

A Revision of the Freshwater Crab Genus *Hainanpotamon* Dai, 1995 (Crustacea: Decapoda: Brachyura: Potamidae: Potamiscinae), with a Redescription of *Potamon* (*Potamon*) *orientale* (Parisi, 1916) and Descriptions of Three New Species

Darren C. J. Yeo and Tohru Naruse*

Department of Biological Sciences, National University of Singapore,
14 Science Drive 4, Singapore 117543, Republic of Singapore

The taxonomy of the potamid genus *Hainanpotamon* Dai, 1995, from Vietnam, Laos, Hainan Island (China) and, purportedly, Okinawa Island (Japan) is reviewed. The type species, *Potamon* (*Potamon*) *orientale* (Parisi, 1916), is redescribed and a lectotype designated. In addition, three new species are described. The poorly known species *Potamon* (*Geothelphusa*) *globosum* Parisi, 1916, is assigned to *Hainanpotamon* and its taxonomy clarified, with a lectotype designated. A key to the nine species of *Hainanpotamon* is provided.

Key words: taxonomy, freshwater crab, *Hainanpotamon*, new species, Potamidae, Potamiscinae, Laos, Vietnam, Hainan Island, Okinawa

INTRODUCTION

In establishing the genus *Hainanpotamon*, Dai (1995) did not examine any type specimens of the type species, *Potamon* (*Potamon*) *orientale* Parisi, 1916, and relied instead on ostensibly topotypic material from Hainan Island, as reference material. The present study, however, shows that the specimens that Dai (1995) referred to as *H. orientale* are not conspecific with *Potamon* (*Potamon*) *orientale* Parisi, 1916, sensu stricto, and actually represent an undescribed species formally named herein as *Hainanpotamon daiae* new species. The present paper also serves to designate a lectotype and to redescribe *Potamon* (*Potamon*) *orientale* Parisi, 1916. In addition, two new species of *Hainanpotamon*, *H. auriculatum* [central Vietnam] and *H. directum* [Laos] are described and the generic placement of *Potamon* (*Geothelphusa*) *globosum* Parisi, 1916, is clarified. A total of nine species are now recognised in *Hainanpotamon*.

The male first gonopod contains characters essential for the identification of species of *Hainanpotamon*, due to a paucity of reliable external characters useful for interspecific diagnosis. A key to the species of *Hainanpotamon* is constructed with emphasis on characters of the male first gonopod. Specimens examined are deposited as follows: Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS); Museo Civico di Storia Naturale di Milano, Milan, Italy (MMI); Muséum national d'Histoire naturelle, Paris, France (MNHN); Natural History Museum, London, UK (NHM); Nationaal Natuurhistorisch Museum (formerly

Rijksmuseum van Natuurlijke Historie), Leiden, Netherlands (RMNH); Zoological Museum, Hanoi University (ZMHU); Zoological Reference Collection of the Raffles Museum of Biodiversity Research, National University of Singapore (ZRC); and Zoologische Staatssammlung, Munich, Germany (ZSM). Measurements are taken in millimeters for carapace width and length. The following abbreviations are used: G1 for male first pleopod; G2 for male second pleopod. Terminology used follows Ng (1988).

TAXONOMY

Family **Potamidae Ortmann, 1896**

Subfamily **Potamiscinae Ortmann, 1896**

(sensu Yeo and Ng, 2003)

Genus ***Hainanpotamon* Dai, 1995**

Orientalia—Dang, 1975: 75; Dang and Tran, 1992: 17 (preoccupied by *Orientalia* Radoman, 1972, a genus of Mollusca).

Hainanpotamon—Dai, 1995: 391, 1999: 145; Yeo and Ng, 1998: 357, 2005: 12.

Type species

Potamon (*Potamon*) *orientale* Parisi, 1916, by original designation.

Diagnosis

Carapace (Figs. 1A, B, 4A, B, 6A, B, 7A, B, 10A, B) distinctly broader than long, high; dorsal surface strongly convex longitudinally and transversely, smooth, grooves weak to indistinct, regions poorly defined; epigastric cristae weak, indistinct, slightly anterior to but almost confluent with postorbital cristae, faintly separated by shallow, weak but distinct groove; postorbital cristae distinct, rounded; antennular

* Corresponding author. Phone: +65-65162969;
Fax : +65-65162486;
E-mail : dbstn@nus.edu.sg

fossae slit-like; external orbital angle triangular, low but discernible, separated from epibranchial tooth by distinct cleft; epibranchial tooth distinct, low, triangular; anterolateral margin distinctly convex, weakly serrated, cristate; epistome posterior margin median tooth low, lateral parts straight, outer parts gently concave. Ischium of third maxilliped broadly rectangular, exopod reaching beyond upper edge of ischium, with well developed flagellum subequal to or exceeding width of merus (Figs. 2A, 5A, 9A, 12A). Chelipeds distinctly unequal; ambulatory legs normal length, with long, slender dactyli (Figs. 1A, 4A, 6A, 7A, 10A). Suture between thoracic sternites 3 and 4 not discernible, except for shallow clefts at lateral edges of sternum; abdominal cavity reaching imaginary line joining median points of cheliped bases (Figs. 2D, 4B, C, 8A, 11). Male abdomen narrowly triangular (Figs. 2E, 5B, 8A, 11). G1 terminal segment about 0.3 times length of subterminal segment, conical, gently curving upwards or superiorly to almost straight, with tapered tip, with hump-like, dorsal flap in proximal part; subterminal segment relatively slender (Figs. 3, 5C–F, 9C, D, 12B, C). G2 with distal segment longer than half length of basal segment (Figs. 5G, 9E, 12D).

Remarks

Dai (1995) established the genus *Hainanpotamon* for three species of freshwater crabs from Hainan Island, China: *H. orientale* (Parisi, 1916) [type species], *H. helense* Dai, 1995, and *H. fuchengense* Dai, 1995. However, Dai (1995) was unaware that the type species *Potamon* (*Potamon*) *orientale* Parisi, 1916, had already been included in a similar genus of freshwater crabs, *Orientalia* Dang, 1975 [type species: *Orientalia glabra* Dang, 1975], previously described from Vietnam (Dang, 1975, 1992; Dang and Tran, 1992). *Orientalia* Dang, 1975, however, was found to be a junior homonym of a genus of Yugoslavian land snail, *Orientalia* Radoman, 1972, and *Hainanpotamon* Dai, 1995, is thus the first available replacement name, with the five known *Orientalia* species being regarded as congeneric with *Hainanpotamon* and transferred to that genus (see Yeo and Ng, 1998). The nomenclatural status of *Orientalia* Dang, 1975, has since been further clarified with detailed arguments refuting Dang and Ho's (2001) subsequent contention for the validity and continued use of *Orientalia* Dang, 1975 (see Yeo and Ng, 2005).

One of the original '*Orientalia*' species, *O. tankiensis* (Dang and Tran, 1992), which was found to be distinct from other *Hainanpotamon* species, was recently reassigned to the newly established genus *Laevimon* [type species: *Laevimon kottelati* Yeo and Ng, 2005] (Yeo and Ng, 2005). Although morphologically closest to one another, these two genera can still be easily separated by the following external and G1 characters (fide Yeo and Ng, 2005): carapace relatively less strongly convex in *Hainanpotamon* (versus carapace more strongly convex in *Laevimon*); postorbital cristae distinct in *Hainanpotamon* (versus postorbital cristae indistinct in *Laevimon*); epibranchial tooth relatively better developed and triangular in *Hainanpotamon* (versus epibranchial tooth very low and rounded in *Laevimon*); anterolateral margin weakly serrated and relatively more distinctly cristate in *Hainanpotamon* (versus anterolateral margin entire and very weakly cristate in *Laevimon*); posterior margin of the epis-

tome with straight lateral parts not confluent with gently concave outer parts in *Hainanpotamon* (versus posterior margin of epistome with convex lateral parts confluent with the gently concave outer part in *Laevimon*); suture between thoracic sternites 3 and 4 undiscernible in *Hainanpotamon* (versus suture between thoracic sternites 3 and 4 clearly demarcated by distinct, strong ridge in *Laevimon*); and G1 terminal segment conical in shape, with a tapered tip in *Hainanpotamon* (versus G1 terminal segment subcylindrical in shape, with a truncate tip) (Figs. 1, 2D, 3, 4, 5C–F, 6, 7, 8A, 9C,D, 10, 11, 12B, C; Dang 1967, Fig. 6, 1980, Fig. 242; Dang and Tran 1992, Figs. 1, 2; Dai, 1995, Figs. 1–3, 1999, Figs. 75–77, Pl. 9 Figs. 2–4; Yeo and Ng, 2005, Figs. 2–6).

The high, dorsally swollen carapace and long, slender ambulatory dactyli of *Hainanpotamon* superficially resemble characters of some other allied genera from Indochina and eastern Asia, namely *Ryukyum* Ng and Shokita, 1995 [Ryukyu Islands], *Nanhaipotamon* Bott, 1968 [Hong Kong, Taiwan, and China], *Geothelphusa* Stimpson, 1858 [Taiwan and Japan, except for Hokkaido], *Thaipotamon* Ng and Naiyanetr, 1993 [Thailand], *Thaiphusa* Ng and Naiyanetr, 1993 [Thailand], and *Pudaengon* Ng and Naiyanetr, 1995 [Thailand, Laos] (cf. Ng and Shokita, 1995; Dai, 1997, 1999; Shy *et al.*, 1994; Ng and Naiyanetr, 1993, 1995). *Hainanpotamon*, however, can be immediately distinguished from these genera by various combinations of third maxilliped and gonopodal characters: the long, well-developed flagellum of the third maxilliped exopod, subequal to or longer than the merus width (versus shorter than merus width to vestigial or absent); the distinct, narrow, hump-like, raised proximal part of the dorsal flap of the G1 terminal segment (versus G1 terminal segment without hump-like, raised proximal part of the dorsal flap in *Thaiphusa*, or dorsal flap large and semi-circular in *Thaipotamon* and *Pudaengon*, or without dorsal flap but with G1 terminal segment dorsal margin proximally produced as high, broad triangular structure in *Nanhaipotamon*, or without dorsal flap altogether in *Geothelphusa* and *Ryukyum*); and the G2 distal segment proportionately longer than in *Ryukyum* and *Geothelphusa* (*i.e.* longer versus shorter than half length of basal segment).

A recently described species from Vietnam, *Geothelphusa vietnamica* Dang and Ho, 2002, also bears a slight resemblance to *Hainanpotamon* in its smooth carapace. On closer examination, it clearly does not belong to *Geothelphusa*, a genus restricted to Taiwan and Japan, and possesses a very different suite of morphological characters (see Shy *et al.*, 1994), and is actually a species of *Tiwaripotamon* Bott, 1970 [central Vietnam to southern China]. *Geothelphusa vietnamica* possesses a low carapace; long, slender legs; a squarish third maxilliped ischium bearing a very weak sulcus; a short third maxilliped exopod and flagellum; broadly triangular male abdomen; and a subconical G1 terminal segment lacking a dorsal flap (Dang and Ho, 2002; unpublished data), a suite that characterizes *Tiwaripotamon* and immediately differentiates it from *Hainanpotamon* (see Ng and Yeo 2001; Yeo and Ng, 2005).

The present study restricts the genus *Hainanpotamon* to nine species: *H. orientale* (Parisi, 1916), *H. helense* Dai, 1995, *H. fuchengense* Dai, 1995, *H. daiae*, new species [all Hainan Island], *H. globosum* (Parisi, 1916) [Okinawa Island?], *H. glabrum* (Dang, 1967), *H. rubrum* (Dang and

Tran, 1992), *H. auriculatum*, new species [all northern to central Vietnam], and *H. directum*, new species [Laos].

Distribution

Central and northern Vietnam; Laos; Hainan Island, China; Okinawa Island, Japan(?).

Hainanpotamon orientale (Parisi, 1916)

(Figs. 1–3)

Potamon (Potamon) orientale— Parisi, 1916: 159, Pl. 8 Fig. 2, Pl. 9 Fig. 2, Figs. 1a, 2b.

Ranguna (Ranguna) orientalis orientalis— Bott, 1966: 485.

Ranguna (Ranguna) orientalis— Bott, 1970: 170, Pl. 39 Fig. 43, Pl. 48 Fig. 38; Dang, 1975: 75.

Ranguna orientalis— Froggia and Grippa, 1986: 275.

Potamon orientalis— Ng and Dudgeon, 1992: 743.

Hainanpotamon orientalis— Dai, 1995: 391[name only].

Potamon orientale— Yeo and Ng, 2005: 12.

Hainanpotamon orientale— Yeo and Ng, 2005: 12.

Not *Hainanpotamon orientalis*— Dai, 1995: 20, Fig. 1.

Material examined

Lectotype: male (36.6 by 26.9 mm) (NHM 1934.2.5.3), Mount Wuchi, Hainan Island, China, coll. A. Owston, 10–20 Apr. 1904.

Paralectotypes: one male (44.2 by 31.8 mm), one female (31.7 by 23.5 mm) (MMI 1470), one male (31.1 by

22.8 mm) (MNHN-B.5261), same data as lectotype.

Others: one male (40.1 by 30.9 mm), one female (ZSM 1173/1), Mt Wuchi, Hainan, coll. Tarisch and Parisi.

Description of lectotype

Carapace broader than long, high, inflated; dorsal surface smooth, glabrous, strongly convex longitudinally, gently convex laterally; regions indistinct, cervical groove absent, H-shaped depression very weak (Fig. 1). Epigastric cristae indistinct, very weakly rugose, not sharp, separated by shallow, weak but distinct V-shaped groove, appearing almost confluent with postorbital cristae, hardly separated by shallow, indistinct groove; postorbital cristae distinct, smooth, not sharp, separated from epibranchial tooth by small cleft (Fig. 1). Frontal margin gently emarginate medially; frontal region strongly deflexed downwards, very weakly rugose; supra- and infraorbital margins very weakly sinuous, weakly cristate; orbital region very narrow, almost groove-like; eyes normal; subhepatic and subbranchial regions distinctly rugose (Fig. 1B). External orbital angle triangular, sharp; outer margin distinctly convex; epibranchial tooth distinct, low, broadly triangular, separated from external orbital angle by distinct cleft; anterolateral margin gently serrated, cristate, distinctly convex, running obliquely inwards posteriorly; branchial region smooth; posterolateral margin entire, almost straight, anteriorly meeting midpoint of anterolateral margin, converging posteriorly; metabranchial region lined with few, weak oblique striae extending from rugose sub-

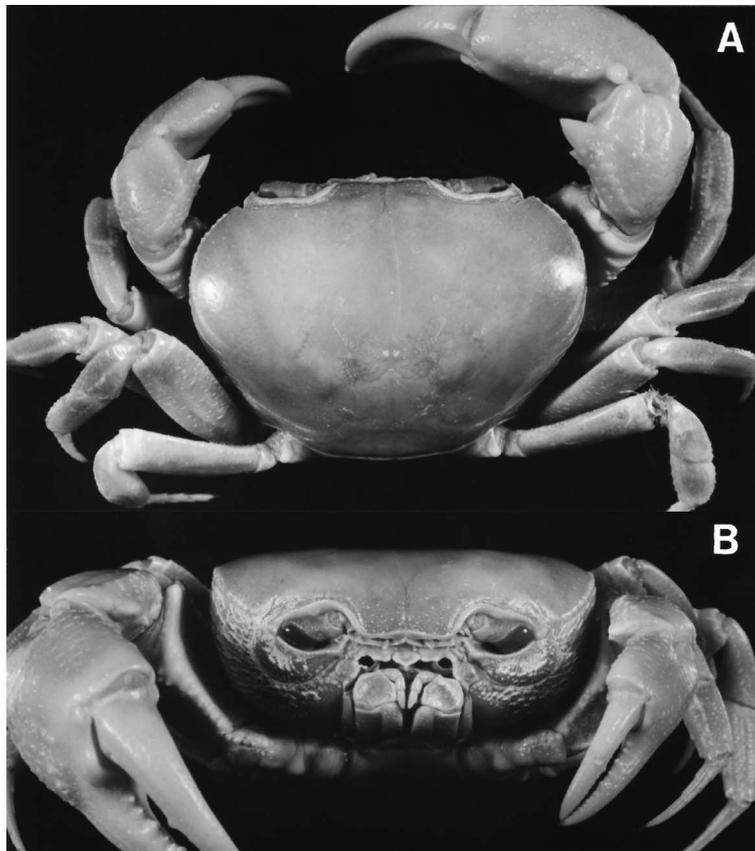


Fig. 1. *Hainanpotamon orientale* (Parisi, 1916). Lectotype male (36.6 by 23.9 mm) (NHM 1934.2.5.3), Mount Wuchi, Hainan Island, China. (A) Dorsal view. (B) Frontal view.

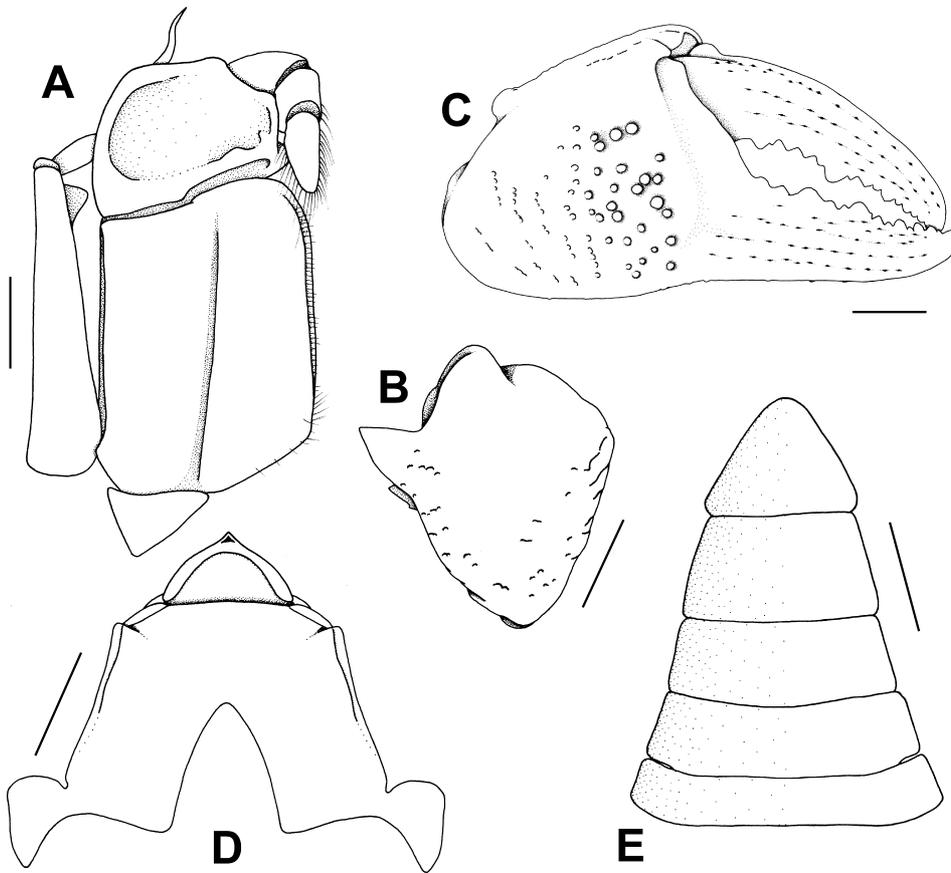


Fig. 2. *Hainanpotamon orientale* (Parisi, 1916). Lectotype male (36.6 by 23.9 mm) (NHM 1934.2.5.3), Mount Wuchi, Hainan Island, China. **(A)** Right third maxilliped. **(B)** Carpus of right cheliped. **(C)** Right chela. **(D)** Anterior thoracic sternites. **(E)** Abdominal segments 3–7. Scales= 2.0 mm in A; 5.0 mm in B–E.

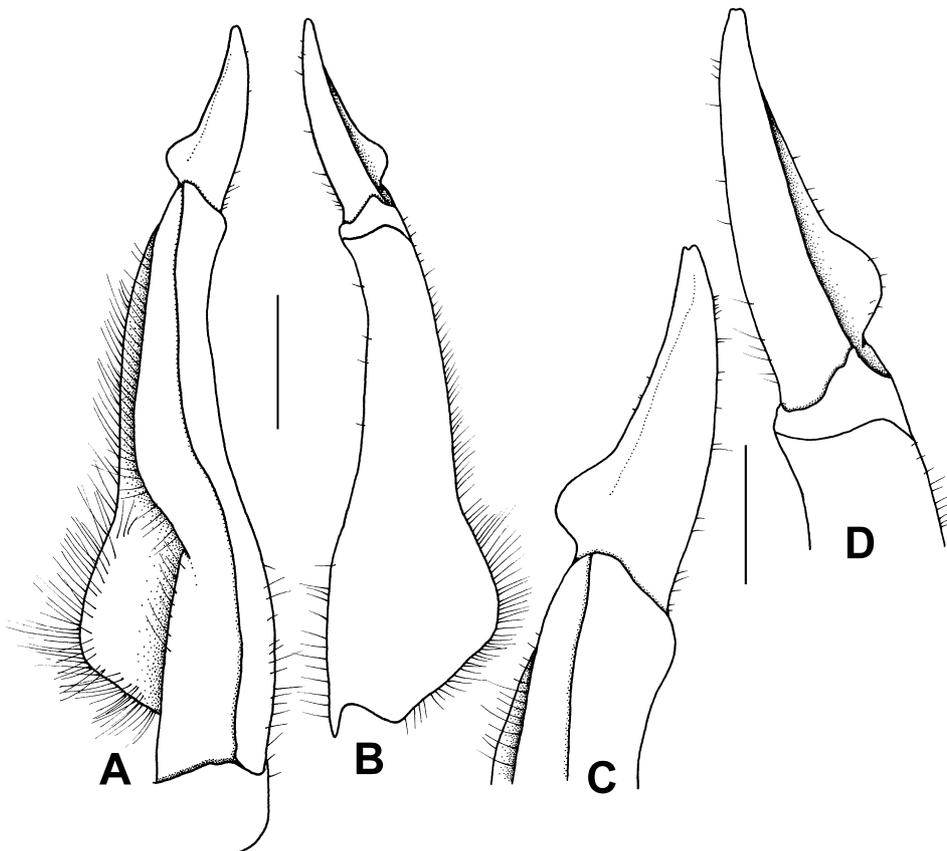


Fig. 3. *Hainanpotamon orientale* (Parisi, 1916). Lectotype male (36.6 by 23.9 mm) (NHM 1934.2.5.3), Mount Wuchi, Hainan Island, China. **(A)** Ventral view of G1. **(B)** Dorsal view of G1. **(C)** Ventral view of G1 terminal segment. **(D)** Dorsal view of G1 terminal segment. Scales=2.0 mm in A, B; 1.0 mm in C, D.

branchial region (Fig. 1). Epistome anterior margin with median triangle; posterior margin with median triangular tooth (Fig. 1B).

Ischium of third maxilliped broadly rectangular, ca. 1.5 times longer than broad, with well developed longitudinal median sulcus; merus squarish, subequal to half of ischium length, with concave outer surface; palp normal; exopod long, exceeding upper edge of ischium but not reaching mid-point of merus, inner margin of distal part produced as a blunt tooth, with well developed flagellum longer than width of merus (Fig. 2A).

Chelipeds unequal, right side larger, outer surfaces of merus, carpus and palm rugose to granulose; fingers gaping, shorter than palm, movable finger shorter than fixed finger, tips hooked and overlapping, smooth, with several longitudinal rows of pits; carpus with robust, obliquely directed subdistal spine on inner margin; merus without subterminal spine (Fig. 2B, C).

Ambulatory legs glabrous; second pair longest, dactylus long, slender, ca. 1.3 times as long as propodus, ca. 5 times longer than proximal width, propodus with indistinct broad ridge, carpus with sharply defined ridge, merus with scattered rugae and granules, without distinct subdistal spine; fourth ambulatory leg without ridge on propodus and carpus, merus smooth.

Anterior thoracic sternites 1 to 4 deflexed upwards; suture between sternites 2 and 3 complete, distinct, straight; suture between sternites 3 and 4 not discernible, except for shallow clefts at lateral edges of sternum; male abdominal cavity barely reaching level of median points of cheliped bases (Fig. 2D). Male abdomen triangular; telson longer than sixth segment, lateral margins straight, tip rounded, proximal margin straight; segment 6 with median length more than half of proximal margin length, proximal margin almost straight, lateral margins straight to weakly convex, lateral margins of segments 3 to 5 straight (Fig. 2E).

G1 slender, gently sinuous, inner margin and groove for G2 lined with setae; terminal segment clearly separated from subterminal segment, about 0.3 times length of subterminal segment, conical, gently curved upwards, dorsal fold extending distally more than halfway along terminal segment, produced in proximal portion as narrow, hump-like, raised lobe, gradually tapering down towards tip; subterminal segment slender, slightly sinuous, with relatively narrow synovial membrane (Fig. 3). G1 distal segment longer than half of basal segment, slender and tapering, without distal conical projection; basal segment outer margin expanded (Fig. 3A, B). G2s missing.

Remarks

Dang (1975) referred this species to the genus *Orientalia* Dang, 1975, but it was subsequently assigned to *Hainanpotamon* Dai, 1995, by Dai (1995) (see genus Remarks).

Although Dai (1995) named *Potamon orientale* Parisi, 1916, as the type species when she established *Hainanpotamon*, she did not examine any type material of the species. The description and figure of '*H. orientale*' given by Dai (1995) was, instead, based on newly collected material from Hainan Island. Here we reexamined type material of *H. orientale* and compared these specimens with the

'*Hainanpotamon orientale*' figures of Dai (1995), and we conclude that these represent separate species based on clear differences in the G1 structure, with Dai's species actually referring to an undescribed taxon formally named herein as *Hainanpotamon daiae* (see later).

In the original description, Parisi (1916) did not designate a holotype and deposited all syntypes (12 males, five females) in MMI. In addition to type specimens from MMI, the material examined in the present study also includes part of the syntype series from NHM and MNHN, which were obtained from MMI through exchanges. In order to stabilize the taxonomy of the species (and the genus), the male specimen (36.6 by 23.9 mm) (NHM 1934.2.5.3) is hereby designated as the lectotype for the species. The paralectotypes match the lectotype in both external as well as gonopodal characters. Although missing in the lectotype, the G2 can still be seen in the male paralectotype (44.2 by 31.8 mm) (MMI 1470) to possess a slender distal segment greater than half the length of the basal segment, similar to that of other *Hainanpotamon* species figured by Dai (1995).

Dai (1995) also described two other species of *Hainanpotamon* from Hainan Island, *H. helense* and *H. fuchengense*. *Hainanpotamon orientale* can be separated from these two taxa by its G1 being more sinuous, with the subterminal segment gently curved distally (versus less sinuous, with subterminal segment straight) and the apex of the raised lobe of the G1 dorsal fold being more rounded (versus apex broader and flatter) (Fig. 3; Dai, 1995: Figs. 2(3–5), 3(3–5)).

Hainanpotamon orientale also differs from both *H. glabrum* and *H. rubrum* by its broader sixth male abdominal segment, about 0.54 times as long as broad (versus sixth male abdominal segment narrower, about 0.61–0.63 times as long as broad), and its relatively stouter and very gently upcurved G1 terminal segment (versus terminal segment relatively slender and straight) (Figs. 2E, 3; Bott, 1970: Pl. 39 Fig. 43; Dang, 1980: Fig. 242; Dang and Tran, 1992: Fig. 1(4, 5); Parisi, 1916: Figs. 1a, 2b).

Distribution

Mount Wuzhi (Wuzhishan), Hainan Island, China.

Hainanpotamon globosum (Parisi, 1916)

(Figs. 4, 5)

Potamon (Geothelphusa) globosum— Parisi, 1916: 164; Froggia and Grippa, 1986: 274, Pl. 1 Figs. b, e; Ng and Dudgeon, 1992: 743.

Potamon (Geothelphusa) globosum— Miyake and Minei, 1965: 377.

Nanhaipotamon globosum— Minei, 1973: 222; Minei, 1981: 80, Table 2; Sakai, 1976: 565 (English text), 349 (Japanese text); Gima and Shokita, 1980: 9; Minei, 1981: 80; Shokita, 1990: 4, Table 2; Anonymous, 1991: 229; Shokita, 1996: 348; Kasai and Naruse, 2003: 283.

Potamon (Geothelphusa) globosa— Balss, 1937: 167, Fig. 31; Sakai, 1940: 57.

Geothelphusa globosa— Balss, 1937: 167, Fig. 31; Minei, 1968: 99, Fig. 12.

Potamon globosum— Naruse, Segawa and Shokita, 2004: 5.

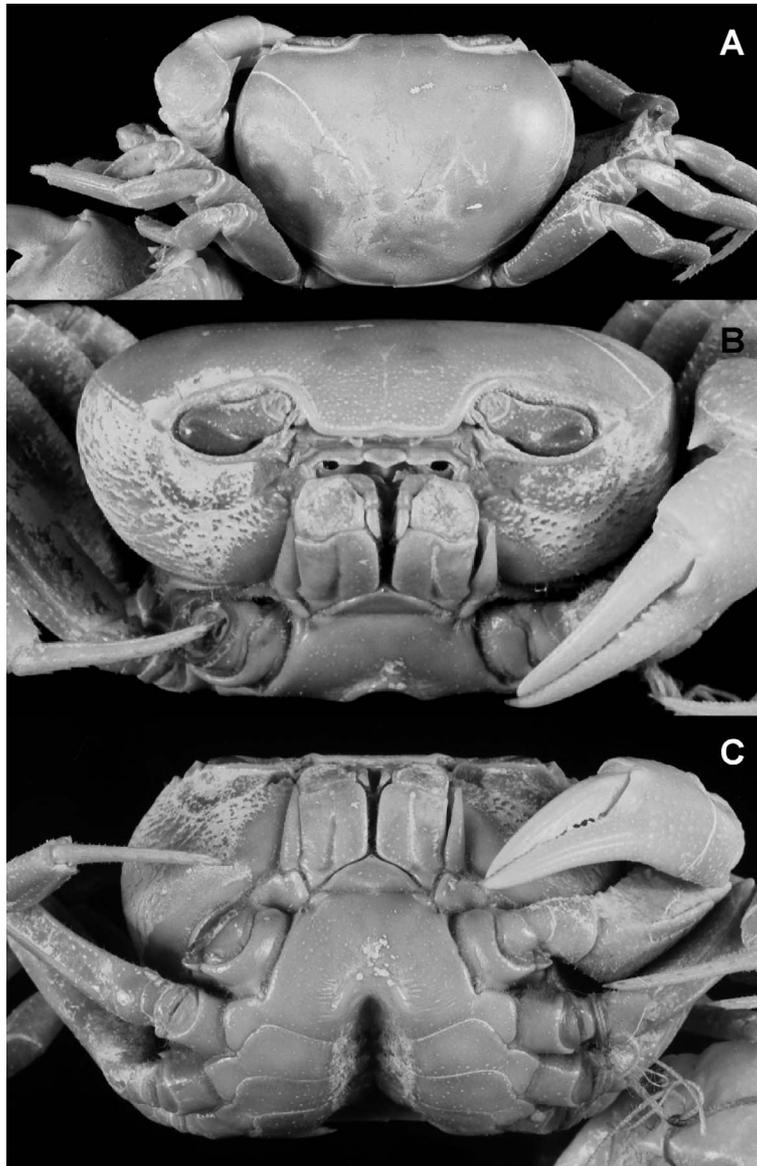


Fig. 4. *Hainanpotamon globosum* (Parisi, 1916). Lectotype male (38.1 by 28.6 mm) (MM 1465), Okinawa Island (?). **(A)** Dorsal view. **(B)** Frontal view. **(C)** Ventral view.

Not *Isolapotamon* (*Nanhaipotamon*) *formosanum globosum*— Bott, 1968: 124, Fig. 10 a, b.

Not *Nanhaipotamon formosanum globosum*— Bott, 1970: 196, Pl. 41 Fig. 84, Pl. 57 Fig. 84; Ng and Dudgeon, 1992: 743.

Material examined

Lectotype: male (38.1 by 28.6 mm) (MM1465), Okinawa, Is. Loochoo [=Ryukyu Islands], coll. A. Owston, 7 May 1914.

Paralectotypes: one female (29.6 by 21.7 mm), same data as lectotype.

Remarks

The generic placement of *Hainanpotamon globosum* has been unclear for some time. Bott (1970) assigned the species to the genus *Nanhaipotamon* as *Nanhaipotamon*

formosanum globosum. Froggia and Grippa (1986: 274, Pl. 1 Figs. b, e) reexamined the type material of *Potamon* (*Geothelphusa*) *globosum* Parisi, 1916, from the MMI and correctly pointed out that the specimen reported by Bott (1970) does not belong to Parisi's species. The G1 figured by Bott (1968: 124, Fig. 10 a, b; 1970: 196, Pl. 41 Fig. 84) clearly does not belong to a *Hainanpotamon* species and in fact indicates a species of *Nanhaipotamon* now known as *N. aculatum* (see Dai, 1997: 232, Fig. 11, Pl. 2(5); 1999: 124, Fig. 62, Pl. 7(3)).

Ng and Dudgeon (1992: 743) also noted that "the G1 of Parisi's types of *P. globosum* is clearly not that of *Nanhaipotamon*, but resembles that of *Potamon orientalis* Parisi, 1916, instead", and that the two species would have been placed in the genus *Ranguna* Bott, 1966. However, they preferred to treat the generic placement of *Potamon globosum* and *P. orientale* as unclear due to the heteroge-

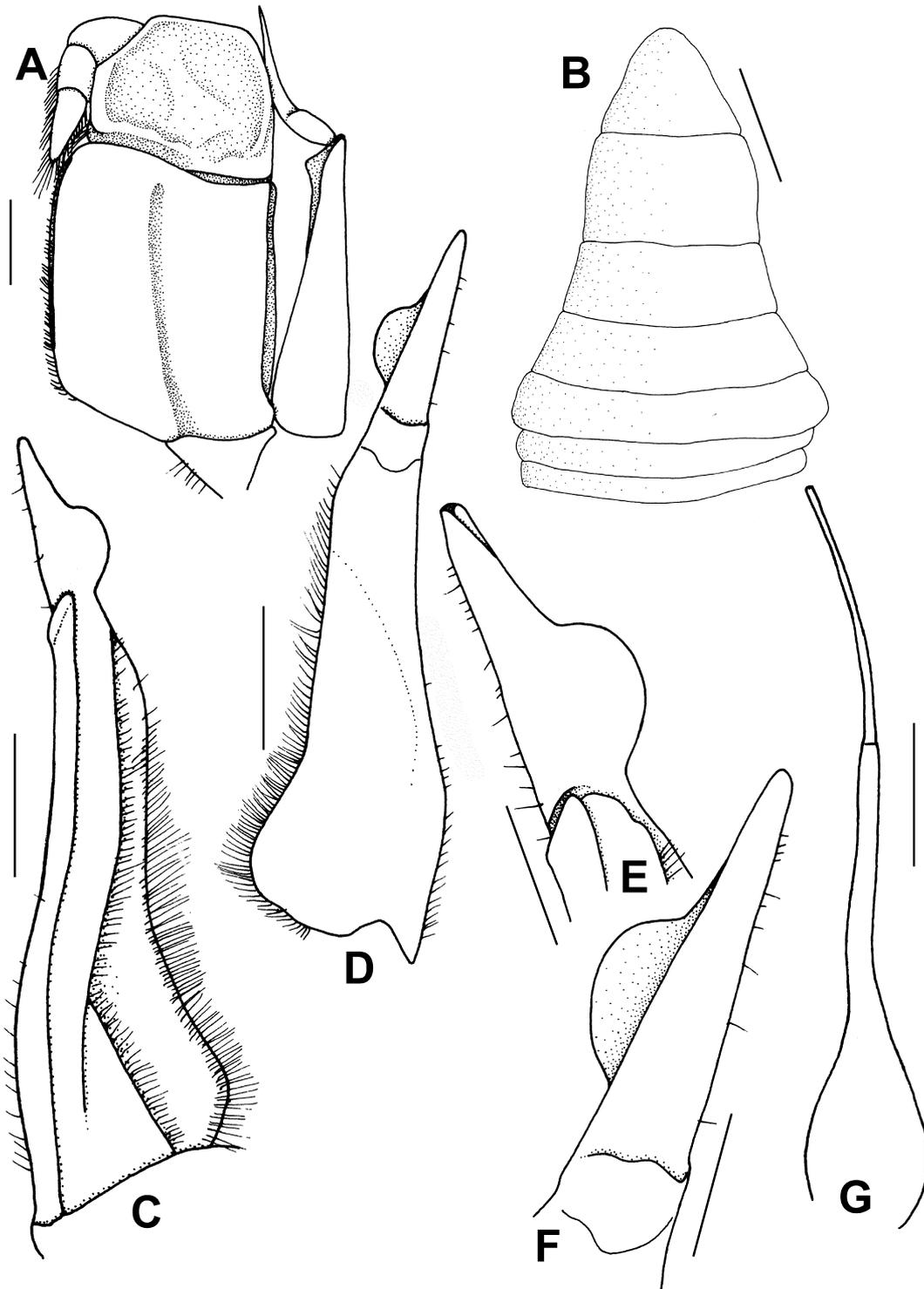


Fig. 5. *Hainanpotamon globosum* (Parisi, 1916). Lectotype male (38.1 by 28.6 mm) (MM 1465), Okinawa Island (?). **(A)** Left third maxilliped. **(B)** Abdominal segments. **(C)** Ventral view of G1. **(D)** Dorsal view of G1. **(E)** Ventral view of G1 terminal segment. **(F)** Dorsal view of G1 terminal segment. **(G)** G2. Scales=2 mm in A, C, D, G; 5 mm in B; 1 mm in E, F.

neity of *Ranguna* and the great deal of confusion surrounding the genus at the time (see Türkay and Naiyanetr, 1987, 1989; ICZN, 1991; Holthuis, 1990; Ng, 1990; Ng and Naiyanetr, 1993: 6, 31). With the establishment of the genus *Hainanpotamon* Dai, 1995, for *P. orientale*, the generic placement of *P. globosum* becomes clear—the G1s figured

by Froglija and Grippa (1986: 274, Pl. 1 Fig. e), as well as by Balss (1937: 167, Fig. 31) are of the *Hainanpotamon* type, and we thus have little doubt that *P. globosum* should be transferred to *Hainanpotamon*. Our reexamination of part of the type series of *P. (G.) globosum* (MMI 1465) in the present study corroborates this. We found *P. (G.) globosum*

to be clearly congeneric to *H. orientale*, possessing similar external and G1 characters, and it is duly included here in the genus *Hainanpotamon*.

Interestingly, Parisi (1916: Fig. 3) recognised considerable variation in chela morphology, and the two specimens of *Hainanpotamon globosum* in Parisi's (1916: Pl. 10 Figs. 1–2) photographs differ somewhat in carapace and chela structure, which may indicate a heterogeneous type series. For now, it is important to fix the identity of the species and stabilise its taxonomy, and the male specimen examined here (38.1 by 28.6 mm) (MMI 1465) is thus designated as the lectotype. The remainder of the type series should be reexamined to determine the extent of variation in the taxon.

There remains doubt over the purported type locality of the species [Okinawa, Japan] (Ng and Shokita, 1995). The type series of *Hainanpotamon globosum* is reported to have been collected by A. Owston from Okinawa, Ryukyu Islands, Japan (Parisi, 1916). However, despite intensive sampling in the Ryukyu Islands in recent years, the genus has not been collected there again (e.g., Gima and Shokita, 1980; Minei, 1973; Shokita, 1990, 1991; 1996; Ng and Shokita, 1995; Kasai and Naruse, 2003). Furthermore, the potamid fauna of the Ryukyu Islands and Taiwan is distinctive and uniform, consisting of the genera *Geothelphusa*, *Ryukyum*, *Candidiopotamon*, *Amamiku*, and *Nanhaipotamon* whereas *Hainanpotamon* occurs in central to northern Vietnam and on Hainan Island, China. We believe therefore that the locality data of the type series of *H. globosum* may have resulted from mislabelling, and that the types are more likely to have been collected from the vicinity of northern Vietnam, Hainan Island, or even southern China.

Hainanpotamon globosum is also similar to *H. orientale*. *Hainanpotamon globosum*, however, can be distinguished from *H. orientale* by the dorsal flap of the terminal segment of the G1 having a wider base (versus narrower in *H. orientale*), and the smooth anterolateral margin of the carapace (versus gently serrated in *H. orientale*) (Figs. 3, 5C–F; Dai, 1995: Fig. 1(3–5); Parisi, 1916: 2b, Pls. 8(2), 9(2), 10; Froglija and Grippa, 1986: Pl. 1(b, e)). The G1 of *H. rubrum* is also similar to that of *H. orientale*, but *H. orientale* can be differentiated from *H. rubrum* by its strongly excurved G1 (versus anteriorly directed distal margin weakly and broadly concave on outer margins of the distal segment to distal two-thirds of the proximal margin in *H. rubrum*) and the tip of the epibranchial tooth positioned slightly anterior to the base of the external orbital angle (versus distal tip of the epibranchial tooth on same level with the tip of the external orbital angle in *H. rubrum*) (Figs. 4A, 5C–F; Dang, 1967: Fig. 6(4); Dang and Tran, 1992: Fig. 1(1, 2, 4); Parisi, 1916: Fig. 2b).

***Hainanpotamon glabrum* (Dang, 1967)**

Potamon (*Geothelphusa*) *glabra* Dang, 1967: 159, Fig. 6.

Orientalia glabra—Dang, 1975: 75, 1980: 425, Fig. 242, 1992: 317, Fig.

Hainanpotamon glabrum—Yeo and Ng, 1998: 358.

Hainanpotamon glabra—Yeo and Ng, 1999: 641.

Material examined

None.

Diagnosis

Carapace distinctly broader than long, high; dorsal surface strongly convex longitudinally and transversely, smooth; external orbital angle acutely triangular; epibranchial tooth distinct, low; anterolateral margin distinctly convex. Chelipeds unequal. Ambulatory legs normal length, with long, slender dactyli. Male abdomen narrowly triangular. G1 terminal segment less than 0.3 times length of subterminal segment, conical, straight, with tapered tip, with narrow, hump-like, dorsal flap in proximal part, extending less than half of terminal segment length; subterminal segment relatively slender, gently curved outwards distally.

Remarks

The holotype of this species is probably lost (see Yeo and Ng, 1998). However, Yeo and Ng's (1998) assignment of this species to *Hainanpotamon* is clearly warranted, as Dang's (1980: Fig. 242) diagrams show that it clearly possesses the suite of characters diagnostic of the genus, including a high, strongly inflated, smooth carapace, with acutely triangular external orbital angles and low epibranchial teeth; long, slender ambulatory dactyli; a narrowly triangular male abdomen; and a G1 with a short, straight conical terminal segment, with tapered tip and narrow proximal dorsal flap, and a slender subterminal segment. The present diagnosis is based on Dang's (1980) diagrams.

Hainanpotamon glabrum differs from *H. rubrum* by characters of the carapace, male abdomen and G1 characters (see key to Indochinese species of *Hainanpotamon* herein).

Distribution

Hoa Binh, Ha Tay, Bac Thai Provinces, northern Vietnam (Dang, 1975, 1980).

***Hainanpotamon rubrum* (Dang and Tran, 1992)**

(Fig. 6)

Orientalia rubra—Dang and Tran, 1992: 17, Fig. 1.

Hainanpotamon rubrum—Yeo and Ng, 1998: 358.

Hainanpotamon rubra—Yeo and Ng, 1999: 641.

Material examined

Paratype: female (46.0 by 34.1 mm) (ZMHU), Nhu Xuan District, Thanh Hoa Province, northern Vietnam, coll. unknown, Sept. 1990.

Diagnosis

Carapace distinctly broader than long, high; dorsal surface strongly convex longitudinally and transversely, smooth; external orbital angle acutely triangular; epibranchial tooth distinct, low; anterolateral margin distinctly convex. Chelipeds unequal. Ambulatory legs normal length, with long, slender dactyli. Male abdomen narrowly triangular. G1 terminal segment less than 0.3 times length of subterminal segment, conical, straight, with tapered tip, with narrow, hump-like, dorsal flap in proximal part, extending about half of terminal segment length; subterminal segment relatively slender, almost straight to very gently curved outwards distally.

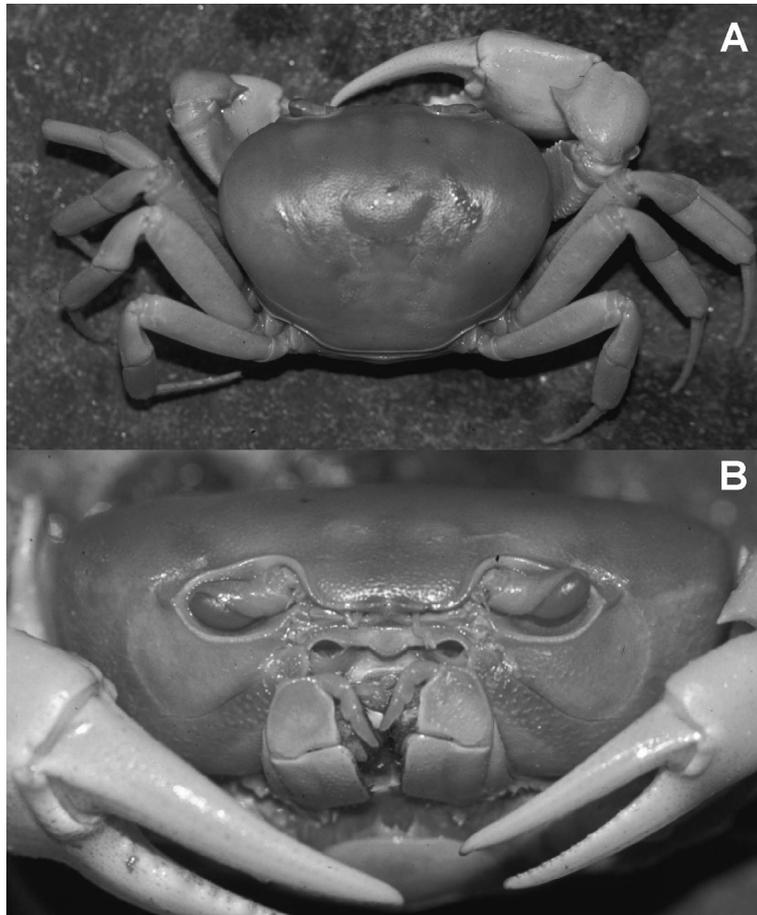


Fig. 6. *Hainanpotamon rubrum* (Dang and Tran, 1992). Paratype female (46.0 by 34.1 mm) (ZMHU), Vietnam. **(A)** Dorsal view. **(B)** Frontal view.

Remarks

Although *Hainanpotamon rubrum* was described relatively recently by Dang and Tran (1992), the holotype male was also not available for reexamination (present study). The present diagnosis is based Dang and Tran's (1992) schematic drawings, which are sufficient to indicate that this is probably a valid species, differing from *H. glabrum* in features of the carapace, male abdomen and G1 (see key to Indochinese species of *Hainanpotamon* herein).

Distribution

Thanh Hoa Province, northern Vietnam; Nghe Tinh Province, central Vietnam (Dang and Tran, 1992).

Hainanpotamon daiae, new species

Hainanpotamon orientalis— Dai, 1995: 20, Fig. 1 [not *Potamon (Potamon) orientale* Parisi, 1916].

Type

Holotype: male (32 by 25 mm) (IZCAS), Jiangfengling, Wuzhishan (Mount Wuzhi), Hainan Island, China (specimen figured by Dai, 1995: Fig. 1).

Diagnosis

Dai (1995: 392, Fig. 1, 1999: 145, Fig. 75, Pl. 9 (3)) gave

a detailed, illustrated description of the present species as '*Hainanpotamon orientalis*'.

Etymology

The species is named in honour of the late Professor Dai Aiyun, in recognition of her lifetime of contributions to Chinese carcinology.

Remarks

This species was reported by Dai (1995) as *Hainanpotamon orientalis* (Parisi, 1916). However, a comparison of the lectotype of *H. orientale* (Parisi, 1916) with Dai's (1995: Fig. 1) figures of '*H. orientalis*' has revealed the two species to be distinct. Unfortunately, Dai's (1995) '*H. orientalis*' specimens were unavailable to us. However, in 1999, Prof. Dai Aiyun provided reciprocal comparisons of the drawings of the G1 structure of the lectotype of *H. orientale* (Figs. 2H–K) against the actual G1 of the specimen illustrated by her in Dai (1995: Fig. 1, 1999: 145, Fig. 75, Pl. 9 (3)), and confirmed that they indeed belong to two different species (Prof. Dai Aiyun, personal communication).

In her redescription, Dai (1995: 392) examined the following specimens: one male from Wuzhishan; one male and one female from Bawangling; one juvenile male from Jiangfengling (in Wuzhishan area); and one female from

Dongfeng. In her note on its distribution, she stated that the species occurs in Wuzhishan, Dongfeng and Bawangling on Hainan. Dai (1995: Fig. 1) did not indicate the collection locality or the size of the illustrated specimen. Prof. Dai Aiyun (personal communication), informed one of us (DCJY) that the specimen figured by Dai (1995: Fig.1) was collected from Jiangfengling in Wuzhishan, measures 32 by 25 mm, and is deposited in IZCAS. This male specimen is hereby designated as the holotype of *Hainanpotamon daiae*. The remaining specimens in Dai (1995) should be reexamined in order to ascertain their actual identities. It is not surprising to find two species (*H. orientale* and *H. daiae*) on Mount Wuzhi as it is high enough (1,867 m) and large enough to have three major drainages flowing independently from it (to the southeast, northeast and west), which could isolate and give rise to several sibling species.

Hainanpotamon daiae is morphologically closest to *H. orientale* (Parisi, 1916), but can be distinguished from it by the following differences in the G1 structure: i) terminal segment almost straight (versus gently curved upwards or superiorly); ii) terminal segment slender, cylindrical, with narrow proximal part, whose sides are almost parallel along most of length (versus robust and conical, with broad proximal part tapering gradually towards tip along entire length); iii) dorsal fold with apex of raised lobe closer to median part (versus

apex of raised lobe in proximal part); iv) raised lobe of dorsal fold with apex broader and flatter (versus apex more rounded) (Fig. 3; Dai, 1995: Fig. 1(3–5); 1999: Fig. 75(4–6)). The characters used by Dai (1995) in separating *H. orientale* (sensu Dai, 1995) from *H. helense* Dai, 1995, and *H. fuchengense* Dai, 1995, now apply to *H. daiae*, new species, instead.

Distribution

Jianfengling, Wuzhishan; Dongfeng(?); and Bawangling (?), Hainan Island, China.

Hainanpotamon auriculatum, new species

(Figs. 7–9)

Material examined

Holotype: male (32.3 by 26.3 mm) (ZRC 2007.0644), feeder stream to Suoi Mo, Suoi Ho Mon, Ba Na foothills, Song Thuy Loan basin, Da Nang Province, Central Vietnam, coll. local people, obtained by Tran Anh Duc and Tan Heok Hui, 3–5 Mar. 2005.

Paratypes: five males (18.3 by 15.8 – 34.4 by 28.4 mm) (ZRC 2007.0645), one female (31.8 by 25.9 mm), same data as holotype; one male (31.7 by 26.2 mm) (RMNH), one female (30.0 by 24.6 mm).

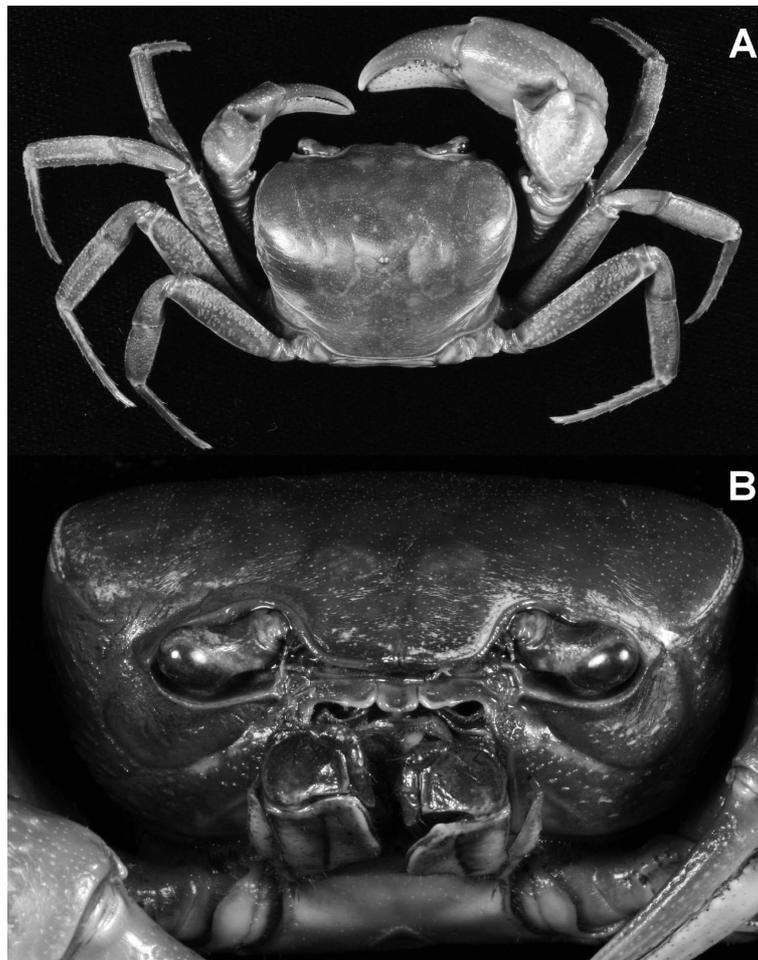


Fig. 7. *Hainanpotamon auriculatum*, new species. Holotype male (32.3 by 26.3 mm) (ZRC 2007.0644), Vietnam. (A) Dorsal view. (B) Frontal view.

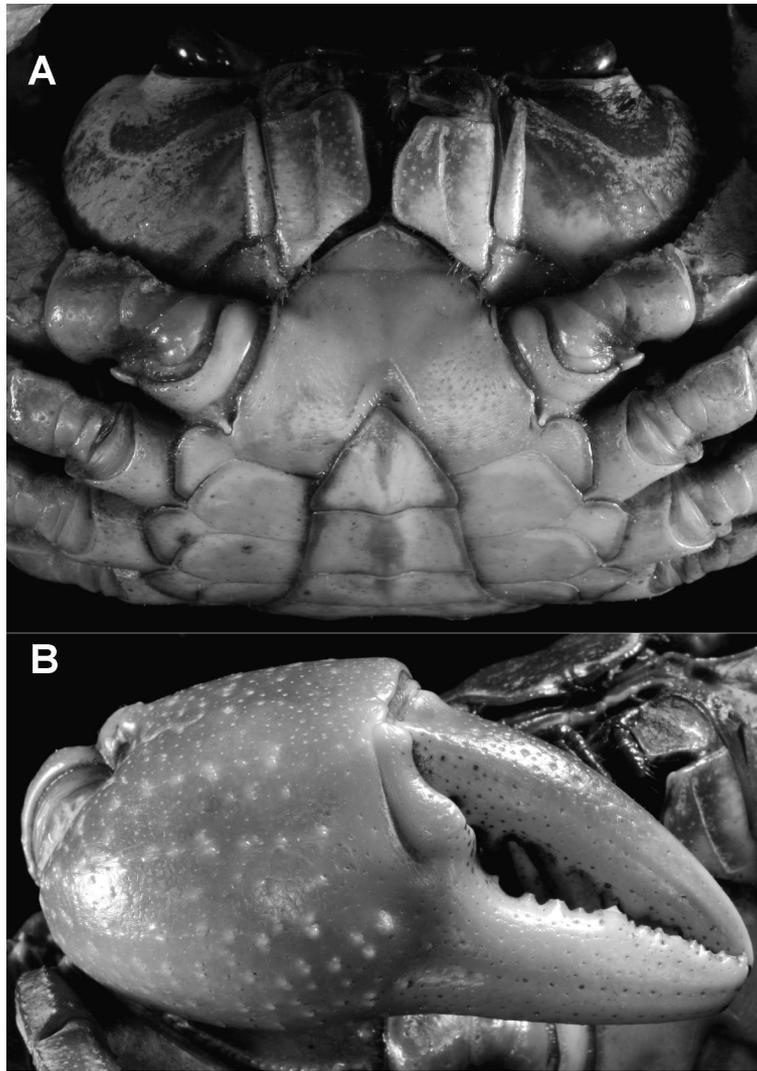


Fig. 8. *Hainanpotamon auriculatum*, new species. Holotype male (32.3 by 26.3 mm) (ZRC 2007.0644), Vietnam. **(A)** Ventral view. **(B)** Right chela.

Diagnosis

Carapace wider than long, dorsal surface strongly convex longitudinally and transversely, smooth, external orbital angle triangular, directed anteriorly, outer margin inferior to inner, epibranchial tooth obtuse, inner margin horizontal; anterolateral margin convex, thinly cristate, granulated microscopically. Male chelipeds unequal, carpus with large tooth, with three smaller teeth below inner tooth. Telson almost regular triangle, as long as sixth abdominal segment; abdominal segments with lateral margins forming bell-shape, narrowed gradually by fourth to fifth segments. G1 with distal segment directing outwards, but tip slightly directed distally, dorsal flap auriculate, base of flap as wide as about half length of distal segment, higher than width of shaft, arising proximally after some distance from proximal border with subterminal segment, with membrane between distal and subdistal segment of dorsal surface; subdistal segment gently to strongly curved outwards by distal fifth of outer margin.

Etymology

The species name is from the Latin word *auriculatum*, meaning “auriculate” or ear-shaped, alluding to the shape of the dorsal flap of G1 terminal segment. The name is used as an adjective.

Remarks

Hainanpotamon auriculatum, new species, is most similar to *H. glabrum* (Dai, 1967) in the distally outcurving G1 and relatively high dorsal flap of the terminal segment of the G1. *Hainanpotamon auriculatum*, however, can be distinguished from *H. glabrum* by the wider dorsal flap of the terminal segment of the G1 (as wide as about half length of the distal segment versus distinctly narrower), the dorsal flap arising proximally some distance from the proximal border of the subterminal segment (versus arising from the border in *H. glabrum*), the distal tip of the terminal segment directed distally (versus directed outwards in *H. glabrum*), and a relatively longer distal segment (slightly shorter than one-third of the total length versus shorter than one quarter of the total length) (Fig. 9; Dang, 1980: Fig. 242).

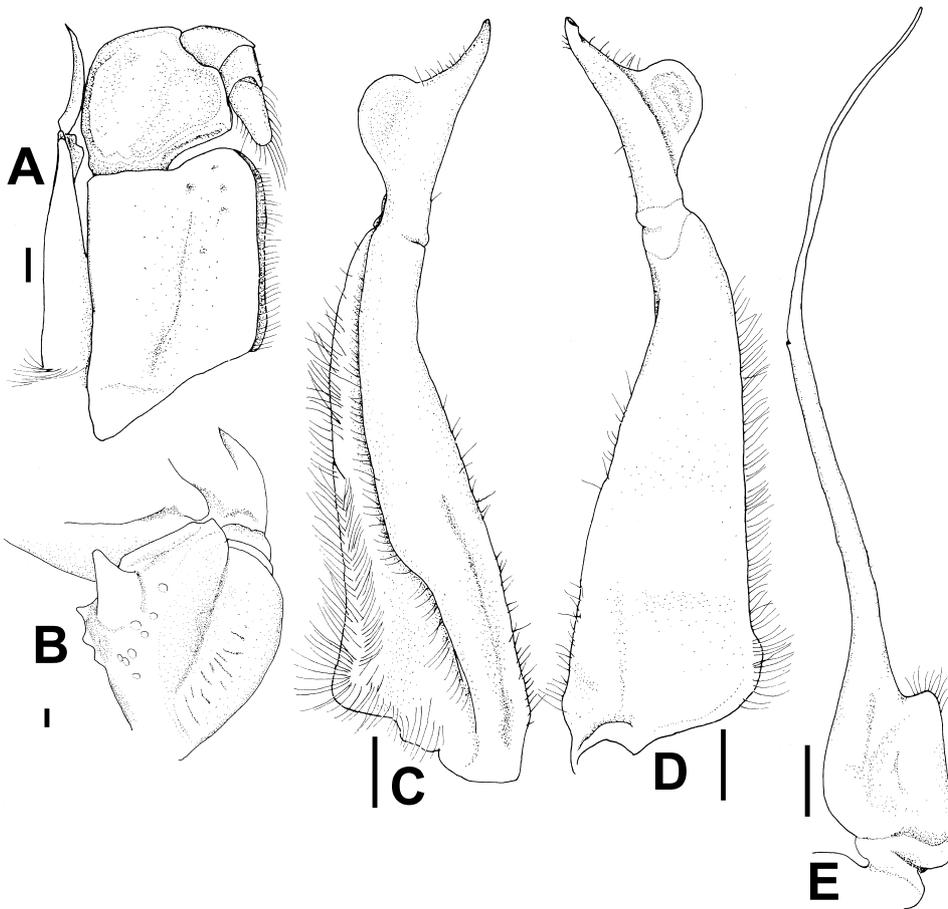


Fig. 9. *Hainanpotamon auriculatum*, new species. **(A)** right third maxilliped. **(B)** Right carpus of cheliped. **(C)** Ventral view of G1. **(D)** Dorsal view of G1. **(E)** G2. A, Paratype female (25.9 by 31.8 mm) (ZRC 2007.0644); B–E, holotype male (32.3 by 26.3 mm) (ZRC 2007.0645), Vietnam. Scales=1 mm.

Hainanpotamon fuchengense Dai, 1995, also possesses a similar curve in the subterminal segment of the G1. *Hainanpotamon auriculatum* can be easily differentiated from *H. fuchengense* by the auriculate dorsal flap (low with distal narrow extension in *H. fuchengense*) and proportionally longer terminal segment of the G1 (about one-fourth of the total length in *H. fuchengense*) (Fig. 9; Dai, 1995: 3(3–5); 1999: Fig. 76)3–5)).

Distribution

Da Nang Province, Central Vietnam.

Hainanpotamon directum, new species

(Figs. 10–12)

Material examined

Holotype: male (28.4 by 22.7mm) (ZRC 2007.0646), tributary of Nam Thenn, downstream of Nam Noy, Laos, coll. Leong Tzi Ming, 3 May 2006.

Diagnosis

Carapace wider than long, dorsal surface strongly convex longitudinally and transversely, smooth, external orbital angle triangle, directing anteriorly, outer margin inferior to inner, about three-halves of inner margin; epibranchial tooth obtuse, anterolateral margin convex, thinly cristate, granulated. Male chelipeds unequal. Telson triangular with slightly convex lateral margins, as long as sixth abdominal segment. G1 slightly sinuous, slender; terminal segment about quarter

of total length of G1; tip of distal segment directed inwards, dorsal flap very low, transverse width distinctly narrower than half width of shaft, arising proximally from border with subterminal margin, with dorsal membrane between distal and subdistal segment of dorsal surface.

Etymology

The species name is from the Latin *directum*, meaning “straight” or “simple”, alluding to the shape of the G1. The name is used as an adjective.

Remarks

The G1 structure of *Hainanpotamon directum* new species, is similar to those of *H. rubrum* (Dang and Tran, 1992) and *H. helense* Dai, 1995, in the sinuous shape and low dorsal flap of the terminal segment. *Hainanpotamon directum*, however, can be distinguished from both *H. rubrum* and *H. helense* by its distally-directed proximal part of the terminal segment of the G1 with a slightly incurving distal tip (versus a terminal segment that is oriented outward in *H. directum* and *H. rubrum*) and a much lower dorsal flap (versus a higher dorsal flap in *H. directum* and *H. rubrum*) (Fig. 12B, C; Dai, 1995: Fig. 2(3–5); Dang and Tran, 1992: Fig. 1(4)).

Distribution

Tributary of the Nam Thenn River, downstream of Nam Noy, Laos.

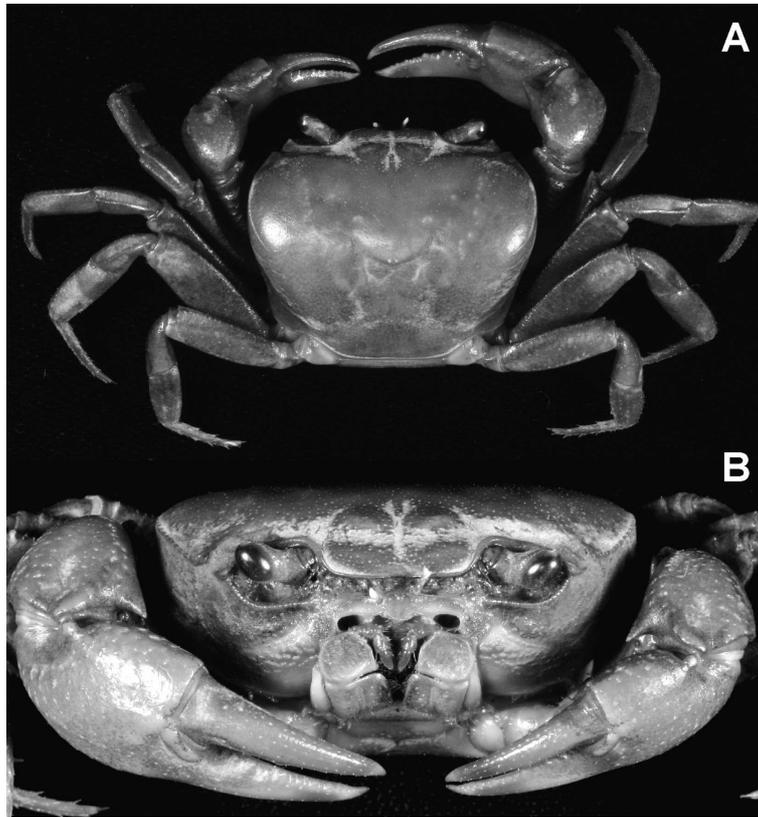


Fig. 10. *Hainanpotamon directum*, new species. Holotype male (28.4 by 22.7 mm) (ZRC 2007.0646), Laos. **(A)** Dorsal view. **(B)** Frontal view.



Fig. 11. *Hainanpotamon directum*, new species. Holotype male (28.4 by 22.7 mm) (ZRC 2007.0646), Laos. Ventral view.

Key to the species of *Hainanpotamon*

- 1a** G1 straight in overall appearance 2
- 1b** G1 curving outwards distally in overall appearance 3
- 2a** Epibranchial tooth weakly developed, rounded. Male telson with triangular tip. Dorsal flap of terminal segment of G1 semicircular, basal width distinctly shorter than half length of terminal segment
 - *H. helense* Dai, 1995
 - 2b** Epibranchial tooth distinct, triangular. Male telson with rounded tip. Dorsal flap of terminal segment of G1 very low, basal width slightly shorter than half length of terminal segment..... ***H. directum*, new species**
- 3a** Dorsal flap of G1 auriculate, higher than width of shaft of terminal segment ***H. auriculatum*, new species**

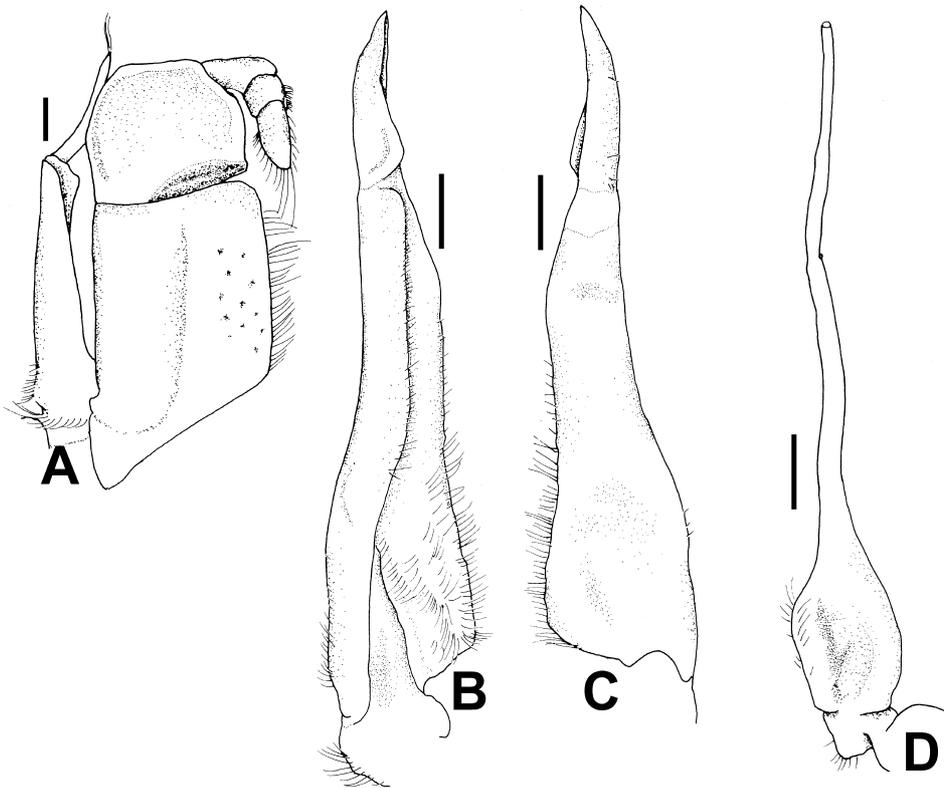


Fig. 12. *Hainanpotamon directum*, new species. Holotype male (28.4 by 22.7 mm) (ZRC 2007.0646), Laos. (A) Right third maxilliped. (B) Ventral view of G1. (C) Dorsal view of G1. (D) G2. Scales=1 mm.

- 3b Dorsal flap of G1 low, lower than width of shaft of terminal segment 4
- 4a Male telson with concave lateral margins. Terminal segment of G1 strongly oriented outwards *H. glabrum* (Dang, 1967)
- 4b Male telson with almost straight to gently convex lateral margins. Terminal segment gently oriented outwards 5
- 5a Dorsal flap of distal segment of G1 highest proximally with distal extension..... 6
- 5b Dorsal flap of distal segment semicircular, highest medially or subdistally 7
- 6a G1 sinuous, distal outer margin of subterminal segment concave *H. orientale* (Parisi, 1916)
- 6b G1 straight, distal outer margin of subterminal segment not clearly concave *H. fuchengense* Dai, 1995
- 7a G1 outer margin of terminal segment and distal part of subterminal segment not forming smooth concave curve, dorsal flap semicircular *H. globosum* (Parisi, 1916)
- 7b G1 outer margin of terminal segment and distal part of subterminal segment forming wide concave curve, dorsal flap otherwise 8
- 8a Lateral margins of male abdomen gently concave, with lateral margins of sixth segment subparallel. Dorsal flap of G1 with wide base, abruptly narrowed..... *H. daiae*, new species
- 8b Lateral margins of male abdomen almost straight to gently convex, with lateral margins of sixth segment distinctly converging distally. Dorsal flap of G1 with wide base, gradually narrowed *H. rubrum* Dai and Tran, 1992

ACKNOWLEDGMENTS

We are grateful to Paul F. Clark (NHM), Danièle Guinot (MNHN), Carlo Pesarini (MMI), Nguyen Xuan Quynh (National University of Hanoi), Dang Ngoc-Thanh (Vietnam National Centre for Natural Science and Technology), and Ludwig Tiefenbacher (Zoologische Staatssammlung, Munich) for their help with providing access to material under their care; the late Dai Aiyun, Cai Yixiong, Tran Anh Duc, Tan Heok Hui, and Leong Tzi Ming for all their kind help; and Tan Swee Hee and two anonymous reviewers for useful comments and suggestions. Yip Hoi Kee kindly helped to develop the photographs used in this paper. We are most grateful to Peter K. L. Ng for his support. This study is partially supported by research grant R-154-000-222-112 to the first author from the National University of Singapore.

REFERENCES

Anonymous (1991) Brackish and freshwater decapod crustaceans. In "Threatened Wildlife in Japan: Red Data Book on Invertebrates" Ed by Environment Agency, Wildlife Research Center, Tokyo, pp 211–230 [in Japanese]

Balss H (1937) Potamoniden (Dekapoda Brachyura) der Philippinen und des Malayischen Archipels. Internat Rev Gesamt Hydrobiol Hydrogr 34: 143–187

Bott R (1966) Potamiden aus Asien (*Potamon* Savigny und *Potamiscus* Alcock) (Crustacea, Decapoda). Senckenberg Biol 47: 469–509, Pls 16–21

Bott R (1968) Potamiden aus Süd-Asien (Crustacea, Decapoda). Senckenb Biol 49: 119–130, 5 pls

Bott R (1970) Die Süßwasserkrabben von Europa, Asien, Australien und ihre Stammesgeschichte. Eine Revision der Potamoidea und Parathelphusoidea (Crustacea, Decapoda). Abhandl Senckenberg Naturforsch Gesells, Frankfurt 526: 1–338, Pls 1–58

- Dai A-Y (1995) On a new genus and two new species of freshwater crabs from Hainan Island, China (Crustacea: Decapoda: Brachyura: Potamidae). *Acta Zootaxon Sin* 20: 391–397
- Dai A-Y (1997) A revision of the freshwater crabs of the genus *Nanhaipotamon* Bott, 1968, from China. *Raffles Bull Zool* 45: 209–235
- Dai A-Y (1999) Fauna Sinica Arthropoda Crustacea Malacostraca Decapoda Parathelphusidae Potamidae. Science Press, Beijing [in Chinese, with English abstract]
- Dang NT (1967) Các loài mới và giống mới tìm thấy trong khu hệ động vật không xương sống nước ngọt và nước lợ miền Bắc Việt-nam [New genera and new species of invertebrate fauna of freshwaters and saltwaters of North Vietnam]. *Tap san Sinh Vat – Dia Hoc* [Journal of Biology and Geology, National Institute of Science, Hanoi] 6: 155–164 [In Vietnamese, with French summary]
- Dang NT (1975) Phan loài tôm cua nước ngọt miền bắc Việt Nam [The identities of North Vietnamese freshwater shrimp and crabs]. *Tap san Sinh Vat – Dia Hoc* [Journal of Biology and Geology, National Institute of Science, Hanoi] 13: 65–78 [In Vietnamese, with French summary]
- Dang NT (1980) Dinh Loai Dong Vat Khong Xuong Song Nuoc Noot Bac Vit Nam. [The Identities of the Freshwater Invertebrates of North Vietnam]. Nha Xuat Ban Khoa Hoc Va Ky Thuat, Ha Noi [Science and Technology Publishing House, Hanoi], Hanoi [in Vietnamese]
- Dang NT (1992) Phan V. Dong Vat Khong Xuong Song, V.1. Dong Vat Khong Xuong Song Nuoc Ngot [Part V, Invertebrates, Vol 1, freshwater invertebrates]. In “Sach Do Viet Nam (Phan Dong Vat) [Red Data Book of Vietnam]” Ed by NT Dang, TD Dang, HH Dang, DD Hoang, DY Mai, TB Thai, K Tran, Q Vo, Hanoi, pp 317–322 [In Vietnamese]
- Dang NT, Ho TH (2001) Dong Vat Chi Viet Nam. 5. Giap Xac Nuoc Ngot. [Fauna of Vietnam. 5. Freshwater Crustacea] Trung Tam Khoa Hoc Tu Nhien Va Cong Nghe Quoc Gia. Nha Xuat Ban Khoa Hoc Va Ky Thuat, Ha Noi [National Center for Science and Technology of Vietnam, Science and Technology Publishing House, Hanoi], Hanoi [in Vietnamese]
- Dang NT, Ho TH (2002) Hai Loai Cua Moi Thuoc Ho Potamidae O Viet Nam [translation]. *Tap chi Sinh Hoc* [Journal of Biology, National Center for Natural Science and Technology of Vietnam] 24: 1–8 [In Vietnamese, with English summary]
- Dang NT, Tran NL (1992) Hai loài cua nước ngọt Potamidae mới ở Việt Nam [Two new species of freshwater crab from Vietnam]. *Tap chi Sinh Hoc* [Journal of Biology, National Institute of Science, Hanoi] 14: 17–21 [In Vietnamese, with English summary]
- Froggia C, Grippa GB (1986) A catalogue of the types kept in the collections of the Museo Civico di Storia Naturale di Milano. VIII. Types of decapod Crustacea (Annotated Catalog). *Atti Soc Ital Sci Nat Mus Civ Sto Natl Milano* 127: 253–83, Pls 1, 2
- Gima H, Shokita S (1980) Distribution of potamoid crabs in the Yona River of Okinawa Island in the Ryukyus. *Biol M Okinawa* 18: 9–15 [In Japanese, with English abstract]
- Holthuis LB (1990) Comments on the proposed fixation of type species for *Larnaudia* and *Ranguna* Bott, 1966 (Crustacea, Decapoda). *Bull Zool Nomencl* 47: 45
- International Commission on Zoological Nomenclature (ICZN) (1991) Opinion 1640. *Ranguna* Bott, 1966 and *Larnaudia* Bott, 1966 (Crustacea, Decapoda): *Potamon rangoonensis* Rathbun, 1904 and *Thelphusa larnaudii* A. Milne Edwards, 1869 confirmed as the respective type species. *Bull Zool Nomencl* 48: 171–172
- Kasai H, Naruse T (2003) Potamidae. In “The Flora and Fauna of Inland Waters in the Ryukyu Islands” Ed by M Nishida, N Shikatani, S Shokita, Tokai University Press, Tokyo, pp 282–288 [in Japanese]
- Minei H (1968) Fresh-water crabs of Japan. *Nat Stud* 4: 94–99 [in Japanese]
- Minei H (1973) Potamoid crabs of the Ryukyu islands, with description of five new species (Crustacea, Decapoda, Potamoidea). *J Fac Agric Kyushu Univ* 17: 203–226
- Minei H (1981) Distribution and general habitat of the freshwater crabs of Japan. In “Ecological Studies of Coastal Marine and Freshwater Crabs. (Report for the Grant-in-Aid for Co-operative Research, 1978–1980)” Ed by T Yamaguchi, Ministry of Education, Tokyo, pp 79–92 [In Japanese]
- Miyake S, Minei, H (1965) A new fresh-water crab, *Potamon (Geothelphusa) tenuimanus* sp. nov. from Okinawa-jima, the Ryukyu Islands. *Sci Bull Fac Agr Kyushu Univ* 4: 377–382, Pl 21 [in Japanese, with English summary]
- Naruse T, Segawa R, Shokita S (2004) *Amamiku*, a new genus for the true freshwater crab, *Candidiopotamon amamense* Minei, 1973 (Decapoda: Brachyura: Potamidae), from the Central Ryukyu Islands, Japan. *Zootaxa* 653: 1–8
- Ng PKL (1988) The Freshwater Crabs of Peninsular Malaysia and Singapore. Department of Zoology, National University of Singapore, Shinglee Press, Singapore
- Ng PKL (1990) Comments on the proposed fixation of type species for *Larnaudia* and *Ranguna* Bott, 1966 (Crustacea, Decapoda). *Bull Zool Nomencl* 47: 45–46
- Ng PKL, Dudgeon D (1992) The Potamidae and Parathelphusidae (Crustacea: Decapoda: Brachyura) of Hong Kong. *Invertebr Taxon* 6: 741–76
- Ng PKL, Naiyanetr P (1993) New and recently described freshwater crabs (Crustacea: Decapoda: Brachyura: Potamidae, Gecarcinucidae and Parathelphusidae) from Thailand. *Zool Verh* 284: 1–117
- Ng PKL, Naiyanetr P (1995) *Pudaengon*, a new genus of terrestrial crabs (Crustacea: Decapoda: Brachyura: Potamidae) from Thailand and Laos, with descriptions of seven new species. *Raffles Bull Zool* 43: 355–376
- Ng PKL, Shokita S (1995) *Ryukyum*, a new genus of terrestrial crab from the Ryukyu Islands (Brachyura: Potamidae). *Crustac Res* 24: 1–7
- Ng PKL, Yeo DCJ (2001) A revision of the genus *Tiwaripotamon* Bott, 1970 (Decapoda: Brachyura: Potamidae), with a description of a new species. *J Crustac Biol* 21: 275–287
- Ortmann AE (1896) Das System der Decapoden-Krebse. *Zool Jahrb Abt Syst Geogr Biol Tiere* 9: 409–453
- Parisi B (1916) I Decapodi Giapponesi del Museo di Milano. IV. Cyclometopa. *Atti Soc Ital Sci Nat Milano* 55: 153–190, Pls 7–11
- Radoman P (1972) Nochmals über die Gattung *Pseudamnicola* und schliesslich die Gattung *Orientalia* n. gen. *Arch Moll* 102: 195–200
- Sakai T (1940) Bio-geographic review on the distribution of crabs in Japanese waters. *Rec Oceanogr Work Jpn* 11: 27–63
- Sakai T (1976) Crabs of Japan and the Adjacent Seas. Kodansha, Tokyo
- Shokita S (1990) Inland-water decapods and their distribution in Iriomotejima Island of the Ryukyu Islands. In “Study of Essential Factors for Preservation of Wildlife in the Nansei Islands” Ed by Nature Conservation Bureau of the Environment Agency, Nature Conservation Bureau of the Environment Agency, Tokyo, pp 305–317 [In Japanese, with English summary]
- Shokita S (1991) Crustacean fauna from terrestrial and inlandwater areas and its conservation in the Ryukyus. In: Study of Essential Factors for Preservation of Wildlife in the Nansei Islands. Ed by Nature Conservation Bureau of the Environment Agency, Nature Conservation Bureau of the Environment Agency, Tokyo, pp 394–407 [In Japanese, with English summary]
- Shokita S (1996) The origin of land-locked freshwater shrimps and potamoids from the Ryukyu Islands, southern Japan. *J Geogr* 105: 343–353
- Shy J-Y, Ng PKL, Yu H-P (1994) Crabs of the genus *Geothelphusa*

- Stimpson, 1858 (Crustacea: Decapoda: Brachyura: Potamidae) from Taiwan, with descriptions of 25 new species. *Raffles Bull Zool* 42: 781–846
- Stimpson W (1858) Prodromus descriptionis animalium everbra-torum quoe in Expeditione ad Oceanum Pacificum eptenrion-alem a Republica Federata Missa, Cadwaladaro Ringgold et Johann Rodgers Ducibus, observatit et descriptsit — Part V, Crustacea Ocyppoidea. *Proc Acad Nat Sci Philadelphia* 9: 93–110
- Türkay M, Naiyanetr P (1987) The identity of *Potamon rangoonense* Rathbun, 1904 and *Thelphusa larnaudii* A. Milne Edwards, 1869, with introduction of *Neolarnaudia botti* n. g. n. sp. (Crus-tacea: Decapoda: Potamidae). *Senckenberg Biol* 67: 389–396
- Türkay M, Naiyanetr P (1989) Case 2624. *Ranguna* Bott, 1966 and *Larnaudia* Bott, 1966 (Crustacea: Decapoda): proposed fixation of *Thelphusa longipes* A. Milne Edwards, 1869 and *Thelphusa larnaudii* A. Milne Edwards, 1869 as the respective types. *Bull Zool Nomencl* 46: 101–103
- Yeo DCJ, Ng PKL (1998) Nomenclatural notes on *Hainanpotamon* Dai, 1995 (Brachyura, Potamidae), *Orientalia* Dang, 1975 (Brachyura, Potamidae) and *Orientalia* Radoman, 1972 (Mol-lusca, Gastropoda, Prosobranchia, Hydrobiidae). *Crustaceana* 71: 357–359
- Yeo DCJ, Ng PKL (1999) The state of freshwater crab taxonomy in Indochina (Decapoda, Brachyura). In “Crustaceans and the Biodiversity Crisis, Proceedings of the Fourth International Crustacean Congress, 1998, Vol 1” Ed by FR Schram, JC von Vaupel Klein, Brill, Leiden, pp 637–646
- Yeo DCJ, Ng PKL (2003) Recognition of two subfamilies in the Pot-amidae Ortmann, 1896 (Brachyura, Potamidae) with a note on the genus *Potamon* Savigny, 1816. *Crustaceana* 76: 1219–1235
- Yeo DCJ, Ng PKL (2005) On a new genus and species of freshwa-ter crab from Vietnam, with comments on the nomenclatural status of *Orientalia* Dang, 1975 (Crustacea: Brachyura: Potami-dae: Potamiscinae). *Zootaxa* 917: 1–15

(Received February 16, 2007 / Accepted July 24, 2007)