



Garra arupi, a new cyprinid fish species (Cypriniformes: Cyprinidae) from upper Brahmaputra basin in Arunachal Pradesh, India

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Abstract: *Garra arupi*, a new cyprinid fish species is differentiated from its congeners along the base of the Himalaya in Brahmaputra basin by a combination of characters: two pairs of barbels, anterior position of vent (vent to anal distance 52.6-60.0% pelvic to anal distance), a band of 6-9 prominent horny tubercles on the tip of the snout, a submarginal black band on the dorsal fin, and 16 circumpeduncular scales. It is similar to *G. kempi* in having an anterior position of the vent, and similar to *G. lissorynchus* in having a distinct submarginal band on the dorsal fin. *Garra arupi* differs from *G. kempi* in having 35-36 (vs. 40-42) lateral line scales, 11-12 (vs. 13-14) predorsal scales, 16 (vs. 12) circumpeduncular scales, the presence of a distinct submarginal band on the dorsal fin (vs. absence), the presence of a transverse band of tubercles on the snout tip (vs. absence), and the presence of 7-8 thin stripes on the caudal peduncle (vs. absence). *Garra arupi* differs from *G. lissorynchus* in having 11-12 (vs. 14-15) predorsal scales, 7 (vs. 6) branched dorsal fin rays, 5 (vs. 4) branched anal fin rays, the absence of a W-shaped color band on the caudal fin (vs. presence), the absence of a rostral lobe on the snout (vs. presence), the presence of a transverse band of tubercles on the snout tip (vs. absence), and a vent to anal distance 52.6-60.0 (vs. 37.3-40.2%) pelvic to anal distance.

Keywords: Arunachal Pradesh, cyprinid, *Garra arupi*, new species

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Author contribution: W. VISHWANATH The study: Supervision of taxonomy and phylogeny of freshwater fishes of northeastern India. Current paper: Supervised the work and helped in identifying the species. K. NEBESHWAR The study: Morphometric study and identification of fish species. Current paper: Detailed examination of specimens and comparison with closely related species to establish the new species. D.N. DAS The study: Exploration fish species in the region. Current paper: Supervision of fish collection and assisted in comparative study.

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INTRODUCTION

The bottom dwelling cyprinid fish genus *Garra* Hamilton, 1822 consists of approximately 70 species distributed from Borneo to West Africa through southern China, South and Southeast Asia, the Middle East, the Arabian Peninsula, and East Africa (Zhang & Chen 2002). While revising the genus, Hora (1921) recognized 25 species including seven new species from the Himalayan foothills, viz., *G. annandalei* from Assam and Darjeeling Himalayas, *G. abhoyai* and *G. naganensis* from Manipur, *G. prashadi* from Uttar Pradesh, *G. chaudhurii* from northern Bengal, *G. jenkinsonianum* from Bengal, and *G. kempi* from Arunachal Pradesh. Other known species from the region are: *G. rupecula* (McClelland), *G. lissorhynchus* (McClelland), *G. lamta* (Hamilton), *G. gotyla* (Gray), *G. nasuta* (McClelland) (Hora 1921; Menon 1964). Menon (1964) recognized 38 species under the genus and considered Hora's (1921) *G. abhoyai* a junior synonym of *G. rupecula*; *G. chaudhurii* of *G. annandalei*; *G. prashadi* of *G. lamta*, and *G. jenkinsonianum* of *G. mullya*. Nath & Dey (2000) reported seven species of *Garra*, viz., *G. annandalei*, *G. gotyla gotyla*, *G. kempi*, *G. lamta*, *G. lissorynchus*, *G. mCclellandi*, and *G. naganensis* from Arunachal Pradesh. Collections from the Deopani, Ipipani, Sisiri, and Lohit rivers in the Lower Dibang Valley and the Lohit District in Arunachal Pradesh included an undescribed *Garra*, which is herein described as *Garra arupi* sp. nov.

MATERIALS AND METHODS

The descriptions are based on formalin preserved specimens. Counts, measurements and terminology follow Kullander & Fang (2004). Measurements were taken point to point with digital calipers to the nearest 0.1mm. The number in parentheses after a specific count indicates number of specimens examined. Fin rays and number of scales were counted under a zoom stereoscopic microscope. Terminology used for description of disc follows Zhang et al. (2002). Other measurement techniques adopted are as follows: disc width, the widest portion of the lower lip; disc length, length from anterior mid-point of the anterior papillated skin fold to the posterior mid-point of the posterior margin of mental disc; head height, distance from the midline at occiput vertically downward to ventral contour of the breast; lateral line scales, counted from the anterior-most scale in contact with the shoulder girdle to the last scale on the caudal fin; lateral transverse scales above the lateral line, counted from the dorsal fin origin to the lateral line obliquely ventral and caudal and scales below lateral line are counted from the ventral fin origin obliquely dorsal and rostral to lateral line and also from the anal fin origin to the lateral line. Measurements of the head parts are also given in percentages of head length for comparison with data of literature. For vertebral count, eight

specimens were dissected and stained with alizarin S. Vertebral count includes the first four vertebrae of Weberian apparatus. Abdominal vertebrae were counted from the first four vertebrae of the apparatus to the last vertebra bearing pleural rib and caudal vertebrae, from the vertebra immediately posterior to the anal fin pterygiophore. Types of the comparative materials were physically examined for the study.

***Garra arupi* sp. nov.**

(Images 1-3; Fig. 1)

Material examined

Holotype: 60.0mm SL; Deopani River at Roing, Lower Divang Valley, Arunachal Pradesh, India, RGUMF-0184, Rajiv Gandhi University Museum of Fishes.

Paratype: 49 specimens, all from Arunachal Pradesh, Brahmaputra drainage collected by Nebeshwar and his party during 7-18 February 2007: RGUMF-0185, 15 exs., 50.0-72.4mm SL; same data as of holotype; RGUMF-0186, 10 exs. 36.5-69.0mm SL; Iphipani River at Roing, Lower Divang Valley District; RGUMF-0187, 12 exs., 35.5-65.5 mm SL, Sisiri River at Dambuk, Lower Divang Valley District; RGUMF-0188, 12 exs. 39.5-65.8mm SL, Lohit River at Tezu, Lohit District.

Diagnosis

Garra arupi sp. nov. is similar to its sympatric species *G. kempi* in having the anterior position of vent and to *G. lissorynchus* in having a distinct transverse submarginal band on dorsal fin. The species differs from *G. kempi* in having 35-36 (vs. 40-42) perforated lateral line scales, vent to anal distance 52.6-60.0 (vs. 50.0-52.9%) pelvic to anal distance, 11-12 (vs. 13-14) predorsal scales, 16 (vs. 12) circumpeduncular scales, 3½ (vs. 2½) transverse scales between anal fin origin and lateral line, presence (vs. absence) of a distinct submarginal band on the dorsal fin, presence (vs. absence) of a transverse band of tubercles on the snout tip, and the presence (vs. absence) of 7-8 thin stripes on the caudal peduncle. It differs from *G. lissorynchus* in having 11-12 (vs. 14-15) predorsal scales, 7 (vs. 6) branched dorsal fin rays, 5 (vs. 4) branched anal fin rays, 3½ (vs. 4½) transverse scales between the anal fin origin and the lateral line, absence (vs. presence) of a W-shaped colour band on the caudal fin, absence (vs. presence) of a rostral lobe on the snout, presence (vs. absence) of a transverse band of tubercles on the snout tip, and vent to anal distance 52.6-60.0 (vs. 37.3-40.2%) pelvic to anal distance.

Description

Measurements and counts of specimens (35.5-72.4mm SL) are given in Table 1. A comparison of the species with its closest congeners is in Table 2. The general appearance of the body is in Image 1, the ventral appearance of body in Image 2, and the morphology of dorsum of head in Image 3. Body elongate, slightly compressed laterally, more on caudal peduncle region. Dorsal profile of body slightly convex from tip of the supraoccipital process to dorsal fin origin. Dorsal fin base almost straight, slightly sloped posteroventrally. Profile from posterior end of dorsal fin base to caudal fin base straight. Ventral profile of body convex from pectoral to pelvic fin origin and straight from pelvic to anal fin origin. Anal fin base nearly straight, posterodorsally inclined. Profile between posterior end of the anal fin base to caudal fin base straight. Head

moderately large, depressed with a convex interorbital space; height less than length; width greater than height. Snout broadly rounded with a mere groove across its tip to form a transverse lobe, which contains a band of 6-9 small or large pointed tubercles; 3-5 small lateral tubercles anteroventral to nostrils; 4-12 minute tubercles anteromedially to nostrils, of which 2-4 on each side on the anterosuperior region of nostrils; lateral from the base of rostral barbel having a slightly posteroventrally sloping shallow groove continuous to the lateral groove of rostral cap; rostral lobe absent. Eyes placed dorsolaterally in the posterior half of head.

Two pairs of barbels; rostral ones anterolaterally located, similar to eye diameter; maxillary ones at corner of mouth, shorter than rostral ones. Rostral cap well developed, moderately crenulated, and with a narrow papillated margin; separated from upper jaw by a deep groove and laterally continuous with a distinct antero-lateral lobe of lower lip. No lip in the form of papilliferous tissue along the upper jaw and no papilliferous fold in the corner of mouth. Upper jaw entirely covered by rostral cap. Lower lip modified into a mental adhesive disc. Disc elliptical, shorter than wide and narrower than head width through roots of maxillary barbels; anterior margin modified to form a transverse, fleshy, and crescentic skin fold covered by numerous tiny papillae; anteriorly separated from lower jaw by a groove running along lower jaw and posteriorly bordered in a deep groove with central callous pad; lateral and posterior margin surrounding central callous pad, papillated and free; posteriormost margin extending a little beyond vertical from posterior margin of eye.

Dorsal fin with three (15) simple and seven (15) branched rays; last simple ray shorter than HL; distal margin slightly concave; origin a little nearer to snout tip than caudal fin base, inserted anterior to pelvic fin; first branched ray longest, last branched ray not extending to vertical from anal fin origin. Pectoral fin with one simple and 10 (2), or 11 (13) branched rays, reaching beyond midway to pelvic fin origin; its length shorter than HL; subacuminate margin; fourth branched ray longest, not extending to base of pelvic fin. Pelvic fin with one simple and seven (4) or eight (11) branched rays reaching beyond midway to anal fin origin, surpassing the vent; second branched ray longest, not extending to base of anal fin; origin closer to anal fin origin than to pectoral-fin origin, situated vertically at base of third branched dorsal fin ray; its distal margin almost convex. Anal fin short with three (15) simple and five (15) branched rays; first branched ray longest, straight posterior margin; its tip not reaching base of caudal fin; origin of anal fin closer to caudal-fin base than to pelvic fin origin. Vent slightly closer to pelvic fin origin than to anal fin origin. Caudal fin emarginated; lobe tips slightly pointed; tenth ray shortest; lobes equal in length.

Lateral line complete with 35 (6) or 36 (9) scales. Scales in transverse row above lateral line 3½ (8), 4 (4), or 4½ (3) and below lateral line from ventral fin origin 2½ (15) and from anal fin origin 3½ (10), 4 (1), or 4½ (4). Circumpeduncular scales 15 (3) or 16 (12). Predorsal scales 11 (10) or 12 (5); scales arranged regularly, same size as flank scales. Chest and belly scaled, embedded under thin skin. An axillary scale at base of pelvic fin nearly reaching its base. Scales between vent and anal-fin base six (1), seven (10), or eight (4) scales. A row of small elongated scales at the base of dorsal fin five (15) and a row of two (5) or three (10) scales at the base of anal fin; all the scales



Image 1. *Garra arupi* sp. nov. Lateral view of holotype RGUMF-0184



Image 2. *Garra arupi* sp. nov. Ventral view of holotype RGUMF-0184



Image 3. *Garra arupi* sp. nov. Dorsal view of head of holotype RGUMF-0184

Table 1. Morphometric characteristics of *Garra arupi* sp. nov.

Morphometrics	<i>Garra arupi</i> sp. nov. (49 specimens including Holotype)			
	Min.	Max.	Mean	S.D.
standard length	50.0	72.4		
In %SL				
body depth	21.8	23.6	22.5	0.76
head length	23.3	27.5	24.8	1.31
head height at nape	15.0	17.9	16.2	0.75
head height at eye	12.6	14.7	13.5	0.81
head width at opercle	19.3	21.2	20.3	0.72
head width at nare	15.7	17.9	16.9	0.70
body width at dorsal	16.5	19.7	18.2	1.02
body width at anal	10.1	11.5	10.9	0.53
caudal peduncle length	15.6	17.7	16.4	0.59
caudal peduncle height	13.0	14.8	14.0	0.57
dorsal fin length	19.8	23.4	21.2	1.16
dorsal fin base length	12.7	14.7	13.7	0.72
pectoral fin length	20.0	23.4	21.4	1.32
pelvic fin length	17.1	20.2	18.5	1.05
anal fin length	15.6	19.8	17.4	1.46
anal fin base length	6.6	8.8	7.6	0.57
upper caudal fin lobe length	23.9	29.2	26.4	1.71
lower caudal fin lobe length	25.4	30.3	27.3	1.56
median caudal fin rays length	16.9	19.8	17.9	1.03
preanal length	76.3	81.2	78.2	1.43
pre-anus length	62.4	65.6	64.4	1.12
preventral length	51.7	54.6	52.9	0.72
predorsal length	50.0	52.3	51.0	0.76
prepectoral length	18.8	22.9	20.5	1.16
In % ventral-anal length				
vent-anal length	52.6	60.0	56.1	2.20
In % HL				
snout length	50.0	53.2	51.5	1.22
eye diameter	20.7	27.0	23.5	1.79
interorbital space	45.9	50.6	47.9	1.42
disc length	40.7	48.0	43.8	1.99
disc width	56.0	62.8	60.4	2.46
callous pad length	25.7	30.0	27.7	1.50
callous pad width	35.0	40.0	38.3	1.38

Table 2. Differentiating characteristics of *Garra arupi* sp. nov. from its closest congeners

Characters	<i>Garra arupi</i> sp. nov.	<i>Garra kempfi</i>	<i>Garra lissorhynchus</i>
Meristic count			
branched dorsal fin rays	7	7-8	6
branched pectoral fin rays	10-11	11-12	13
branched pelvic fin rays	7-8	8	7
branched anal fin rays	5	5	4
principal caudal fin rays	10+9= 19	9-10+9= 18-19	10+9= 19
lateral line scales	35-36	40-42	34-35
lateral transverse scales	3½ -4½ / 3½	4½ -5 / 2½	3½ -4½ / 4½
predorsal scales	11-12	13	14-15
circumpeduncular scales	15-16	12	16
Measurement in % SL			
body depth	21.8-23.6	20.7-23.1	18.1-20.0
caudal peduncle height	13.0-14.8	12.1-13.1	12.8-13.5
dorsal fin length	19.8-23.4	22.3-24.0	18.6-19.7
dorsal fin base length	12.7-14.7	13.8-15.3	10.5-12.2
anal fin base length	6.6-8.8	6.9-8.0	5.6-6.0
pre-anus length	62.4-65.6	62.8-65.0	67.8-73.1
disc width	14.4-15.4	14.3-15.4	13.4-14.0
caudal upper lobe length	23.9-29.2	26.5-29.1	22.5-24.8
caudal lower lobe length	25.4-30.3	27.4-29.6	22.4-24.4
In % pelvic-anal distance			
vent-anal distance	52.6-60.0	48.1-52.9	37.3-40.2
a submarginal band on dorsal fin	present	absent	present
a transverse band of tubercles on snout tip	present	absent	absent
stripes on caudal peduncle	present	absent	absent
W-shaped color band on caudal fin	absent	absent	present
rostral lobe on snout	absent	absent	present



Figure 1. Map showing collection site of *Garra arupi* sp. nov.

cover the basal region of the fins.

Osteological features

Total vertebrae 35 (7), 36 (1); abdominal 16 (6), 17 (2),

predorsal vertebrae 11 (7), 12 (1); caudal 11 (3), 12 (3), 13 (2).

Colour in preservation

Dorsum, sides of head dark brown; head, chest, and abdomen

whitish or yellowish. All the last six branched dorsal fin rays excluding its distal rim highly spotted with black. These black spots extend anteriorly from its corresponding rays to its distal $\frac{1}{3}$ - $\frac{1}{2}$ interradial membranes. Whole length of interradial membrane between last simple and 1st branched ray and proximal $\frac{2}{4}$ and $\frac{1}{2}$ length of those between 1st and 2nd branched, 2nd and 3rd branched and 3rd and 4th branched rays covered with elongated membranous flaps, which are gradually tapered distally and originate from their corresponding anterior rays. Seven or eight thin lateral stripes, more in the caudal peduncle region. All the full length of the 9th to 13th rays of caudal fin and outer rays of the dorsal and ventral lobe dark grayish, more on the median. A small rounded black spot at the upper angle of gill opening.

Etymology

Named in honour of Prof. Arup Kumar Das, Coordinator, UGC sponsored 'Centre of Excellence in Biodiversity', Rajiv Gandhi University, Itanagar.

Distribution

Garra arupi sp. nov. is known from the upper Brahmaputra basin in the Lower Divang Valley and the Lohit District of Arunachal Pradesh (Fig. 1).

DISCUSSION

There have been several new descriptions and revisions of *Garra* species in Asia (Vishwanath & Sarojnalini 1988; Kosygin & Vishwanath 1998; Vishwanath & Kosygin 2000; Kottelat 2000; Gopi 2001; Zhang & Chen 2002; Kullander & Fang 2004; Vishwanath & Shanta 2005; Zhang 2006).

Nath & Dey (2000) reported the occurrence of *Garra naganensis*, *G. kempi*, *G. lissorhynchus*, *G. gotyla*, *G. annandalei*, *G. lamta* and *G. McClellandii* in Arunachal Pradesh. Among them, *G. McClellandii* is a peninsular form (Menon 1964; Jayaram 1999). Menon (1964) noted the type locality of *G. lamta* to be Tinau River, tributary of Rapti River, at Butwal (Nepal) and reported its distribution up to Kumaon Himalaya.

Garra arupi sp. nov. is characteristic in having a shallow groove transversely on its snout tip with a band of 6-9 small or large pointed tubercles. In the specimens having smaller tubercles on the snout tip, there is no such transverse groove. The new species is similar to *G. lamta* and *G. mullya* by the presence of a groove on the snout tip. However, *G. lamta* and *G. mullya* have a distinct lateral broad stripe and a black blotch on caudal base which *G. arupi* does not have. *G. arupi* differs from *G. lamta* in having 35-36 (vs. 31-34) perforated lateral line scales, 11-12 (vs. 8-10) predorsal scales, and vent to anal distance 1.67-1.90 (vs. 4.00-6.67) in pelvic to anal fin distance. *G. arupi* further differs from *G. mullya* in 35-36 (vs. 32-34) perforated lateral line scales, 11-12 (vs. 9-11) predorsal scales, vent to anal distance 1.67-1.90 (vs. 2.67-3.80) in pelvic to anal fin distance, and $2\frac{1}{2}$ (vs. $3\frac{1}{2}$) transverse scales between the pelvic fin and lateral line.

In addition to *Garra kempi* and *G. lissorhynchus*, there are five species of *Garra* from the Brahmaputra basin in India, namely *G. annandalei*, *G. naganensis*, *G. gotyla*, *G. nasuta*, and *G. rupecula* (Menon 1964; Talwar & Jhingran 1991; Jayaram 1999). *G. arupi* sp. nov. is separated from them by having a distinct transverse submarginal band on the dorsal fin and an anterior position of the vent. *G. arupi* has a vent to anal distance 52.6-60.0 % pelvic to anal distance

(vs. 40.6-44.2 in *G. naganensis*, 30-33.8 in *G. annandalei*). *G. arupi* further differs from Menon's (1964) *G. gotyla* in having 9-10 (vs. 11-12) predorsal scales, a snout without a proboscis and with a mere transverse groove on snout tip (vs. a snout with a prominent proboscis and a prominent transverse groove on the snout tip), presence (vs. absence) of a black band on branched dorsal fin rays, and an absence (vs. presence) of black spots at the base of branched dorsal fin rays. *G. arupi* differs from Menon's (1964) *G. nasuta* in having an absence (vs. presence) of a trilobed proboscis with a distinct transverse groove on the snout tip, anterior position of the vent (vent to anal distance 1.67-1.90 vs. 3.71-5.25 in pelvic to anal distance), and an absence (vs. presence) of black spots at the base of branched dorsal fin rays.

Garra rupecula McClelland, 1839 was described from the Mishmi Mountains, Assam (now in Arunachal Pradesh) in Brahmaputra basin having the following characteristics: a W-shaped band on the caudal fin and naked scales in the predorsal region (Talwar & Jhingran 1991), which differentiate it from *G. arupi* sp. nov. While describing *G. abhoyai* as a new species from the specimens collected from the area of the Ukhrul district in Manipur, Hora (1921) reviewed the description of *G. rupecula* based on fresh specimens collected from the hill streams of Manipur valley, an altogether different river basin. He did not mention significant differentiating characteristics between the two species except for the small body size and presence of pores on the snout in *G. rupecula*. After decades, Menon (1964) also reviewed the characteristics of *G. rupecula* based on Manipur valley specimens and put *G. abhoyai* as its junior synonym. All the streams and rivers draining in the Manipur valley and Ukhrul district belong to Chindwin drainage. Ten specimens (45.0-54.9mm SL) having pores on their snout presently collected from the Iril and Nambul rivers (Chindwin basin) have close similarity with those of Hora (1921) and Menon (1964) mentioned above. The distribution pattern clearly suggests the validity of *G. abhoyai* and absence of *G. rupecula* in the basin.

Garra abhoyai characteristically has 16-27 small scales embedded in a thin skin on the predorsal region arranged irregularly, with the size of these scales much smaller than those on the flank scales. It has also a narrow black band in the middle of the dorsal fin, a characteristic that *G. arupi* sp. nov. does not have.

Vishwanath & Sarojnalini (1988) mentioned the type locality of *Garra manipurensis* in the Manipur River at Sherou in the Chindwin basin in Manipur. However, several subsequent collections from the type locality did not represent the species. Instead, it is represented in the collections from Tuivai River in the Brahmaputra River basin, Manipur. Thus type locality as given in the original description might be due to wrong labeling. The species has the following combination of characteristics: 4 branched anal fin rays, 13 branched pectoral fin rays, and a rostral lobe which easily differentiates it from *G. arupi* sp. nov. *G. arupi* further differs from *G. manipurensis* in having head height 21.8-23.6 (vs. 19.2-20.6% SL), pectoral fin length 20.0-23.4 (vs. 25.3-27.8% SL), pelvic-fin length 17.1-20.2 (vs. 21.7-23.4% SL), pre-anus length 62.4-65.6 (vs. 68.9-72.4 % SL), disc width 56.0-62.8 (vs. 44.7-52.1% SL), disc length 40.7-48.0 (vs. 34.6-35.6% SL), callous pad width 35.0-40.0 (vs. 31.9-34.9 %SL), callous pad length 25.7-30.0 (vs. 20.4-21.9% SL), and an anterior position of the vent (vent-anal distance 52.6-60.0 vs. 24.8-29.7% pelvic to anal distance).

There are four species of *Garra* from the Chindwin basin in Manipur, namely, *G. litanensis*, *G. paralissorhynchus*, *G. compressus*, and *G. elongata* (Vishwanath 1993; Kosygin & Vishwanath 1998; Vishwanath & Kosygin 2000; Vishwanath & Shanta 2005). *G.*

arupi sp. nov. differs from them in having an anterior position of the vent (vent-anal distance 52.6–60.0 vs. 25.6–51.8 % pelvic to anal distance). *G. arupi* further differs from *G. elongata* and *G. compressus* in having 35–36 (vs. 40–41) perforated lateral line scales, and 16 (vs. 12) circumpeduncular scales. *G. arupi* differs from *G. paralissorynchus* in having 35–36 (vs. 32–33) perforated lateral line scales, seven (vs. 6) branched dorsal fin rays, five (vs. 4) branched anal fin rays, and an absence (vs. presence) of a rostral lobe. *G. arupi* differs from *G. litanensis* in the absence (vs. presence) of a proboscis, a presence (vs. absence) of scales on the chest, and seven (vs. 8) branched dorsal fin rays.

There are seven species of *Garra* from the Irrawaddy River basin in Rakhine Yoma, Myanmar, namely *Garra propulvinus*, *G. vittatula*, *G. spilota*, *G. rakhinica*, *G. flavatra*, *G. poecilura*, and *G. nigricollis* (Kullander & Fang 2004). All the species (except *G. spilota*) share a common character, a rostral lobe on the snout, which can be utilized to separate them from *G. arupi* sp. nov. *G. arupi* differs from *G. spilota* in having the presence (vs. absence) of a submarginal black band on the dorsal fin, an absence (vs. presence) of blotches on the sides, and seven (vs. 8) branched dorsal fin rays.

Kottelat (1990, 2001) also remarked that most of the highly specialized rheophilic fish species in Southeast Asia have restricted distribution ranges. So, a thorough revision to present the precise differentiating characteristics and geographical distributions of *G. nasuta*, *G. gotyla*, *G. rupecula*, and *Garra mullya* would be essential.

Comparative material

Garra elongata: MUMF 2311, holotype, 86.2mm SL; MUMF 2308–2310, paratype, 3 exs., 72.0–80.8mm SL, a small stream near Tolloi, Ukhrul district, Manipur (Chindwin basin); L. Kosygin, 12 November 1997. – uncatalogued specimen, 4 exs. 63.2–112.5mm SL, Challou River at Challou, Ukhrul district, Manipur (Chindwin basin); Kingson, October 2005. – *Garra annandalei*: RGUMF-0074, 15 exs., 55.3–99.0 mm SL, Kameng River, Balukpung, West Kameng district, Arunachal Pradesh (Brahmaputra basin); Karsen Nyori & Mrinali Choudhuri, 20 August 2005. – RGUMF-0075, 10 exs., 65.0–85.0mm SL, Panye R., Tamen, Lower Subansiri district; 17 July 2005 – *Garra lissorynchus*: MUMF 4163–4166, 67.1–86.2mm SL, Iyei River at Noney, Tamenglong district (Brahmaputra basin); K. Nebeshwar, 2 September 2000. – *Garra naganensis*: MUMF 4156–4159, 4 exs., 92.3–106.9mm SL, Barak River, Vanchengphai Village, Tamenglong district, Manipur (Brahmaputra basin); K. Nebeshwar, 20 November 1999. – uncatalogued specimen, 2 exs., 77.8–84.4 mm SL, Tuivai River, Churhanpur district, Manipur (Brahmaputra basin); K. Shanta Devi, March 2003. % *Garra abhoyai*: uncatalogued specimen, 6 exs., 45.2–47.0mm SL, Khujailok stream at Nambol, Bishenpur district, Manipur (Chindwin basin); Vishwanath & party, April 2001. – uncatalogued specimen, 6 exs., 49.3–54.9mm SL, Iril River at Phungthar, Ukhrul district, Manipur (Chindwin basin); I. Linthoi & party, 17 January 2003. – uncatalogued specimen, 5 exs., 45.0–53.0mm SL, Nambul River at Singda, Imphal district, Manipur (Chindwin basin); Joyshree, 3 February 2004. % *Garra compressus*: MUMF 2316, holotype, 68.1mm SL, MUMF 2314–2315; paratype, 2 exs., 78.6–83.2mm SL, Wanze stream at Khamson, Ukhrul district, Manipur (Chindwin basin); L. Kosygin, 17 March 1998. % *Garra paralissorynchus*: MUMF 5054, holotype, 65.9mm SL, Khuga River, Churhanpur district, Manipur (Chindwin basin); L. Shanta Devi, 25 July 2000; Paratype: MUMF 5094, 1 ex., 60.9mm SL; 10 April 2000. – MUMF 5041, 1 ex., 58.0mm SL; 3 May 2000. – MUMF 5104–5106, 3 exs., 49.6–

59.6mm SL; 21 August 2002; same collection data as holotype. – *Garra manipurensis*: MU/LSD/F-130, holotype, 59.8mm SL, Manipur River, Sherou, Manipur (Chindwin basin) – MUMF 4160–4162, 3 exs. 41.9–68.3 mm SL, Iyei River, Noney, Tamenglong district (Brahmaputra basin); K. Nebeshwar, 27 December 2000. – *Garra kempfi*: RGUMF-0184, 3 exs., 52.0–56.0mm SL, Egar Stream, Rottung, East Siang district, Arunachal Pradesh (Brahmaputra basin); K. Nebeshwar & party, 12 January 2007. – uncatalogued specimen, 2 exs., 64.5–65.0mm SL, Demwe stream, Tezu, Lohit district, Arunachal Pradesh (Brahmaputra basin); K. Nebeshwar & party, 1 January 2007.

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