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Gurumon gurumayum, a new genus and new species of freshwater crab (Decapoda: Brachyura: Potamidae) from Arunachal Pradesh, northeastern India

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Abstract. A new genus and new species of potamid crab, *Gurumon gurumayum* gen. et sp. nov., are described from the Arunachal Pradesh State of northeastern India. *Gurumon* gen. nov. has affinities with *Abormon* Mitra, Pati & Ng, 2021, *Pararanguna* Dai & Chen, 1985, and some species of *Potamiscus* Alcock, 1909, but the new genus can easily be differentiated from them mainly by its low external orbital angle, the relatively stouter exopod of the third maxilliped, and the relatively broader male pleonal somite 6. Their male first gonopods are also different from each other. Counting *Gurumon gurumayum* gen. et sp. nov., India is currently known for ten genera and 24 species of potamiscine freshwater crabs, and Arunachal Pradesh for eight genera and 11 species of these crabs. The current nomenclatural problems with *Potamiscus* are also discussed.

Keywords. Taxonomy, Crustacea, Potamiscinae, nomenclature, *Potamiscus*.

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Introduction

The potamiscine freshwater crab genus, *Potamiscus* Alcock, 1909 (type species *Potamiscus annandalii* Alcock, 1909, from Nemotha, Cachar, Assam State, India) currently includes 20 species from northeastern India, Myanmar, and China (Ng *et al.* 2008, 2020; Naruse *et al.* 2018; Mitra & Waikhom 2019; Pati 2021). *Potamiscus*, however, is not monophyletic (Shih *et al.* 2009; Chu *et al.* 2017; Zhang *et al.* 2020). The current morphological definition of *Potamiscus* (sensu Naruse *et al.* 2018) is not applicable to all congeners, but the exopod of the third maxilliped in all the species of *Potamiscus* completely lacks a flagellum or possesses a vestigial flagellum. *Potamiscus* was established by Alcock (1909) for the species that does not possess a flagellum on the exopod of the third maxilliped. The absence of flagellum on the third maxilliped exopod alone is currently insufficient to define the genus, and this feature is reliable only when it is used with other features of carapace and male gonopods (Ng *et al.* 2020). For instance, *Quadramon* Yeo & Ng, 2007 (type species *Potamon* (*Potamiscus*) *aborense* Kemp, 1913) completely lacks a flagellum on the third maxilliped exopod like that in *Potamiscus*, but it has already been separated from the latter genus due to the differences in the structure of the carapace and ambulatory legs (Yeo &

Ng 2007). *Potamiscus rangoonensis* (Rathbun, 1904) also has a vestigial flagellum on the exopod of the third maxilliped, but it should be now assigned to *Ranguna* Bott, 1966 (Darren Yeo, unpublished data; also see Ng *et al.* 2020). The absence of a flagellum on the third maxilliped exopod notwithstanding, *Abormon* Mitra, Pati & Ng, 2021 was distinguished from *Potamiscus* s. str. (represented by the type species) and some species of *Potamiscus* s. lat. by the features in the carapace, pereiopods, male thoracic sternites, male pleon and telson, and male first gonopod (Mitra *et al.* 2021).

While the taxonomy of *Potamiscus* needs an urgent revision, Pati (2021) separated the members of the genus into different informal groups based on the structure of the terminal segment of the male first gonopod. One such group of *Potamiscus* included species with the terminal segment of the male first gonopod being stout, cylindrical, relatively long, and lacking a dorsal flap, viz., *Potamiscus loshingensis* (Wu, 1934) and *P. rongjingensis* Dai & Chen in Dai, Chen, Liu, Luo, Yi, Liu, Gu & Liu, 1990 (cf. Wu 1934: fig. 1; Dai *et al.* 1990: fig. 2(5); Dai 1999: figs 103 (5–6), 105 (4–5)). These two species of *Potamiscus* (*Potamiscus loshingensis* and *P. rongjingensis*) have affinities with some specimens of a hitherto unknown genus and species, which were recently collected from the Arunachal Pradesh State in northeastern India. Those specimens also resemble *Abormon* and *Pararanguna* Dai & Chen, 1985, in some features of the cephalothorax, ambulatory legs, male pleon, male telson, male first gonopod and vulvae. The specimens from Arunachal Pradesh can easily be differentiated from them and *Potamiscus* s. str. mainly by the features of the external orbital angle, exopod of the third maxilliped and male pleonal somite 6. Additional differences in the features of carapace, male pleon, male telson, male first gonopod and vulvae further confirm those specimens from Arunachal Pradesh as a new genus and new species, which are described herein as *Gurumon gurumayum* gen. et sp. nov.

Material and methods

The terminologies are after Ng (1988) but with some changes as suggested by Davie *et al.* (2015). The terminologies for female vulvae are adopted from Guinot *et al.* (2013). The measurement methods of the carapace follow Pati *et al.* (2022), whereas the measurements of the female sternum and vulvae follow Pati (2021). The techniques recommended by Montesanto (2015, 2016) and Coleman (2018) were followed for the digital illustrations.

Institutional abbreviations

IZCAS = Institute of Zoology, Chinese Academy of Sciences, Beijing, China
ZRC = Zoological Reference Collection of the Lee Kong Chian Natural History Museum (formerly Raffles Museum of Biodiversity Research), National University of Singapore, Singapore
ZSIK = Crustacea Section, Zoological Survey of India, Kolkata, India
ZSI-WRC = Zoological Survey of India, Western Regional Centre, Pune, India

Abbreviations for morphological terms

CH = height of carapace
CL = length of carapace
CW = width of carapace
FW = width of front
G1 = male first gonopod
G2 = male second gonopod
P2–P5 = pereiopods 2–5, respectively
s1–s8 = thoracic sternites 1–8, respectively
s2/s3 = suture between thoracic sternites 2 and 3
s3/s4 = suture between thoracic sternites 3 and 4

s4/s5 = suture between thoracic sternites 4 and 5
s5/s6 = suture between thoracic sternites 5 and 6
s6/s7 = suture between thoracic sternites 6 and 7
s7/s8 = suture between thoracic sternites 7 and 8
SW = maximum width of sternum
VD = closest distance between female vulvae

Results

Taxonomy

Phylum Arthropoda von Siebold, 1848
Subphylum Crustacea Brünnich, 1772
Class Malacostraca Latreille, 1802
Order Decapoda Latreille, 1802
Infraorder Brachyura Latreille, 1802
Superfamily Potamoidea Ortmann, 1896
Family Potamidae Ortmann, 1896
Subfamily Potamiscinae Bott, 1970 (sensu Yeo & Ng 2004)

Genus ***Gurumon*** gen. nov.
urn:lsid:zoobank.org:act:BCA0A03D-DC25-440D-B62E-51F2D7AA753C
Figs 1–4

Type species

Gurumon gurumayum sp. nov., by present designation; gender neuter.

Diagnosis

Small adult size (adult CW < 15 mm). Carapace transversely ovate; dorsal surface generally smooth, glabrous, conspicuously arched; epigastric cristae low, visible as 2 broad protuberances; postorbital cristae indiscernible; external orbital angle indistinct, low; epibranchial tooth very low; cervical grooves barely visible (Figs 1A–B, 2A, E, H, 3A). Epistome posterior margin with well-developed, triangular medial tooth (Fig. 1B). Antennules short, folded in longitudinally broad fossae; antennae vestigial (Fig. 1B). Mandibular palp 3 segmented; terminal segment simple, undivided (Fig. 2B). First, second maxillipeds each with short flagellum on exopod; third maxilliped exopod relatively stout, tapered, reaching beyond anterolateral angle of ischium, completely lacking flagellum (Figs 1B–C, 3B). Chelipeds smooth, glabrous (Figs 1A, C, 2A, E, H). Ambulatory legs glabrous, slender; merus (P2–P5) elongated (Figs 1A, C, 2A, E, H). Male s2/s3 deep, reaching lateral margins; s3/s4 indiscernible; s7/s8 lacking transverse ridge (Figs 1C, 2C–D, 3C). Male pleon broad, with distinctly broader pleonal somite 6 (Figs 1C, 3C–D). Male telson tongue-shaped, with concave lateral margins (Figs 1C, 3C–D). G1 stout, long; flexible zone small; terminal segment stout, cylindrical, long, ca 0.6 × combined length of flexible zone and subterminal segment, curved outwards, dorsal flap absent; subterminal segment stout (Figs 2C, 3E, 4A–B). G2 longer than G1; distal segment long, ca 0.4 × as long as basal segment (Figs 2C, 3F, 4C). Vulvae on S6 located apart from each other (VD/SW = ca 0.25), open mesially, subovate, large (Fig. 2G).

Etymology

The genus is named in the honour of Dr Shantabala Devi Gurumayum for her extensive work in aquatic biology, in arbitrary combination with the genus name *Potamon* Savigny, 1816. The gender of the generic name is neuter.

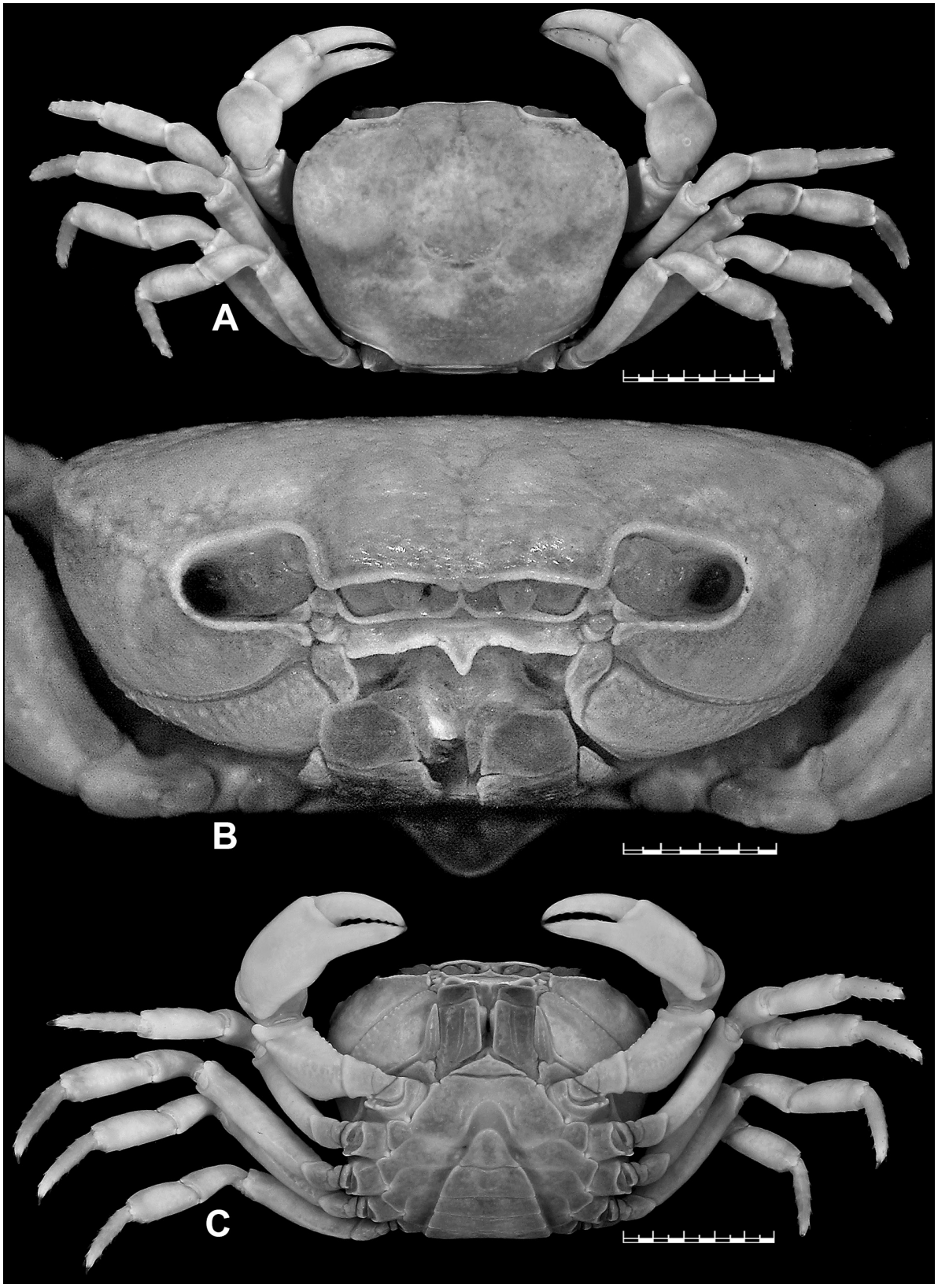

Fig. 1. *Gurumon gurumayum* gen. et sp. nov., holotype (ZSI-WRC C.2170), ♂ (CW 10.9 × CL 8.8 mm). **A**. Entire animal, dorsal view. **B**. Cephalothorax, frontal view. **C**. Entire animal, ventral view. Scale bars: A, C = 5 mm; B = 2 mm.

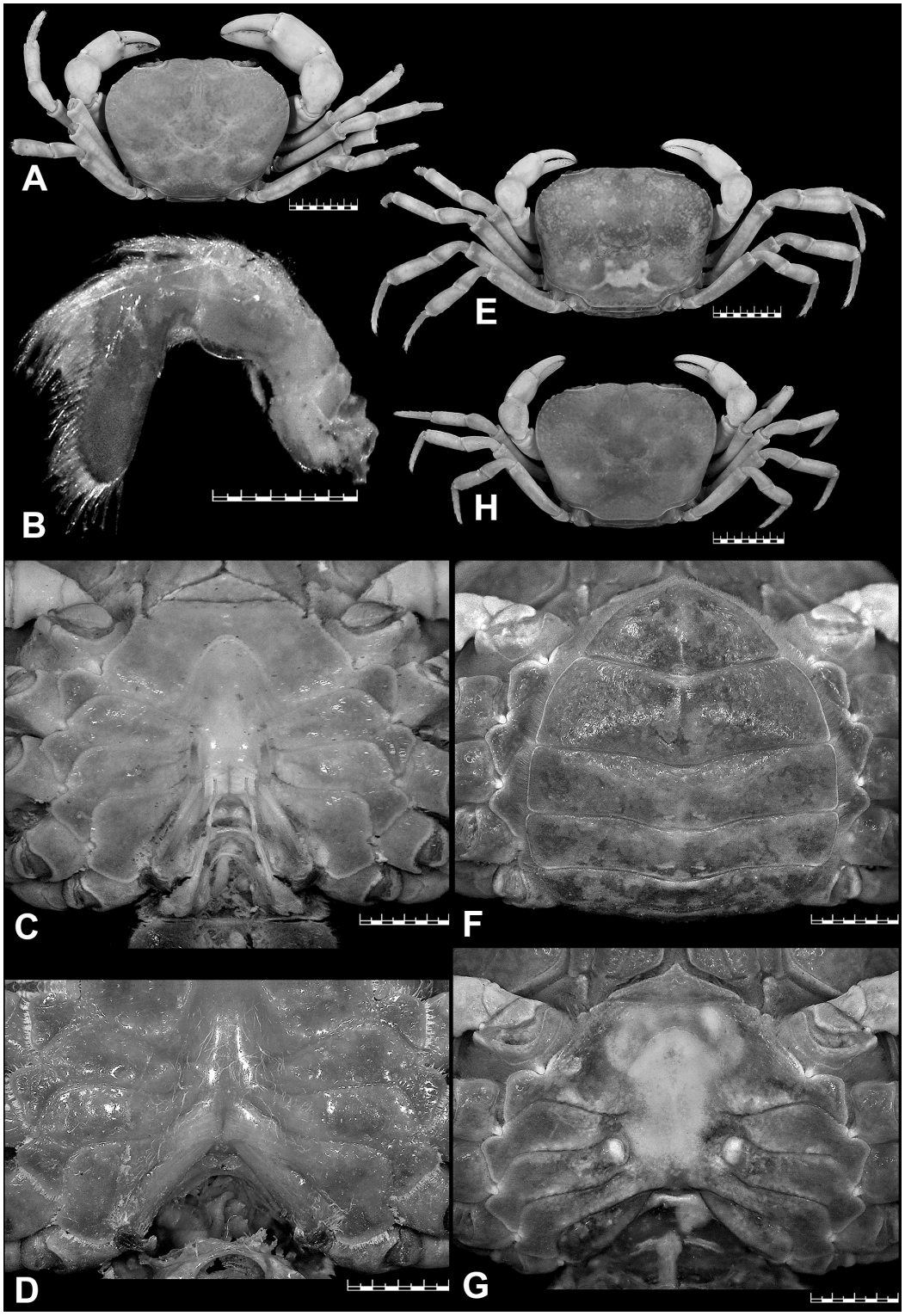

Fig. 2. *Gurumon gurumayum* gen. et sp. nov. **A**–**D**. Paratype (ZSI-WRC C.2171), ♂ (CW 13.3 × CL 9.9 mm). **E**–**G**. Paratype (ZSI-WRC C.2171), ♀ (CW 12.7 × CL 10.0 mm). **C**. Paratype (ZSI-WRC C.2172), ♀ (CW 12.6 × CL 9.5 mm). **A**, **E**, **H**. Entire animal, dorsal view. **B**. Mandibular palp, dorsal view. **C**. Thoracic sternites with G1 and G2 in situ. **D**. Posterior thoracic sternites (s5–s8). **F**. Pleonal somites 3–6 and telson. **G**. Thoracic sternites showing vulvae. Scale bars: A, E, H = 5 mm; C–D, F–G = 2 mm; B = 0.5 mm.

Comparative material

Abormon capillosum Mitra, Pati & Ng, 2021

Material examined

Holotype

INDIA – **Arunachal Pradesh State** • ♂, CW 10.2 mm, CL 8.5 mm; Upper Siang District: Tulung Village, near Tutting, Abor Hills; 29.006° N, 94.897° E; alt. 1240 m; 5 Nov. 2019; S. Mitra leg.; ZSIK C.8610/2.

Paratype

INDIA – **Arunachal Pradesh State** • 1 ♀, CW 14.5 mm, CL 11.8 mm; same collection data as for holotype; ZSIK C.8612/2.

Abormon praecalvum Mitra, Pati & Ng, 2021

Material examined

Holotype

INDIA – **Arunachal Pradesh State** • ♂, CW 12.9 mm, CL 10.5 mm; Upper Siang District: Dambung Stream, approximately 1.7 km from Hawa Camp, Mouling National Park, Abor Hills; 28.686° N, 94.969° E; alt. 406 m; 28 Oct. 2017; G. Maheswaran *et al.* leg.; ZSI-WRC C.1941.

Paratype

INDIA – **Arunachal Pradesh State** • 1 ♀, CW 14.5 mm, CL 11.5 mm; Upper Siang District: Ramsing Guest House, Mouling National Park, Abor Hills; 28.656° N, 94.976° E; alt. 601 m; 26 Oct. 2017; G. Maheswaran *et al.* leg.; ZSI-WRC C.1942.

Pararanguna hemicyclia Naruse, Chia & Zhou, 2018

Material examined

Paratype

CHINA – **Yunnan Province** • 1 ♂, CW 14.0 mm, CL 11.9 mm; Fengqing County: Dashan Village, Xueshan Town; [24.466° N, 99.780° E]; 1 Feb. 2004; Yang Zheng Bing leg.; ZRC 2013.0559.

Pararanguna semilunata (Dai & Chen, 1985)

Material examined

Holotype

CHINA – **Yunnan Province** • ♂; Xi Yi Village, Baoshan; [24.928° N, 99.323° E]; 13 Oct. 1981; A.Y. Dai and G.X. Chen leg.; IZCAS CB05191.

Paratypes

CHINA – **Yunnan Province** • 1 ♀; same collection data as for holotype; IZCAS CB05191 • 1 ♂, CW 21.8 mm, CL 17.3 mm; same collection data as for holotype; ZRC 2020.0085 • 1 ♀, CW 20.2 mm, CL 16.6 mm; same collection data as for holotype; ZRC 2020.0085.

Potamiscus annandali (Alcock, 1909)

Material examined

Lectotype

INDIA – **Assam State** • ♂, CW 33.0 mm, CL 25.0 mm; Cachar District: Nemotha; [25.029° N, 92.948° E]; J. Wood-Mason leg.; ZSIK 6602-3/9.

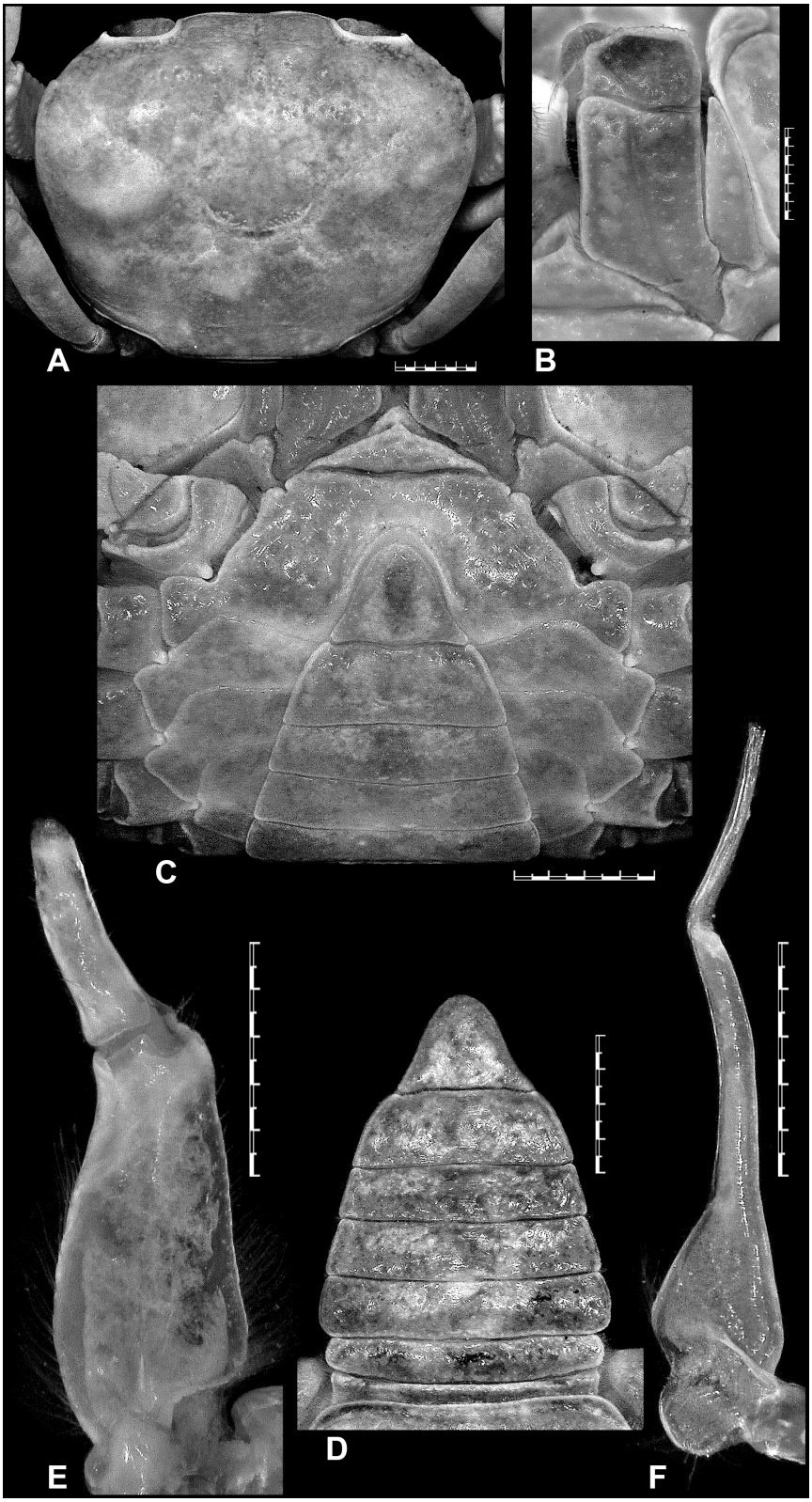

Fig. 3. *Gurumon gurumayum* gen. et sp. nov., holotype (ZSI-WRC C.2170), ♂ (CW 10.9 × CL 8.8 mm). **A**. Cephalothorax, dorsal view. **B**. Third maxilliped (left). **C**. Thoracic sternites (s1–s7), pleonal somites 3–6 and telson. **D**. Pleon and telson. **E**. G1 (left), dorsal view. **F**. G2 (left). Scale bars: A, C–D = 2 mm; B, E–F = 1 mm.

Remarks

Gurumon gen. nov. certainely belongs to Potamiscinae (sensu Yeo & Ng 2004) because the transverse ridge on s7/s8 is absent (Fig. 2C–D). The medial portion of the s8, however, is conspicuously narrow so that the longitudinal medial groove is indiscernible (Fig. 2C–D). The indistinct, low external orbital angle (Figs 1A, 2A, E, H, 3A), the relatively stouter exopod of the third maxilliped (Figs 1C, 3B), and the relatively broader male pleonal somite 6 (proximal width ca 3 × the medial length) (Figs 1C, 3C–D) are characteristic to *Gurumon* gen. nov. by which it can be distinguished from the morphologically related

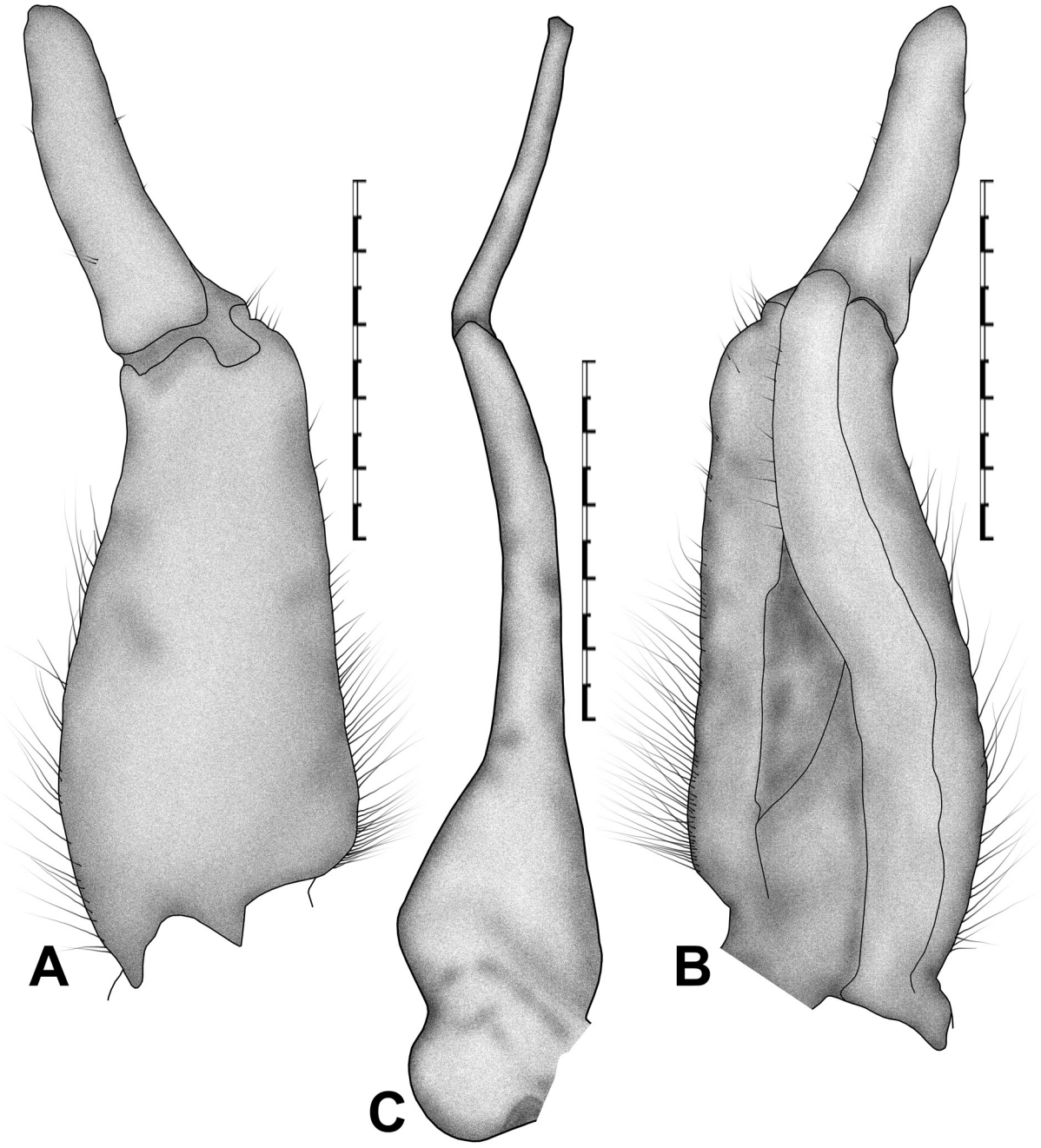

Fig. 4. *Gurumon gurumayum* gen. et sp. nov., holotype (ZSI-WRC C.2170), ♂ (CW 10.9 × CL 8.8 mm). **A**. G1 (left), dorsal view. **B**. G1 (left), ventral view. **C**. G2 (left). Scale bars = 1 mm.

Potamiscus loshingensis, *Potamiscus rongjingensis*, *Abormon*, and *Pararanguna*. The external orbital angle is distinct and triangular, the exopod of the third maxilliped is relatively slenderer, and the male pleonal somite 6 is relatively narrower (proximal width ca 2.0–2.5 × the medial length) in *Potamiscus loshingensis*, *Potamiscus rongjingensis*, *Abormon*, and *Pararanguna* (see Wu 1934: fig. 1; Dai *et al.* 1990: pl. 1 fig. 2, fig. 2 (1, 8); Dai 1999: pl. 25 fig. 1, fig. 200 (1–2); Naruse *et al.* 2018: figs 20a, 21; Mitra *et al.* 2021: figs 2a–b, e, 6a–b, e).

In carapace morphology, *Gurumon* gen. nov. most resembles *Abormon* in that both genera have a transversely ovate carapace, the low epigastric cristae, the indiscernible postorbital cristae, a very low epibranchial tooth, barely visible cervical grooves, the deep s2/s3, a broad male pleon, and a tongue-shaped male telson with the lateral margins concave (Figs 1A–C, 2A, C, E, H, 3A, C–D; see Mitra *et al.* 2021: figs 1a–c, 2a, d–e, 4a, 5a–c, 6a, d–e, 8a). In addition to the character states of the external orbital angle, third maxilliped exopod and male pleonal somite 6, *Gurumon* gen. nov. can be separated from *Abormon* by the relatively small flexible zone of the G1 (Figs 3E, 4A) (vs G1 flexible zone relatively large; see Mitra *et al.* 2021: figs 3a–b, 7a–b), the cylindrical G1 terminal segment with the dorsal flap absent (Figs 3E, 4A–B) (vs G1 terminal segment conical with the dorsal flap distinct but low; see Mitra *et al.* 2021: figs 3a–c, 7a–c), and the mesially open, subovate and relatively large vulvae (Fig. 2G) (vs vulvae anteriorly open, transversely ovate and relatively small; see Mitra *et al.* 2021: figs 4c, 8c). Although both genera are known from the mountains of the Arunachal Pradesh State (Fig. 5), *Gurumon* gen. nov. seems to be restricted to the elevated areas (2473–2513 m altitude), while *Abormon* dwells at relatively lower altitude (406–1240 m) (Mitra *et al.* 2021).

In G1 structure, *Gurumon* gen. nov. is quite similar to *Potamiscus loshingensis* and *P. rongjingensis* because all possess a stout G1 with the terminal segment being cylindrical, relatively long (ca 0.5–0.6 × the combined length of the flexible zone and the subterminal segment) and lacking a dorsal flap (Figs 3E, 4A–B; see Wu 1934: fig. 1; Dai *et al.* 1990: fig. 2(5); Dai 1999: figs 103 (5–6), 105 (4–5)). Despite their similar G1s, *Gurumon* gen. nov. differs from *Potamiscus loshingensis* and *P. rongjingensis* by the relatively small flexible zone of the G1 (Figs 3E, 4A) (vs G1 flexible zone relatively large; see Dai *et al.* 1990: fig. 2(5); Dai 1999: fig. 103 (5–6)), and the relatively less stout G1 terminal segment (Figs 3E, 4A, B) (vs G1 terminal segment relatively stouter; see Wu 1934: fig. 1; Dai *et al.* 1990: fig. 2(5); Dai 1999: figs 103 (5–6), 105 (4–5)). Other features of carapace, including those of the external orbital angle, third maxilliped exopod and male pleonal somite 6, however, confirm their separation. For instance, the epigastric cristae are low in *Gurumon* gen. nov. (Figs 1A, 2A, E, H, 3A) (vs epigastric cristae well-developed in *Potamiscus loshingensis* and *P. rongjingensis*; see Wu 1934: fig. 1; Dai *et al.* 1990: pl. 1 fig. 2); the postorbital cristae are indiscernible in *Gurumon* gen. nov. (Figs 1A, 2A, E, H, 3A) (vs postorbital cristae relatively distinct in *Potamiscus loshingensis* and *P. rongjingensis*; see Wu 1934: fig. 1; Dai *et al.* 1990: pl. 1 fig. 2); the external orbital angle is indistinct, low in *Gurumon* gen. nov. (Figs 1A, 2A, E, H, 3A) (vs external orbital angle distinct, triangular in *Potamiscus loshingensis* and *P. rongjingensis*; see Wu 1934: fig. 1; Dai *et al.* 1990: pl. 1 fig. 2); the epibranchial tooth is very low in *Gurumon* gen. nov. (Figs 1A, 2A, E, H, 3A) (vs epibranchial tooth relatively distinct in *Potamiscus loshingensis* and *P. rongjingensis*; see Wu 1934: fig. 1; Dai *et al.* 1990: pl. 1 fig. 2); the exopod of the third maxilliped is relatively stouter in *Gurumon* gen. nov. (Figs 1C, 3B) (vs third maxilliped exopod relatively slenderer in *Potamiscus loshingensis* and *P. rongjingensis*; see Wu 1934: fig. 1; Dai *et al.* 1990: fig. 2 (1)); and the male pleon is relatively stouter, with the pleonal somite 6 broad, proximal width ca 3 × the medial length in *Gurumon* gen. nov. (Figs 1C, 3C–D) (vs male pleon relatively slenderer, with the pleonal somite 6 narrow, proximal width ca 2.0–2.1 × the medial length in *Potamiscus loshingensis* and *P. rongjingensis*; see Wu 1934: fig. 1; Dai *et al.* 1990: fig. 2 (8)). While the structure of the vulvae is not known in *Potamiscus rongjingensis*, *P. loshingensis* possesses the transversely ovate vulvae, which are close to each other (VD/SW = ca 0.1) (see Dai 1999: fig. 103 (9)) against the subovate and relatively widely located vulvae (VD/SW = ca 0.25) of *Gurumon* gen. nov. (Fig. 2G). *Gurumon*

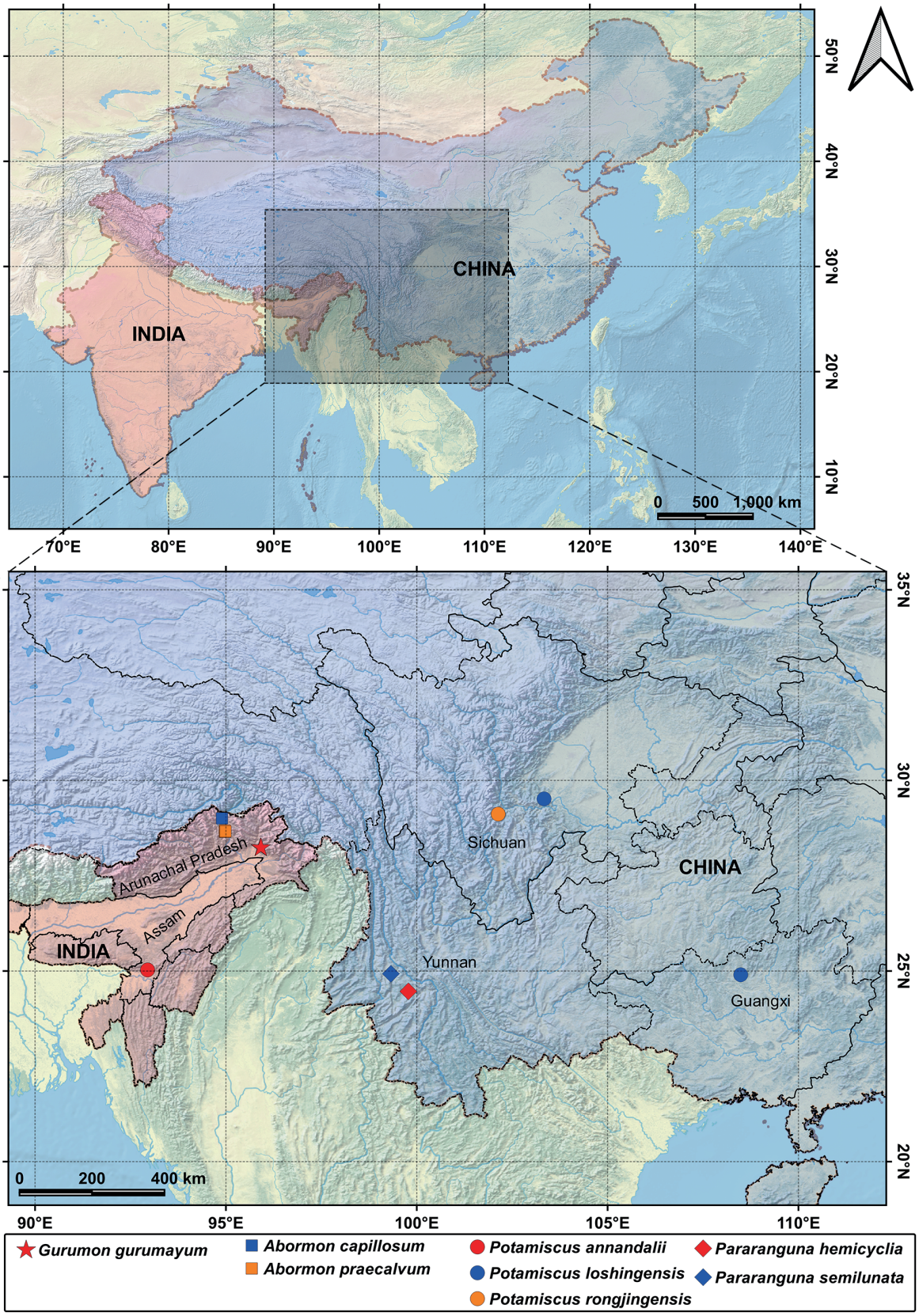

Fig. 5. Map showing India, China and distribution of the species of *Gurumon* gen. nov., *Abormon* Mitra, Pati & Ng, 2021, *Pararanguna* Dai & Chen, 1985, and *Potamiscus* Alcock, 1909.

gen. nov. is found in the Arunachal Pradesh State of northeastern India, while *Potamiscus loshingensis* and *P. rongjingensis* are known only from Guangxi and/or Sichuan provinces of China (Wu 1934; Dai *et al.* 1990; Dai 1999) (Fig. 5). The disjunct geographical distributions with several mountain barriers further corroborate their separation.

Gurumon gen. nov. need not to be confused with *Potamiscus* s. str. (represented by the type species) because the new genus possesses the following characters in contrast to those of *Potamiscus* s. str.: the low epigastric cristae (Figs 1A, 2A, E, H, 3A) (vs epigastric cristae well-developed; see Yeo & Ng 2007: fig. 11a); the indiscernible postorbital cristae (Figs 1A, 2A, E, H, 3A) (vs postorbital cristae distinct, reaching each epibranchial tooth; see Yeo & Ng 2007: fig. 11a); the indistinct, low external orbital angle (Figs 1A, 2A, E, H, 3A) (vs external orbital angle distinct, triangular; see Yeo & Ng 2007: fig. 11a); the very low epibranchial tooth (Figs 1A, 2A, E, H, 3A) (vs epibranchial tooth distinct; see Yeo & Ng 2007: fig. 11a); the relatively stouter exopod of the third maxilliped (Figs 1C, 3B) (vs third maxilliped exopod relatively slenderer; see Alcock 1910: pl. III fig. 10b); the relatively stouter male pleon, with a relatively broad pleonal somite 6, proximal width ca 3 × the medial length (Figs 1C, 3C–D) (vs male pleon relatively slenderer, with a relatively narrow pleonal somite 6, proximal width ca 2.5 × the medial length; see Bott 1970: pl. 46 fig. 26); the tongue-shaped male telson, with the lateral margins concave (Figs 1C, 3C–D) (vs male telson triangular, with the straight lateral margins; see Bott 1970: pl. 46 fig. 26); and the relatively stouter and longer G1 (tip reaching up to s4/s5 in situ), with a cylindrical, less strongly curved and long terminal segment, measuring ca 0.6 × the combined length of the flexible zone and the subterminal segment (Figs 2C, 3E, 4A–B) (vs G1 relatively slenderer and shorter (tip reaching slightly beyond s5/s6 up to the proximal third of s5 in situ), with a conical, strongly bent and short terminal segment, ca 0.2 × the combined length of the flexible zone and the subterminal segment; see Bott 1970: pl. 38 fig. 28; unpublished data). Moreover, *Potamiscus* s. str. was originated from the hills of lower Assam (Alcock 1909), which is some 460 km away from the known range of *Gurumon* gen. nov. (Fig. 5).

As mentioned earlier, *Gurumon* gen. nov. is immediately distinguished from *Pararanguna* by the shapes of external orbital angle, third maxilliped exopod and male pleonal somite 6. The additional differences include the very low epibranchial tooth (Figs 1A, 2A, E, H, 3A), the distinctly concave lateral margins of the male telson (Figs 1C, 3C–D), the relatively small flexible zone of the G1 (Figs 3E, 4A), and the cylindrical G1 terminal segment that lacks a dorsal flap (Figs 3E, 4A–B) in *Gurumon* gen. nov. against the distinct epibranchial tooth (see Dai 1999: pl. 25 fig. 1; Naruse *et al.* 2018: fig. 20a), the almost straight lateral margins of the male telson (see Dai 1999: fig. 200 (2); Naruse *et al.* 2018: fig. 21), the relatively large flexible zone of the G1 (see Dai 1999: fig. 200 (5); Naruse *et al.* 2018: fig. 22b), and the conical G1 terminal segment with a distinct dorsal flap (see Dai 1999: fig. 200 (4–5); Naruse *et al.* 2018: fig. 22a–b) in *Pararanguna*. *Pararanguna* is known only from the Yunnan Province of southwestern China (Dai 1999; Naruse *et al.* 2018) (Fig. 5). The elevated mountains with deep valleys between Yunnan and Arunachal Pradesh justify the separation of *Gurumon* gen. nov. from *Pararanguna*.

Geographical distribution

Gurumon gen. nov. is currently known only from the Mehao Wildlife Sanctuary in the Lower Dibang Valley District of Arunachal Pradesh State, northeastern India (Fig. 5).

Gurumon gurumayum sp. nov.
urn:lsid:zoobank.org:act:766FC0A2-3E63-4089-9949-CD72800E492F
Figs 1–4, 6

Diagnosis

As for new genus.

Etymology

The species epithet is the family name of Dr Shantabala Devi Gurumayum, an Indian zoologist who kindly collected and provided the crab specimens for the present study. The species name is treated here as a Latin noun in apposition.

Material examined

Holotype

INDIA – **Arunachal Pradesh State** • ♂, adult, CW 10.9 mm, CL 8.8 mm, CH 4.7 mm, FW 3.9 mm; Lower Dibang Valley District: Mayodia, Mehao Wildlife Sanctuary; 28.233° N, 95.909° E; alt. 2473 m; 17 Oct. 2015; S.D. Gurumayum leg.; ZSI-WRC C.2170.

Paratypes

INDIA – **Arunachal Pradesh State** • 1 ♂, adult, CW 13.3 mm, CL 9.9 mm, CH 5.6 mm, FW 4.6 mm; same collection data as for holotype; ZSI-WRC C.2171 • 1 ♀, adult, CW 12.7 mm, CL 10.0 mm, CH 5.9 mm, FW 4.4 mm; same collection data as for preceding; ZSI-WRC C.2171 • 1 ♀, adult, CW 13.1 mm, CL 9.9 mm, CH 5.6 mm, FW 4.2 mm; same collection data as for preceding; ZSI-WRC C.2172 • 1 ♀, adult, CW 12.6 mm, CL 9.5 mm, CH 5.7 mm, FW 4.0 mm; same collection data as for preceding; ZSI-WRC C.2172.

Additional material

INDIA – **Arunachal Pradesh State** • 3 ♂♂, 4 ♀♀; Lower Dibang Valley District: near Mayodia Inspection Bungalow, Mehao Wildlife Sanctuary; 28.235° N, 95.917° E; alt. 2513 m; 5 Sep. 2016; S.D. Gurumayum leg.; ZSI-WRC C.2173.

Description of male holotype

Carapace transversely ovate, broader than long (CW/CL = 1.2), low (CH/CW = 0.4); dorsal surface generally smooth, glabrous, conspicuously arched; anterolateral surface gently inflated in frontal view; anterolateral margins almost straight, subcristate, shorter than posterolateral margins; posterolateral margins converging posteriorly, almost straight medially; front broad (FW/CW = 0.3), strongly deflexed anteriorly, almost rectangular, anterior margin smooth, cristate, gently concave medially in dorsal view; epigastric cristae low, visible as 2 broad, rugose protuberances; postorbital cristae indiscernible; external orbital angle indistinct, low; epibranchial tooth very low, with very small cleft; postorbital region gently concave; branchial regions inflated; cervical grooves very shallow, narrow; mesogastric groove moderately deep, narrow, long, bifurcated posteriorly; H-shaped groove distinct; subhepatic region smooth, glabrous; suborbital region smooth, glabrous; pterygostomial region generally smooth, glabrous; supraorbital margin cristate, smooth, straight; suborbital margin cristate with low granules, almost straight on mesial half, curved upwards on lateral half, continuous with supraorbital margin; frontal medial triangle incomplete, with dorsal margin only, lateral margins indiscernible (Figs 1A–C, 3A). Epistome posterior margin with well-developed, narrowly triangular medial tooth and gently sinuous lateral margins (Fig. 1B).

Eyes occupying most of orbital space; eyestalk short, stout; cornea moderately large, pigmented (Fig. 1B).

Antennules short, folded in longitudinally broad fossae; antennae vestigial (Fig. 1B). Mandibular palp 3 segmented; terminal segment simple, undivided. First, second maxillipeds each with short flagellum

on exopod. Third maxillipeds cover most of buccal cavity when closed; ischium subrectangular, longer than broad, with deep, oblique medial groove; merus subpentagonal, broader than long, sunken; exopod stout, tapered, reaching beyond anterolateral angle of ischium, completely lacking flagellum (Figs 1B–C, 3B).

Chelipeds smooth, glabrous, unequal, right chela larger (Fig. 1A, C). Major chela with 5 low, blunt teeth on each finger, distinct gape when fingers closed; dactylus gently curved, moderately stout, shorter than palm, smooth; palm longer than high, smooth; carpus smooth, gently inflated, with low, blunt inner distal tooth; merus smooth, lacking subterminal spine (Fig. 1A, C).

Ambulatory legs generally smooth, glabrous, slender, short, P3 longest; merus (P2–P5) elongated, lacking subdistal spine; dactylus (P2–P5) gently recurved, slightly longer than propodus, with distinct, sharp chitinous spines on margins (Fig. 1A, C).

Thoracic sternites punctate, glabrous; s1 and s2 completely fused; s2/s3 prominent, deep, narrow, gently sinuous, reaching lateral margins; s3/s4 indiscernible; s4/s5, s5/s6, s6/s7 shallow, narrow, indiscernible towards sternopleonal cavity; s7/s8 shallow, narrow, medially interrupted by longitudinal groove of s7, lacking transverse ridge; s8 completely covered by pleon, narrowed medially, longitudinal medial groove indiscernible (Figs 1C, 3C). Pleonal locking mechanism with prominent tubercle on submedial part of s5. Sternopleonal cavity deep, long, reaching to imaginary line joining submedial part of cheliped coxae (Figs 1C, 3C).

Pleon broad, triangular; pleonal somites 1–2 almost rectangular, narrower than pleonal somite 3; pleonal somite 3 subrectangular, broadest; pleonal somites 4–5 trapezoidal; pleonal somite 6 trapezoidal, distinctly broader than long (proximal width ca 3 × medial length), slightly longer than preceding pleonal somites, shorter than telson, with convex lateral margins (Figs 1C, 3C–D). Telson tongue-shaped, broader than long (proximal width ca 1.5 × medial length), with concave lateral margins, apex broad, rounded (Figs 1C, 3C–D).

G1 stout, long, tip reaching up to s4/s5 in situ; flexible zone small; terminal segment stout, cylindrical, long, ca 0.6 × combined length of flexible zone and subterminal segment, curved outwards at angle of about 30° from longitudinal axis, distal half gently upcurved, tip broad, blunt, dorsal flap absent; subterminal segment almost straight, stout, broad at base, relatively narrow distally, outer margin sinuous, inner margin almost straight; groove for G2 median (Figs 3E, 4A–B). G2 slightly longer than G1, ca 1.1 × as long as G1; distal segment gently curved, cylindrical, long, ca 0.4 × as long as basal segment, with blunt tip; basal segment stout at proximal third, appearing narrowly ovate (Figs 3F, 4C).

Remarks

The male paratype (ZSI-WRC C.2171) of *Gurumon gurumayum* sp. nov. is an adult and slightly larger in size than the male holotype. The male paratype shares most of the morphological features with the holotype except for its relatively broader carapace, CW/CL = 1.3 (Fig. 2A) (vs carapace relatively less broad, CW/CL = 1.2 in the holotype; Figs 1A, 3A) and the straight s2/s3 (Fig. 2C) (vs s2/s3 gently sinuous in the holotype; Figs 1C, 3C).

The female paratypes (ZSI-WRC C.2171, 2172) of *Gurumon gurumayum* sp. nov. are adults and slightly larger than the male holotype. All the female paratypes possess most of the non-sexual character states as those in the male holotype. Their carapace, however, is relatively broader, CW/CL = 1.3 (Fig. 2E, H) like that of the male paratype. All the female paratypes have subequal chelipeds (Fig. 2E, H) unlike the unequal chelipeds of the holotype and paratype males (Figs 1A, C, 2A). The pleonal somites and telson of the female paratypes are ovate in shape, which cover the thoracic sternum except for lateral edges

when closed (Fig. 2F). Their pleonal somite 1 is the shortest; pleonal somites 2–5 are progressively longer; and pleonal somite 6 is the longest, much broader than long, subequal in length to the telson, with the convex lateral margins (Fig. 2F). The telson in the female paratypes is broadly triangular, much broader than long, with convex lateral margins and narrow apex (Fig. 2F). The vulvae in female paratypes are located apart from each other (VD/SW = ca 0.25) on s6, each opens mesially, subovate, large, occupying three-quarters the length of s6, touching but not pushing s5/s6 anteriorly, and covered by soft membranous operculum (Fig. 2G).

Colour in life

The cephalothorax is dark purple; the chelipeds are generally reddish brown with dark purplish-brown upper surface; and the ambulatory legs are light brown with dark purple blotches (Fig. 6).

Fig. 6. *Gurumon gurumayum* gen. et sp. nov., paratype (ZSI-WRC C.2171), ♂ (CW 13.3 × CL 9.9 mm), colour in life.

Ecological notes

Gurumon gurumayum sp. nov. was found among the moss-covered stones in the shallow (ca 10 cm deep) and slow-flowing brooks of the subalpine forests of Mayodia during September and October. Located within the Mehao Wildlife Sanctuary, Mayodia is situated in the Mayu hills of the Lower Dibang Valley District of Arunachal Pradesh, which is about 56 km from the district headquarters at Roing. The new species is known to dwell at 2473–2513 m altitude and seems restricted to the high mountains. These crabs are very unlikely to be found during the winter season (Nov.–Feb.) as Mayodia experiences snowfall. Their activities, however, resume during the summer (Mar.–Jun.) (S.D. Gurumayum, personal communication).

Geographical distribution

Gurumon gurumayum sp. nov. is currently known only from two adjacent localities of the Mehao Wildlife Sanctuary in the Lower Dibang Valley District of Arunachal Pradesh State, northeastern India (Fig. 5).

Discussion

With the discovery of the present new genus and species, India is now known to have 10 genera and 24 species of potamiscine crabs (cf. Mitra *et al.* 2018, 2020, 2021; Pati & Thackeray 2018; Mitra & Waikhom 2019; Pati *et al.* 2020a, 2020b; Mitra & Pati 2021; Pati 2021; present study). The remaining four genera and 19 species of potamid crabs in India belong to Potaminae Ortmann, 1896 (cf. Pati & Thackeray 2018; Pati *et al.* 2019; Mitra 2019). The state of Arunachal Pradesh in northeastern India currently possesses eight genera and 11 species of potamiscine crabs, four genera and five species of potamine crabs, and four genera and four species of gecarcinucid crabs (cf. Mitra *et al.* 2018, 2021; Pati & Thackeray 2018; Pati *et al.* 2019; Mitra 2020; Mitra & Pati 2021; present study).

Some nomenclatural uncertainties with *Potamiscus* and its type species have been noted recently (Peter Ng, personal communication), which are addressed here. Alcock first described the taxon as "*Potamiscus*, gen. nov." (Alcock 1909: 246), and on the same page, he described only one new species in it: "*Potamiscus annandalii*, sp. nov." (Alcock 1909: 246). In his discussion on the various taxa later in the same paper, however, he stated that "The Potamonidae of the Indian fauna are included in three principal genera, *Potamon*, *Paratelphusa*, and *Gecarcinucus*" (Alcock, 1909: 249), and he also noted that *Potamon* can be split into four subgenera, including *Potamiscus* (see Alcock, 1909: 249). For nomenclatural purpose, the genus should be treated, as it was first described, i.e., *Potamiscus*, with the type species as *Potamiscus annandalii* Alcock, 1909, not as *Potamon* (*Potamiscus*) *annandalii* Alcock, 1909. The type species was fixed by monotypy as the genus was established for a single species (see article 68.3 of the International Code of Zoological Nomenclature; ICZN 1999). The species-group name of *Potamiscus annandalii* is based upon a personal name in the genitive case, and the correct original spelling ends with a double 'ii' (Alcock 1909: 246). The use of the genitive ending '-i' in the subsequent spelling of the species-group name by Bott (1970: 158) and Ng *et al.* (2008: 165) is deemed to be an incorrect subsequent spelling (see article 33.4 of the International Code of Zoological Nomenclature; ICZN 1999).

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