end of the anteromedian fold on each side usually reaches the anterolateral lobe of the mental adhesive disc.

Currently, the genus consists of 25 valid species in different river drainages of northeast India of which *Garra annandalei* HORA, 1921; *G. arunachalensis* NEBESHWAR

& VISHWANATH 2013; *G. arupi* NEBESHWAR *et al.*, 2009; *G. birostris* NEBESHWAR & VISHWANATH, 2013; *G. gotyla* (GRAY, 1830); *G. kalpangi* NEBESHWAR *et al.*, 2012; *G. kempi* HORA, 1921; *G. lissorhynchus* (M'CLELLAND, 1838); *G. manipurensis* VISHWANATH & SAROJNALINI, 1988; *G. magnidicus* TAMAG 2013; *G. nasuta* (M'CLELLAND, 1838); *G. naganensis* HORA, 1921; *G. quadratirostris* NEBESHWAR & VISHWANATH, 2013; *G. rupicola* (M'CLELLAND, 1839) and *G. tamangi* SHANTABALA & KOSYGIN, 2016 are in the Brahmaputra drainage; *G. abhoyai* HORA, 1921; *G. compressa* VISHWANATH & KOSYGIN 1988; *G. chakpiensis* NEBESHWAR & VISHWANATH, 2015; *G. cornigera* SHANGNINGAM & VISHWANATH, 2015; *G. elongata* VISHWANATH & KOSYGIN, 2000; *G. litanensis* VISHWANATH, 1993; *G. namyaensis* SHANGNINGAM & VISHWANATH, 2012; *G. paralissorhynchus* VISHWANATH & SHANTA, 2005; *G. trilobata* SHANGNINGAM & VISHWANATH, 2015; and *G. ukhrulensis* NEBESHWAR & VISHWANATH, 2015 are in the Chindwin drainage (NEBESHWAR & VISHWANATH, 2013 & 2015, SHANTABALA & KOSYGIN, 2016); and *G. dam-*

paensis LAIRONUNGA *et al.*, 2013 in the Karnaphuli drainage. THONI *et al.* (2016) also described *G. bimaculacauda* and *G. parastenorhynchus* from the Brahmaputra River basin in Bhutan.

A collection of fishes from the Kanamakra River of the Bhramaputra River basin in Assam, India, included an unnamed species of *Garra*, which has a peculiar proboscis on the snout, is herein described as *Garra biloborostris*, new species.

Material and Methods

All descriptions are based on formalin preserved specimens. Measurements were made on left hand side of the specimens with digital calipers to the nearest 0.1 mm. Fin rays and scales were counted under stereo-zoom transmitted light microscope. The number of specimens exhibiting a given count is indicated in parentheses. Counts, measurements and terminology follow NEBESHWAR & VISHWANATH (2013). Lateral line scales (scales on the body + scales on the caudal fin) are counted from the anteriormost pored scale in contact with the shoulder girdle to the posteriormost pored scale on the caudal fin. Dorsal and anal fin ray counts follow KOTTELAT (2001), that is, indicating the last deeply branched ray as “1 ½”.

Two specimens were dissected and stained with alizarin red S to observe the vertebral column. The total number of vertebrae is presented as the sum of abdominal and caudal vertebrae following ROBERTS (1989). Abdominal vertebrae were counted from the vertebrae of the Weberian apparatus to the vertebra with its haemal spine anterior to the first anal-fin pterygiophore. The Weberian apparatus is counted as four vertebrae. Caudal vertebrae were counted from the vertebra with its haemal spine immediately posterior to the first anal fin pterygiophore to the vertebra bearing hypural plate. Predorsal vertebrae were counted from the vertebrae of the Weberian apparatus to the vertebra with its neural spine immediately anterior to the first dorsal fin pterygiophore. The examined specimens are deposited in Manipur University Museum of Fishes (MUMF).

Results

Garra biloborostris sp. nov.

Fig. 1–4

Material examined. Holotype: MUMF 22017: 92.35 mm SL; India, Assam, Chirang district: Kanamakra River, Bhramaputra River basin, 26°45'0.59" N, 90°39'17.36" E, 191 m above sea level, 16 October 2012, Sewali & party.

Paratypes: MUMF 22018–22028, 11 specimens, 44.1–80.1 mm SL; same data as holotype. Two specimens (MUMF 22020–22021, 75.4–79.41 mm SL) were dissected, cleared & stained for osteology.

Comparative Material

- Garra arunachalensis*: MUMF 4304, 1 ex., 121.0 mm SL, holotype; India: Arunachal Pradesh: Lower Divang valley district: Deopani River at Roing (Brahmaputra River basin).
G. birostris: MUMF 4302, 1 ex., 102.0 mm SL, holotype; India: Arunachal Pradesh: Papum Pare district: Dikrong River at Doimukh (Brahmaputra River basin).
G. cornigera: MUMF 12061, 1 ex., 76.0 mm SL, holotype; India: Manipur: Ukhrul district: Sanalok River (Chindwin River basin).
G. elongata: MUMF 2311, 1 ex., 94.9 mm SL, holotype; India: Manipur: Ukhrul district: Hill steram near Tolloi (Chindwin River basin).
G. gotyla: MUMF 4300, 1 ex., 104.3 mm SL, neotype; India: Sikkim: Tista River at Rangpo (Ganga River basin).
G. litanensis: MUMF 68, 1 ex., 92.5 mm SL, holotype; India: Manipur: Tamenglong district: Litan stream at Litan (Chindwin River basin).
G. quadratirostris: MUMF 4306, 1 ex., 108.0 mm SL; holotype; India: Sikkim: Tista River at Rangpo (Ganga River basin).
G. trilobata: MUMF 12051, 1 ex., 118.5 mm SL; India: Manipur: Ukhrul district: Sanalok River, (Chindwin River basin).
G. kalpangi: Data from NEBESHWAR *et al.* (2012).
G. tamangi: Data from SHANTABALA & KOSYGIN (2016).
G. bimaculacauda & *G. parastenorhynchus*: Data from THONI *et al.* (2016).

Diagnosis

Garra biloborostris sp. nov. is distinguished from the congeners of north east India in having a unique combination of the following characters: a proboscis represented by two separate, slightly elevated arch-shaped lobes; each lobe demarcated from depressed rostral surface by a shallow groove, with three acanthoid tubercles on its anterodorsal marginal aspect (medial tubercle large-sized and lateral ones medium-sized); lateral surface of the snout bulgy giving lobe like appearance; transverse lobe appearing a prominent knob as the demarcating transverse groove extending laterally on each side, its dorsal surface covered with 10–16 small- to medium- sized acanthoid tubercles; 30+3 lateral line scales; 8½ branched dorsal fin rays; and 5½ branched anal fin rays.

Description

Morphometric data and counts are presented in Table 1. Body elongate, slightly compressed laterally, more compressed in region of caudal peduncle. Dorsal head profile rising steeply over snout, slightly convex than dorsal body profile. Ventral profile more or less straight to anal-fin origin. Head moderately large, highly depressed with moderately convex interorbital distance; height less than length; width greater than height. Snout narrowly rounded with prominent knob like transverse lobe as demarcating transverse groove extending laterally on each side;



Fig. 1. *Garra biloborostris* sp. nov., MUMF 22017: 92.3 mm SL, holotype.

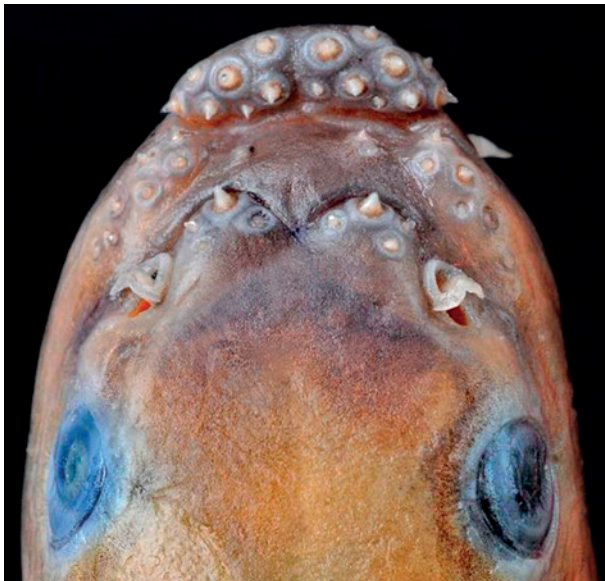


Fig. 2. Snout morphology of *Garra biloborostris* sp. nov., holotype, showing shape of the proboscis.

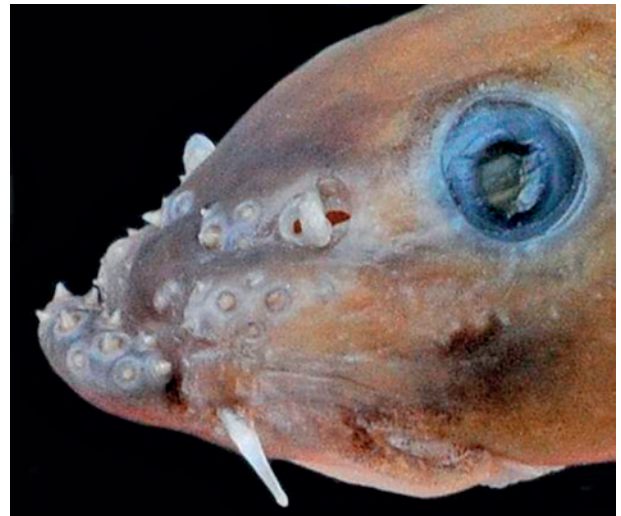


Fig. 3. Lateral view of snout of *Garra biloborostris* sp. nov., holotype, showing position of the eye.

transverse lobe covered with 10–16 small- or medium-sized tubercles; proboscis represented by two separate arch-shaped lobes, each lobe slightly elevated, demarcated from depressed rostral surface by shallow groove; each lobe with three acanthoid tubercles on anterodorsal marginal aspect (medial one prominent, large-sized, directed anterodorsally and lateral ones medium-sized, directed laterodorsally) and with 1–4 small-sized tubercles may be present on dorsal surface; lateral surface of snout bulgy giving lobe like appearance with 3–10 small-sized tubercles (Fig. 2); and depressed rostral surface slightly convex with 1–4 small tubercles immediately posterior to transverse groove. Sublachrymal groove shallow and connected to rostral cap groove. Eyes placed dorsolaterally in posterior half of head (Fig. 3).

Barbels in two pairs; rostral barbels anterolaterally located, shorter than eye diameter; maxillary barbels at corner of mouth, shorter than rostral barbels. Rostral cap well developed, moderately or slightly fimbriate, about one sixth of length of its distal margin on each lateral extremity smooth; papillate ventral surface moderately wide. Upper lip appearing as a thin band of weakly developed papillae. Upper jaw entirely covered by rostral

cap. Mental adhesive disc elliptical, shorter than width, narrower than head width through roots of maxillary barbels; anteromedian fold of mental adhesive disc entirely or slightly covered by rostral cap; papillae on anteromedian fold small and regularly arranged; groove between anteromedian fold and central callous pad deep; papillae on inner half of whole length of lateroposterior flap coarsely arranged; anterior marginal surface of central callous pad with or without small papillae; posterior most margin of lateroposterior flap extending vertically to posterior margin of eye (Fig. 4).

Dorsal fin with 3 (12) simple and 8½ (12) branched rays; last simple ray shorter than head length; distal margin slightly concave; origin closer to snout tip than to caudal fin base, inserted anterior to vertical from pelvic fin origin; first branched ray longest, last branched ray not extending vertically to anal fin origin. Pectoral fin with 1 (12) simple and 12 (6) or 13 (6) branched rays; fourth branched ray longest, shorter than head length; margin subacuminate. Pelvic fin with 2 (12) simple and 7 branched rays; second branched ray longest, surpassing anus; origin closer to anal fin origin than to pectoral fin origin, inserted under base of fifth branched dorsal-fin ray. Anal fin short with 3 (12) simple and 5½ (12) branched rays; first branched ray longest, not reaching



Fig. 4. Oromandibular structure of *Garra biloborostris* sp. nov., holotype.

base of caudal fin; posterior margin straight; origin at midway between caudal-fin base and pelvic-fin origin. Anus closer to anal fin origin than to pelvic-fin origin (distance from anus to anal fin 17.8–26.2 % of pelvic-anal distance). Caudal fin forked; lower lobe slightly longer, tenth ray counting from upper lobe shortest.

Lateral line complete with 30+3 (12) scales. Transverse scales rows above lateral line 4½ (6) or 5½ (6); between lateral line and pelvic fin origin 3½ (12), and between lateral line and anal fin origin 3½ (2) or 4½ (10). Circumpeduncular scale rows 16 (12). Predorsal scales 9 (2) or 10 (10); scales arranged regularly. Chest and belly scaled. One long axillary scale at base of the pelvic fin, its tip reaching posterior end of pelvic fin base. Preanal scales 3 (5) or 4 (7). Dorsal fin base scales 7 (12). Anal fin base scales 5 (8) or 6 (4).

Osteological features. Total vertebrae 31 (2), consisting of 20+11 (2) abdominal + caudal vertebrae. Predorsal vertebrae 9(2).

Colouration in preservative (Fig. 1). body light gray dorsally, light brown ventrally. Mouth and chest light gray. Dorsal and pectoral more dark than pelvic and anal fin. Yellowish white ventrally at origin of pectoral and pelvic fins. Branched dorsal-fin rays with black dots. Six narrow dark black stripes on caudal peduncle. A black spot at upper angle of the gill opening.

Distribution. *Garra biloborostris* is presently known from the Kanamakra River in Chirang district, Assam, India (Fig. 5).

Etymology. The specific epithet is derived from Latin bi, meaning two, lobus meaning lobe, and rostris meaning

Table 1. Morphometric data of holotype (MUMF 22017) and eleven paratypes (MUMF 20018 –22028) of *Garra biloborostris* sp. nov. “*” indicates data of holotype included in range.

Morphometric character	Holotype	Paratypes		
		Range*	Mean	SD
Standard length (mm)	92.3	44.1–92.3		
In % of standard length (SL)				
Body depth	19.4	19.0–21.4	19.6	0.6
Head length	25.4	24.3–25.9	25.1	0.6
Head depth at nape	10.3	8.7–12.1	9.7	0.8
Head depth at eye	12.9	11.9–14.0	13.3	1.3
Body width at anal fin origin	8.1	8.0–10.6	8.8	1.0
Body width at dorsal fin origin	15.5	14.0–17.5	15.3	1.2
Caudal peduncle length	18.2	12.6–18.2	15.1	1.9
Caudal peduncle depth	13.0	11.4–13.1	12.7	0.9
Dorsal fin base length	17.0	9.9–17.1	15.3	2.0
Dorsal fin length	24.8	22.3–26.7	25.0	1.4
Pectoral fin length	19.9	19.6–23.6	21.5	1.3
Pelvic fin length	17.9	17.4–21.4	19.3	0.9
Anal fin base length	7.4	4.0–8.7	6.4	1.3
Anal fin length	18.8	17.8–20.4	18.8	0.9
Predorsal length	48.2	42.8–52.6	47.9	2.5
Prepectoral length	24.6	20.9–25.0	23.3	1.4
Prepelvic length	51.8	51.0–57.5	52.8	2.1
Preanal length	71.7	69.5–79.6	74.6	2.7
Pelvic-anal distance	21.9	20.2–25.3	22.6	1.4
Snout length	13.9	11.4–14.4	12.9	0.9
Eye diameter	4.6	3.8–5.1	4.5	0.5
In % of pelvic-anal distance				
Distance from anus to anal fin	23.5	17.8–26.2	21.5	3.0
In % of head length (HL)				
Snout length	54.9	46.3–54.9	51.3	3.0
Eye diameter	18.2	15.3–20.8	18.1	2.0
Disc width	58.1	52.5–60.5	57.1	2.2
Disc length	46.9	43.2–57.2	47.9	3.9
Central callous pad width	33.8	29.9–37.6	33.7	2.1
Central callous pad length	23.9	16.5–27.8	22.3	3.5

beak or bill, referring to the two beak-like lobes on the proboscis. An adjective.

Remarks

NEBESHWAR & VISHWANATH (2013) described the oromandibular structures and snout morphology including tuberculation patterns of *Garra* HAMILTON. NEBESHWAR & VISHWANATH (2015) also stated the genus to have one of the following snout characters: a smooth surface, a transverse lobe, a proboscis with a transverse lobe, and a pair of rostral lobes with or without a transverse lobe. Thus these characters are very useful in the diagnosis of the species of *Garra*.

Garra biloborostris can be easily distinguished from the congeners of the Brahmaputra River basin (except *G. birostris*) in having bilobed (vs. unilobed) proboscis

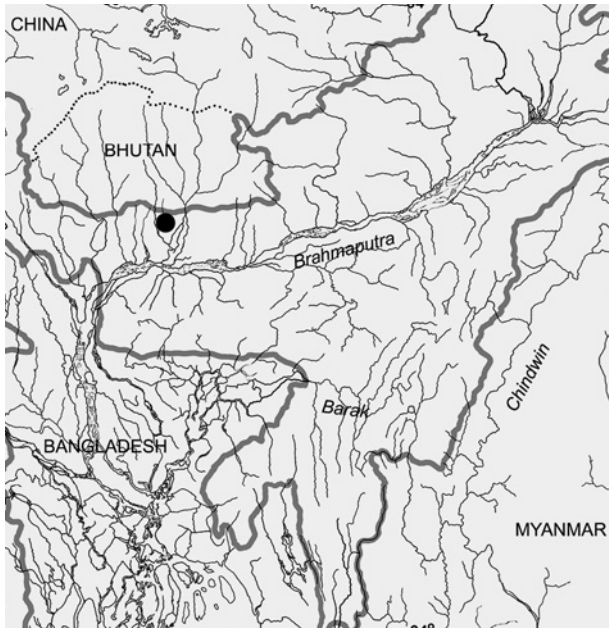


Fig. 5. Map of northeastern India showing type locality.

on the snout. *G. biloborostris* is distinguished from *G. birostris* in having the lobes separated (vs. fused), lacking (vs. having) multicuspoid tubercles on snout, in having 12 or 13 (vs. 14 or 15) branched pectoral fin rays, 7 (vs. 8) branched pelvic fin rays, and anteromedian fold covered (vs. not covered) entirely by rostral cap.

The new species can be further distinguished from *Garra arunachalensis* in having 33 (vs. 35) lateral line scales, in the presence (vs. absence) of anterolateral lobe of lower lip and 16 (vs. 12) circumpeduncular scales rows; from *G. gotyla* in the presence (vs. absence) of separate lobe of the proboscis on the snout, depressed rostral surface not bulgy (vs. highly bulgy); from *G. kalpangi* in having a larger disc (length 43.2–57.2 vs. 34.6–38.1 % of HL; width 52.5–60.5 vs. 46.54.4 % of HL), in the presence (vs. absence) of transverse groove at tip of the snout and presence (vs. absence) of six narrow dark black stripes on caudal peduncle.

It differs from *Garra nasuta* in absence (vs. presence) of a distinct pit between the nares; from *G. quadratirostris* in having 33 (vs. 37) lateral line scales, 16 (vs. 12) circumpeduncular scales, less posteriorly situated anus (17.8–26.2 vs. 37–44 % of pelvic-anal distance) and 6 (vs. 3 or 4) narrow dark black stripes on caudal peduncle and from *G. tamangi* in having shorter snout length (47.3–54.9 % HL vs. 56–98 % HL), in the absence (vs. presence) of multicuspoid tubercles on snout, and 3½ (vs. 2½) transverse scales between lateral-line and pelvic-fin origin.

Garra species with proboscis, viz., *Garra cornigera*, *G. elongata*, *G. litanensis* and *G. trilobata* are distributed in the Chindwin basin of north east India. The new species is distinguished from *G. cornigera* in the presence (vs. absence) of anterolateral lobe of the lower lip, 16 (vs. 14) circumpeduncular scales rows, less posteriorly situated anus (17.8–26.2 vs. 28–41 % of pelvic-anal dis-

tance), and the presence (vs. absence) of black spot at the upper angle of the gill opening; from *G. elongata* in having 33 (vs. 40–41) lateral line scales, 9–10 (vs. 14–15) predorsal scales and 8½ (vs. 7½) branched dorsal-fin rays.

The new species differs from *Garra litanensis* in the presence (vs. absence) of scales on the chest, 33 (vs. 32) lateral line scales and the absence (vs. presence) of black spots at the base of the dorsal fin; from *G. trilobata* in the presence (vs. absence) of anterolateral lobe of the lower lip, 33 (vs. 31–32) lateral line scales and 16 (vs. 14) circumpeduncular scales.

Garra biloborostris further differ from *G. bimaculacauda* in the absence (vs. presence) of two distinct black spots on the caudal fin, one each on the tips of the dorsal and ventral lobes), presence (vs. absence) of dark band along the length of the body); from *G. parastenorhynchus* absence (vs. presence) of a conspicuous dark spot at the caudal fin base), absence (vs. presence) of multicuspoid tubercles), absence (vs. presence) of overhanging proboscis).

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