



Garra jaldhakaensis, a new cyprinid fish (Teleostei: Cyprinidae) from West Bengal, India

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Abstract

Garra jaldhakaensis sp. nov. (Teleostei: Cyprinidae) is described from the Jaldhaka River, Kalimpong district, West Bengal, India. The new species is distinguished from all its congeners in the Indian sub-continent in having a combination of the following characters: a prominent thick unilobed proboscis, protruding downward above the transverse groove; 10–11 predorsal scales, 33 lateral line scales and 16 circumpeduncular scales.

Keywords: Brahmaputra Basin, Cyprinidae, India, New Species

Introduction

Members of the cyprinid genus *Garra* F. Hamilton, 1822 are distributed in Africa and Southwest, South, Southeast and East Asia (Zhang & Chen, 2002). The presence of a gular disc characterizes them. They are found in habitats with a strong current, such as rapids, torrents and waterfalls, usually solitary under rocks or among stones and boulders (Kottelat, 2020). The development of the proboscis, distribution pattern of the tubercles and the transverse lobe on the snout are of taxonomic significance in distinguishing species of the genus (Nebeshwar & Vishwanath 2013). Based on the snout and oromandibular morphology, Nebeshwar & Vishwanath (2017) have categorized the genus *Garra* occurring in India, Sri Lanka, China and Southeast Asia into five distinct aspects: snout smooth; snout with a transverse lobe; snout with a proboscis and transverse lobe; snout with a pair of rostral flaps and snout with a pair of rostral lobes. A collection of fishes in the Jaldhaka River near Jhalong, Kalimpong district, West Bengal, India, included undescribed species of *Garra* belonging to the proboscis species group, which is described herein as *Garra jaldhakaensis* sp. nov.

Material and Methods

Specimens were fixed in 10 % formalin and preserved in 70% ethanol. Measurements were made point to point with a dial caliper and data recorded to tenths of a

millimetre. Counts and measurements follow Nebeshwar & Vishwanath (2013). For the snout terminology, Kottelat (2020) was followed.

Lateral-line scales are counted from the anterior-most pored scale in contact with the shoulder girdle to the posteriormost pored scale on the caudal fin. Transverse scale rows above the lateral line are counted from the dorsal-fin origin to the lateral line obliquely downward and those below the lateral line, from the anal-fin origin and pelvic-fin origin obliquely upwards to the lateral line. Fin rays of dorsal, anal, pectoral, and pelvic fins include separately simple and branched rays. Dorsal and anal-fin rays count follows Kottelat (2001); that is, the last two rays articulating on the same pterygiophore are counted as “1½”. Fin rays and number of scales were counted under a stereoscopic zoom Leica microscope. The value in parentheses after a specific count indicates the frequency of that count. Specimens examined are deposited in the Zoological Survey of India (ZSI), Kolkata. Published information used for comparison on *Garra bimaculacauda*, *G. dengba*, *G. koladynensis*, *G. moyonkhulleni*, *G. mutuoensis*, *G. nasuta*, *G. parastenorhynchus*, *G. qiaojiensis*, *G. rotundinasus*, *G. substrictorostris*, *G. surgifrons* and *G. yajiangensis* are based on Deng *et al.* (2018), Gong *et al.* (2018), Menon (1964), Moyon & Arunkumar (2018), Nebeshwar & Vishwanath (2017), Roni & Vishwanath (2018), Thoni *et al.* (2016), Sun *et al.* (2018) and Zhang (2006).

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Results

Garra jaldhakaensis sp. nov.

(Figures 1a-c, 2)

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Type material: Holotype: 97.2 mm SL, India, West Bengal, Kalimpong district, Jaldhaka River near Jhalong, Brahmaputra River Drainage, 27°02'39" N 88°52'71" E, elevation 1,220 ft. 09.iv.2018, coll. Ujjal Das (ZSI FF 8126). Paratypes: 3 exs., 84.3-95.3 mm SL, same locality and label data as holotype (ZSI FF 8127).

Type depository: The type specimens are deposited in the Zoological Survey of India (ZSI), Kolkata, India.

Description: Morphometric data of holotype and paratypes are presented in Table 1. Body elongate, compressed laterally, more compressed towards caudal peduncle. Dorsal profile smoothly arched to dorsal-fin origin, then sloping down towards caudal peduncle. Ventral profile flattened from head to chest, more or less rounded up to pelvic-fin origin then almost straight towards caudal-fin base.

Head large, depressed with moderately convex inter orbital region, head depth less than head length. Eyes small, dorso-laterally located, closer to posterior margin of opercle than to snout tip. Snout slightly pointed, its transverse lobe covered with 16–25 medium-to large-sized multicuspid tubercles, demarcated posteriorly by a deep transverse groove; 9–12 unicuspid tubercles on slightly elevated lateral surface, 1–2 minute unicuspid tubercles on posterior region of nostrils. Proboscis prominent, short, thick, protruding downward above the transverse groove, with 5–6 uni- to bi-cuspid tubercles on anterolateral margin, 8–10 uni to bicuspid tubercles on anteroventral marginal aspect, differentiated from depressed rostral surface by a distinct transverse groove; width smaller than internarial space. Depressed rostral surface soft, with 2–3 thin ridges. Sublachrymal groove deep, horizontally curved. Rostral lobe absent.

Barbels in two pairs; rostral barbels anterolaterally located, equal to eye diameter; maxillary barbels at the corner of mouth, much shorter than rostral barbels. Upper jaw entirely covered by well-developed rostral cap. Rostral cap well-developed, extended, highly fimbriate,

papillate ventral surface moderately wide; separated from upper jaw by deep groove, laterally continuous with lower lip. Upper jaw entirely covered by rostral cap. Gular disc elliptical, wider than long, narrower than head width through roots of maxillary barbels; labellum of lower lip weakly developed, fully covered with papillae; torus well developed with papillae, not covered by rostral cap; toral groove deep, papillated; papillae on inner half of whole length of labrum coarsely arranged; posteriormost margin of labrum extending to vertical margin of eye.

Dorsal fin with ii (4) simple and 8½ branched rays, last simple rays equal to head length, origin much closer to tip of the snout than caudal-fin base. Pectoral fin with i simple rays and 14 (4) branched rays, its length less than head length. Pelvic fin with I simple and 7–8 (4) branched rays, second branched ray longest, reaching anus; not extending to base of anal fin, its origin closer to anal-fin origin than to pectoral-fin origin, inserted vertically below base of third branched dorsal-fin ray. Anal fin with ii (4) simple and 5 branched rays, anus opening much more closer to anal-fin origin than to pelvic-fin origin. Caudal fin forked, lower lobe slightly longer, 9+8 branched rays.

One long axillary scale at base of pelvic fin, its tip reaching posterior end of pelvic-fin origin. Dorsal-fin



Figure 1. *Garra jaldhakaensis* sp. nov., holotype, a. dorsal, b. lateral, c. ventral view.



Figure 2. *Garra jaldhakaensis* sp. nov., holotype showing **a**. Snout; **b** oromandibular morphology.

base scales 7(4) of which last 6–7 attached to base of dorsal fin. Anal fin base scales 4, of which last 2–3 connected to fin base. Scales between anus and anal-fin origin 3 (4). Lateral line complete with 33 (4) scales. Transverse scale rows between dorsal-fin origin to lateral line $4\frac{1}{2}$ (4); between lateral line and pelvic-fin origin 3(4); between lateral and anal-fin origin 3(4). Predorsal scales 10(2)–11(2), scales regularly arranged. Chest and belly scaled. Circumpeduncular scales 16 (4).

Coloration: In preservative, body grey, yellowish ventrally. Dorsal-fin rays between 3–8 spotted proximally with melanophores. Fin rays spotted with thin melanophores on distal margins. Body with 5–6 longitudinal bands along with the lateral scales, becoming distinct towards the caudal peduncle. A black spot at the upper angle of the gill opening.

Diagnosis: *Garra jaldhakaensis* sp. nov., a member of the proboscis and transverse lobe species group, is distinguished from all congeners in the Ganga-Brahmaputra River drainage in having the following combination of characters: snout with a prominent tuberculated unilobed proboscis protruding downward above the transverse groove and transverse lobe covered with 16–25 medium-to large-sized multicuspoid tubercles; 10–11 predorsal scales, 33 lateral line scales, 16 circumpeduncular scales, scaled chest and belly.

Distribution: *Garra jaldhakaensis* sp. nov. is presently known only from the type locality Jaldhaka River near Jhalong, Kalimpong district, West Bengal, India.

Etymology: The species is named after the type locality, Jaldhaka River.

Discussion

Garra jaldhakaensis sp. nov. is characteristic in having a snout with a unilobed proboscis protruding downward above the transverse groove and tuberculated transverse lobe. It belongs to the snout with proboscis and transverse lobe species group (Nebeshwar & Vishwanath, 2017). The new species is compared with 35 valid species of *Garra* recognized under the snout with a proboscis and transverse lobe. At present, 17 species are known in the Brahmaputra River drainage; *G. arunachalensis* Nebeshwar & Vishwanath (2013), *G. biloborostri* Roni & Vishwanath (2017), *G. binduensis* Ujjal *et al.* (2016), *G. bimaculacauda* Thoni *et al.* (2016), *G. birostris* Nebeshwar & Vishwanath (2013), *G. clavirostris* Roni *et al.* (2017), *G. dengba* Deng *et al.* (2018), *G. gotyla* (Gray, 1832), *G. kalpangi* Nebeshwar *et al.* (2012), *G. langlungensis* Ezung *et al.* 2021, *G. magnacavus* Shangningam *et al.* (2019), *G. motuoensis* Gong *et al.* (2018), *G. nasuta* (McClelland, 1838), *G. parastenorhynchus* Thoni *et al.* (2016), *G. quadratirostris* Nebeshwar & Vishwanath (2013), *G. tamangi* Gurumayum & Kosygin (2016) and *G. yajiangensis* Gong *et al.* (2018).

Garra jaldhakaensis sp. nov. can be distinguished from aforementioned sympatric congeners in having a strongly tuberculated unilobed proboscis protruding downward above the transverse groove (vs. incipient proboscis in *G. binduensis*, *G. bimaculacauda*, *G. dengba*, *G. kalpangi*,

Table 1. Morphometric data of holotype and paratypes of *Garra jaldhakaensis* sp. nov.

	Holotype	Range	Mean	SD
Standard Length (in mm)	97.2	95.3–84.3		
% SL				
Body depth	23.0	21.7–24.1	22.8	1.0
Head length	24.7	23.3–24.1	24.0	0.6
Head depth at eye	13.9	13.5–14.8	14.0	0.6
Head depth at occiput	16.7	16.1–17.3	16.6	0.5
Body width at anal-fin origin	8.8	7.7–9.8	8.5	0.6
Body width at dorsal-fin origin	15.9	15.4–17.3	16.3	0.8
Caudal peduncle length	17.5	17.0–15.2	16.3	1.1
Caudal peduncle depth	13.9	11.9–12.7	12.7	0.9
Dorsal-fin base length	17.5	17.5–18.4	18.3	0.9
Dorsal-fin length	24.7	22.2–24.7	23.8	1.2
Pectoral-fin length	21.1	20.2–21.1	20.7	0.4
Pelvic-fin length	20.1	19.6–20.2	19.9	0.3
Anal-fin base length	7.2	7.2–9.2	8.3	0.8
Anal-fin length	20.2	16.8–20.2	18.2	1.4
Predorsal length	47.3	45.5–47.3	46.1	0.9
Prepectoral length	21.6	21.1–21.9	21.6	0.3
Prepelvic length	49.0	49.0–52.2	49.8	1.5
Preanal length	74.1	72.4–76.1	74.1	1.5
Pelvic anal distance	24.7	24.7–26.7	25.7	0.8
% HL				
Snout length	56.3	55.0–58.1	55	1.7
Eye diameter	18.8	16.0–18.8	17.1	1.3
Inter orbital width	40.4	40.4–44.2	42.1	1.7
Gular disc width	45.8	45.8–55.3	50.5	3.9
Gular disc length	34.6	34.6–37.2	35.8	1.3
Pulvinus width	27.1	27.1–30.4	28.7	1.4
Pulvinus length	21.3	20.0–21.3	20.5	0.6

G. langlungensis and *G. magnacavus*; quadrate bilobed or slightly bilobed proboscis in *G. arunachalensis*, *G. biloborostris*, *G. birostris*, *G. gotyla*, *G. motuoensis*, *G. quadratiostris* and *G. yajiangensis*; trilobed proboscis in *G. nasuta*, *G. tamangi* and club-shaped proboscis in *G. clavirostris* and *G. parastenorhynchus*).

Furthermore, the new species can be distinguished from *G. arunachalensis* and *G. binduensis* in the presence (vs. absence) of labellum in the lower lip, more circumpeduncular scales (16 vs. 12) and fewer lateral line

scales (33 vs. 34–37); from *G. biloborostris* in having greater body depth (21.7–24.1% SL vs. 18.9 – 20.6); from *G. bimaculacauda* in having more circumpeduncular scales (16 vs. 12) and absence (vs. presence) of two distinct black spots on the caudal fin; from *G. birostris* in having a smaller eye (16.0–18.3% HL vs. 21–25) and a smaller pulvinus (27.1–30.4 % HL vs. 32–41); from *G. clavirostris* in having a shorter gular disc (34.6–37.2 % HL vs. 50–65) and a slender caudal peduncle (15.2–17.0 % SL vs. 10.1–14.6); from *G. dengba* in having

more circumpeduncular scales (16 vs. 12–14) and more branched dorsal fin rays ($8\frac{1}{2}$ vs. 6); from *G. gotyla* in having shorter inter orbital distance (40.4–44.2% HL vs. 46 – 51) and a smaller pulvinus (27.1–30.4 % HL vs. 30–37); from *G. kalpangi* in presence (vs. absence) of transverse groove at tip of snout and more branched pectoral fin rays (14 vs. 10–12); from *G. langlungensis* in having more branched pectoral fin rays (14 vs. 11–12), more lateral line scales (33 vs. 30–32), predorsal scales (10–11 vs. 8–9), transverse lobe of snout covered with 16–25 medium-to large-sized multicuspid (vs. 8–12 small-sized unicuspid) tubercles and shorter head length (23.3–24.1% SL vs. 24.9–27.9); from *G. magnacavus* in the absence (vs. presence) of 15–19 rounded large pits on the snout and fewer lateral line scales (33 vs. 42) and fewer predorsal scales (10–11 vs. 14–16); from *G. motuoensis* in having more circumpeduncular scales (16 vs. 12), fewer lateral line scales (33 vs. 34–37) and longer head (23.3–24.1 % SL vs. 21.2–23.8); from *G. nasuta* in the absence (vs. presence) of a pit between the nares; from *G. parastenorhynchus* in having a shorter head length (23.3–24.1% SL vs. 28.5–30.7), shorter dorsal fin (22.2 – 24.7 % SL vs. 28.1 – 31.4); from *G. quadratiostris* in having more circumpeduncular scales (16 vs. 12), fewer lateral line scales (33 vs. 34); from *G. tamangi* in having shorter pectoral fin (20.2–21.1 % SL vs. 24.4–26.4) and shorter pelvic fin length (19.6–20.2 % SL vs. 22.2–22.8), and *G. yajiangensis* in having more circumpeduncular scales (16 vs. 12) and fewer lateral line scales (33 vs. 34–37).

The new species is compared with its congeners *G. substrictorostri* Roni & Vishwanath (2018) and *G. paratrilotata* Roni *et al.* (2019) in the Barak River drainage and *G. koladynensis* Nebeshwar & Vishwanath (2017) in the Kaladan River drainage. *Garra jaldhakaensis* can be distinguished vividly from the three species in having a strongly tuberculated unilobed proboscis protruding downward above the transverse groove (vs. club-shaped proboscis in *G. substrictorostri* and trilobed proboscis in *G. paratrilotata* and *G. koladynensis*). It further differs from *G. substrictorostri* in having a shorter proboscis projecting downward above the transverse groove (vs. longer moderately elevated upward), greater eye diameter (16–18.8 % HL vs. 13–16) and shorter gular disc (34.6–37.2 % HL vs. 44–55); from *G. koladynensis* in the absence (vs. presence) of tubercles on depressed rostral surface, and more lateral line scales (33 vs. 30–31) and

from *G. paratrilotata* in having fewer branched pectoral fin rays (14 vs. 15) and shorter head (23.3–24.1 % SL vs. 24.3–25.9).

Garra jaldhakaensis is compared with *G. kangrae* Prashad (1919), *G. montisalsi* Hora (1921) and *G. simbalbaraensis* Rath *et al.* (2019) existing in the Yamuna River drainage and *G. bicornuta* Rao (1920) and *G. stenorhynchus* (Jerdon, 1849) in the Krishna and Cauvery River drainages. It can be distinguished from *G. kangrae* in having a strongly tuberculated unilobed (vs. incipient) proboscis, fewer lateral line scales (33 vs. 34), more branched pectoral fin rays (14 vs. 10–12), fewer pelvic fin rays (7–8 vs. 9); from *G. montisalsi* in having a shorter unilobed (vs. club-shaped) proboscis protruding downward above the transverse groove (vs. longer and strongly projecting upward above the transverse lobe), transverse lobe not overhanging (vs. overhanging) the snout, longer snout (55.0–58.1 % HL vs. 55), greater body depth (21.7–24.1% SL vs. 15.5), and greater head depth (16.1–17.3 % SL vs. 15.8) and from *G. simbalbaraensis* in having more branched pectoral-fin rays (14 vs. 13), dorsal fin positioned much nearer to tip of snout than to caudal-fin base (vs. dorsal fin positioned midway between tip of snout and caudal-fin base), a shorter head length (23.3–24.1% SL vs. 27.1–29.3), longer snout (55.0–58.1% HL vs. 48.0–50.0), shorter predorsal distance (45.5–47.3%SL vs. 48.9–52.5) and prepectoral distance (21.1–21.9 % SL vs. 25–28.4). It differs from *G. stenorhynchus* in having a tuberculated unilobed (vs. quadrate) proboscis protruding downward above the transverse groove (vs. proboscis not extending to transverse groove), more predorsal scales (10–11 vs. 8–9) and fewer lateral line scales (33 vs. 34) and from *G. bicornuta* in having a unilobed (vs. trilobed) proboscis on the snout and presence of two (vs. one) pairs of barbels.

In the Chindwin-Irrawaddy drainage, there are ten valid species of *Garra* having a proboscis and transverse lobe on the snout. *Garra jaldhakaensis* sp. nov. can be differentiated from its congeners present in the Chindwin-Irrawaddy drainage in having a tuberculated proboscis protruding downward above the transverse groove (vs. incipient quadrate proboscis in *G. gravelyi* (Annandale, 1919), *G. litanensis* Vishwanath (1993), *G. qiaojiensis* Wu & Yao (1977) and *G. rotundinasus* Zhang (2006); bilobed proboscis in *G. bispinosa* Zhang (2005), *G. chindwinensis* Premananda *et al.* (2017) and

G. cornigera Shangningam & Vishwanath (2015); trilobed in *G. moyonkhulleni* Moyon & Arunkumar (2018), *G. trilobata* Shangningam & Vishwanath (2015), and *G. surgifrons* Sun *et al.* (2018). Additionally, it can be distinguished in having more circumpeduncular scales (16 vs. 12–14 in *G. chindwinensis*, *G. cornigera*, *G. moyonkhulleni*, *G. qiaojiensis*, *G. rotundinasus* and *G. trilobata*) and fewer lateral line scales (33 vs. 34–37 in *G. chindwinensis*, *G. bispinosa*, *G. moyonkhulleni*, *G. qiaojiensis* and *G. rotundinasus*). Furthermore, it differs from *G. cornigera* and *G. trilobata* in the presence (vs. absence) of labellum in the lower lip; from *G. qiaojiensis* and *G. rotundinasus* in having fewer unbranched dorsal-fin rays (ii vs. iv) and from *G. surgifrons* in having smaller eye (16.0–18.8% HL vs. 23–25). The new species is further differentiated from *G. gravelyi* in having fewer branched pectoral fin rays (14 vs. 15) and more predorsal scales (10–11 vs. 8–9); and from *G. litanensis* in the presence (vs. absence) of scales on the chest and longer head (23.3–24.1% SL vs. 19.8–23.5).

Comparative Materials

- *Garra arunachalensis*: MUMF 4304, holotype, 121.0 mm SL; MUMF 4305/4, 4 paratypes, 93.0–126.0 mm SL; India: Arunachal Pradesh: Lower Divang valley District: Deopani River at Roing.
- *Garra binduensis*: ZSI FF 5623, holotype, 87.2 mm SL, ZSI FF 5624, paratypes, 9 specimens, 60.1–126.5 mm SL, India, west Bengal, Darjeeling District, Jaldhaka River at Bindu.
- *Garra bicornuta*: ZSI F 9828–30/1, 9954/1, 72–73 mm SL; India: Karnataka: Mysore, Tunga River.
- *Garra biloborostris*: ZSI FF 7928, 2, paratypes, 68.6–74.5 mm; India: Assam: Chirang District, Kanamakra River.
- *Garra birostris*: MUMF 4302, holotype, 102.0 mm SL, MUMF 4303/5, paratypes, 40.0–90.0 mm SL; India: Arunachal Pradesh: Papum Pare District at Doimukh, Dikrong River.
- *Garra clavirostris*: ZSI FF 6062, 2, paratypes, 70.6–81.0 mm SL; India: Assam: Dima Hasao District, Diyung River.
- *Garra cornigera*: ZSI FF 5995, 2, paratypes, 72.26–47.48 mm SL; India: Manipur: Ukhrul District, Sanalok River.
- *Garra gotyla*: MUMF 4300, holotype, 104.3 mm SL; MUMF 4301/9, 14 paratypes, 50.5–132.0 mm SL; India, Sikkim, Tista River at Rangpo.
- *Garra gravelyi*: ZSI F 11586/1, 107.5–112.4 mm SL; Myanmar: S. Shan States: Lawksawk Canal at Lwaksawk.
- *Garra kalpangi*: ZSI FF 8278, 54.0–79.0 mm SL; India: Arunachal Pradesh: Noa Dihing River near Deban, Namdapha.
- *Garra kangrae*: ZSI F 9699/1, 4, types, 96.3–109.6 mm SL; India: Punjab: Kangra District, Jaugal Khad.
- *Garra langlungensis*: ZSI FF 7152, holotype, 54.9 mm SL, ZSI FF 8859, 6 paratypes, 54.8–70.2 mm SL, India, Nagaland, Langlung River near Zutovi Village, Dimapur District, Brahmaputra Basin.
- *Garra litanensis*: MUMF 68/1, holotype, 92.5 mm SL; MUMF 69, 5 paratypes, 69.0–74.0 mm SL; India: Manipur: Ukhrul District, Litan stream at Litan.
- *Garra magnacavus*: ZSI FF 6010, holotype, 68.0 mm SL; India: Arunachal Pradesh: Lower Subansiri District, Ranga River, Brahmaputra River drainage.
- *Garra montisalsi*: ZSI F 9953/1, type, 106.7 mm SL; India: Punjab: Nilwan ravine near Shapur salt ranges.
- *Garra quadratiostris*: MUMF 4306, holotype, 108.0 mm SL; MUMF 4307/5, 5 paratypes, 68.8–97.6 mm SL; India: Sikkim: Tista River at Rangpo.
- *Garra simbalbaraensis*: ZSI FF 8003, holotype, 60.8 mm SL; ZSI FF 8004, paratype, 3 exs, 60.6–69.7 mm SL; India: Himachal Pradesh: Sirmaur District, Simbalbara River.
- *Garra stenorhynchus*: ZSI F 9765, 63.1–72.15 mm SL; India: Tamil Nadu: Nilgiris, Bhavani River, Nierolay Stream (Western Ghats).
- *Garra trilobata*: ZSI FF 5994, 2, paratypes, 94.69–117.98 mm SL; India: Manipur: Ukhrul District, Sanalok River.
- *Garra tamangi*: ZSI FF 5453, 2, paratypes, 79.0–100.5 mm SL; India, Arunachal Pradesh, Dikrong River at Hoj.

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References

- Deng, S.Q., Cao, L. and Zhang, E. 2018. *Garra dengba*, a new species of cyprinid fish (Pisces: Teleostei) from eastern Tibet, China. *Zootaxa*, **4476**(1): 94-108. <https://doi.org/10.11646/zootaxa.4476.1.9>. PMID:30313344.
- Gong, Z., Freyhof, J., Wang, J., Liu, M., Liu, F., Lin, P., Jiang Y. and Liu, H. 2018. Two new species of *Garra* (Cypriniformes: Cyprinidae) from the lower Yarlung Tsangpo River drainage in southern Tibet, China. *Zootaxa*, **4532**(3): 367-384. <https://doi.org/10.11646/zootaxa.4532.3.3>. PMID:30647354.
- Kottelat, M. 2001. Fishes of Laos. Wildlife Heritage Trust Publications, Colombo; p. 196.
- Kottelat, M. 2020. *Ceratogarra*, a genus name for *Garra cambodgiensis* and *G. fasciacauda* and comments on the oral and gular soft anatomy in labeonine fishes (Teleostei: Cyprinidae). *Raff Bull Zool*, **35**: 156-178.
- Menon, A.G.K. 1964. Monograph of the cyprinid fishes of the genus *Garra*, Hamilton. *Mem Indian Mus.*, **14**: 173-260.
- Moyon, W.A. and Arunkumar, L. 2018. *Garra moyonkhulleni*, a new labeonine species (Cyprinidae: Labeoninae) from Manipur, Northeastern India. *Intern. J. Fish Aqua. Stud.*, **6**(5): 107-115.
- Nebeshwar, K. and Vishwanath, W. 2013. Three new species of *Garra* (Pisces: Cyprinidae) from north-eastern India and redescription of *G. gotyla*. *Ichthyol. Explor. Freshw.*, **24**(2): 97-120.
- Nebeshwar, K. and Vishwanath, W. 2017. On the snout and oromandibular morphology of genus *Garra*, description of two new species from the Koladyne River basin in Mizoram, India, and redescription of *G. manipurensis* (Teleostei: Cyprinidae). *Ichthyol. Explor. Freshw.*, **28**: 17-53.
- Roni, N. and Vishwanath, W. 2018. A new species of the genus *Garra* (Teleostei: Cyprinidae) from the Barak River drainage, Manipur, India. *Zootaxa*, **4374**(2): 263-272. <https://doi.org/10.11646/zootaxa.4374.2.6>. PMID:29689800.
- Sun, C., Li, X., Zhou, W. and Li, F.L. 2018. A review of *Garra* (Teleostei: Cypriniformes) from two rivers in West Yunnan, China with description of a new species. *Zootaxa*, **4378**(1): 49-47. <https://doi.org/10.11646/zootaxa.4378.1.3>. PMID:29690016.
- Thoni, R.J., Gurung, D.B. and Mayden, R.L. 2016. A review of the genus *Garra* Hamilton 1822 of Bhutan, including the descriptions of two new species and three additional records (Cypriniformes: Cyprinidae). *Zootaxa*, **4169**(1): 115-132. <https://doi.org/10.11646/zootaxa.4169.1.5>. PMID:27701313.
- Zhang, E. 2006. *Garra rotundinasus*, a new species of cyprinid fish (Pisces: Teleostei) from the upper Irrawaddy River basin, China. *Raff. Bull. Zool.*, **54**: 447-453.
- Zhang, E. and Chen, Y.Y. 2002. *Garra tengchongensis*, a new cyprinid species from the upper Irrawaddy River basin in Yunnan, China (Pisces: Teleostei). *Raff Bull. of Zool.*, **50**: 459-464.