Zootaxa 1621: 17–31 (2007)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

On the taxonomy of the genus *Hymenicoides* Kemp, 1917 (Crustacea: Decapoda: Brachyura: Hymenosomatidae), with resurrection of *Limnopilos* Chuang & Ng, 1991, and descriptions of two new species

TOHRU NARUSE* & PETER K. L. NG
*Department of Biological Sciences, National University of Singapore, 14 Science Drive 4, Singapore 117543, Republic of Singapore. (*e-mail: dbstn@nus.edu.sg)*

Abstract

The systematics of the false spider crab genus *Hymenicoides* Kemp, 1917 (Hymenosomatidae), is revised. *Hymenicoides carteri*, type species of the genus, has a distinct locking structure of male abdomen as well as possession of a strong tubercle on the palm of the chela, features which are quite different from *H. naiyanetri* (Chuang & Ng, 1991), and *H. microrhynchus* Ng, 1995. The present study restricts *Hymenicoides* Kemp, 1917, for *H. carteri* and resurrects *Limnopilos* Chuang & Ng, 1991, for the other two species. Two new species, one of *Hymenicoides* from Myanmar, and one of *Limnopilos* from Sumatra, are also described. A key to the species of both genera is provided.

Key words: *Hymenicoides*, *Limnopilos*, new species, taxonomy, Hymenosomatidae

Introduction

The false spider crabs of the genus *Hymenicoides* Kemp, 1917, currently contains three species from the Indo-West Pacific region, *H. carteri* Kemp, 1917 (from near Calcutta [=Kolkata], India), *H. naiyanetri* (Chuang & Ng, 1991) (from Thailand) and *H. microrhynchus* Ng, 1995 (from Sabah, Malaysian Borneo). *Hymenicoides naiyanetri* was originally placed in its own genus, *Limnopilos* Chuang & Ng, 1991, and distinguished from *Hymenicoides* by its less trilobed pleotelson and the simpler structure of its male first gonopod (Chuang & Ng, 1991). The male first gonopod of the type species of *Hymenicoides*, *H. carteri*, was first described by Lucas (1980: 197) as "strongly bent, with complex apex including long subterminal setae, semicircular lip and denticulate tooth", although no figure was provided. Ng (1995), however, synonymised *Limnopilos* under *Hymenicoides*; with Ng & Chuang (1996: 50) commenting: "*Limnopilos* does not have the protuberance on the outer surface of palm of male cheliped, but this is probably more of an interspecific rather than an intergeneric difference. One of the main reasons for separating *Limnopilos naiyanetri* generically from *Hymenicoides carteri* was by the structures of their telsons (Chuang & Ng, 1991). In *Hymenicoides*, the telson is distinctively trilobate, with the lateral lobes large and distinctively produced. In *Limnopilos*, the trilobate condition is much less obvious, the lateral lobes being smaller and more confluent with the median part... After due reconsideration of this and the congruence of almost all other characters we regard as taxonomically important at the genus level, we feel that it would be better to synonymise *Limnopilos* under *Hymenicoides*." Guinot & Richer de Forges (1997), in their appraisal of the Hymenosomatidae, however, suggested that *Limnopilos* may be separate from *Hymenicoides*, commenting that "*H. naiyanetri* (Chuang *et* Ng, 1991), aux Mxp3 pédiformes mais aux Pl1 un peu différents et au telson moins distinctement trilobé (Ng, 1995), devrait-il être réintégré dans son genre d'origine particulier, *Limnopilos* Chuang *et* Ng, 1991? En tout état de cause, *Cancrocaeca* et *Hymenicoides* (? et *Limnopilos*) sont étroitement apparentés."

Accepted by P. Castro: 3 Sept. 2007; published: 23 Oct. 2007

In the interim years, the second author obtained some specimens from Bangladesh which were referable to *H. carteri*, as well as an undescribed species from Myanmar. A good collection of *Hymenicoides* was also obtained from central Sumatra. This provided us with the opportunity of reappraising the taxonomy of the genus and explore Guinot & Richer de Forges' (1997) assertion that *Limnopilos* might be a valid genus. The present study makes detailed comparisons of the important characters of *Hymenicoides* and *Limnopilos*, and concludes that both should be regarded as distinct genera. Two new species from Myanmar and Sumatra, from both *Hymenicoides* and *Limnopilos*, are also described.

Specimens examined are deposited in Muséum national d'Histoire naturelle, Paris (MNHN); Muzium Zoologicum Bogoriense, Bogor, Indonesia (MZB); The Natural History Museum, London (NHM); Queensland Museum, Brisbane, Australia (QM); and the Zoological Reference Collection, Raffles Museum of Biodiversity Research, National University of Singapore (ZRC). The terminology essentially follows Ng & Chuang (1996) and Guinot & Richer de Forges (1997). Measurements provided are of the carapace length (CL: along the median line from the posterior margin to the tip of the rostrum) by the carapace width (CW: measured at its widest part). The abbreviations G1 and G2 are used for the male first and second gonopods respectively.

Taxonomy

Hymenosomatidae

Hymenicoides Kemp, 1917

Hymenicoides— Kemp, 1917: 267; Lucas, 1980: 196; Ng & Chuang, 1996: 50 (part); Guinot & Richer de Forges, 1997: 460 (part); Guinot & Bouchard, 1998: 685.

Type species. *Hymenicoides carteri* Kemp, 1917, by monotypy; gender of genus masculine.

Diagnosis. Carapace oval, dorsal surface concave; grooves distinct; rostrum absent or very weak; antenna with base of basal article placed posterior-inner part of base of eye; eyes, antennae, antennules visible dorsally; third maxillipeds narrow, not covering more than three-quarters of mouth field when closed, merus rectangular, dactylus styliform, approximately twice length of propodus; male chelae relatively stout, manus with high, prominent, dorso-ventrally compressed tubercle on distal part of outer surface, tubercle absent in females. Female vulvae placed on imaginary line joining inner ends of sutures between sternites 5 and 6 on medially fused plate of thoracic sternum, vulva with basal mount. Male abdomen-pleotelson without fused segments, male pleotelson distinctly trilobed, inner surface thickened externally, forming socket for sternal button (Fig. 1a). G1 stout, bent outwards medially; distal part with prominent distal inner processes, swollen distal outer angle, long, dorsal bursiform projections. Female abdomen with 6 distinctly demarcated segments, boundary between first and second segments (*H. carteri*) or between second and third segments (*H. robertsi*) movable; long, biramous pleopods on second to fifth segments, developed from distal outer end of inner surface of each segment.

Remarks. The distinctive trilobate pleotelson of *H. carteri* has received some attention from taxonomists due to its unusual shape. Lucas (1980: 197) regarded that the lateral lobe of male pleotelson as "a cavity to receive the apice of the first pleopod". Guinot & Richer de Forges (1997: 470) suggested that the lateral lobe of the pleotelson may be derived from the inserted plate (see Guinot & Richer de Forges, 1997: Fig. 6, for mobile intercalated platelet of *Odiomaris pilosus*). Guinot & Bouchard (1998: 685) subsequently hypothesized that the abdominal socket, which is placed on the inner surface of the lateral lobe (or the intercalated platelet), is homologous with the uropod.

Our examination of the type material of *H. carteri* and *H. robertsi* **new species**, shows that the inner surface of the lateral lobe of the male pleotelson is domed and that it is externally surrounded by a thickened rim,

forming a semicircular cavity (Fig. 1b). When the abdomen is closed, the cavity overlays the sternal button (Fig. 1a). This does not support the premise that the lateral lobe of the pleotelson is to accommodate the unusual tip of the G1 (Figs. 2a, b, 5c, d). In fact, even when the abdomen is open, the G1 can easily be accommodated within the sterno-abdominal cavity (Fig. 1a). The sternal buttons and the lateral cavities of the pleotelson function instead to "lock" the abdomen with the thorax. It should be noted that the G1 of *H. carteri* closely resembles that of *Cancrocaeca xenomorpha* (see also Guinot & Richer de Forges, 1997), and in the latter species, the male abdomen is more typical in shape, lacking the trilobite pleotelson, as well as sternal buttons, seen in *Hymenicoides* (Naruse, T., Ng, P.K.L. & Guinot, D., in manuscript).

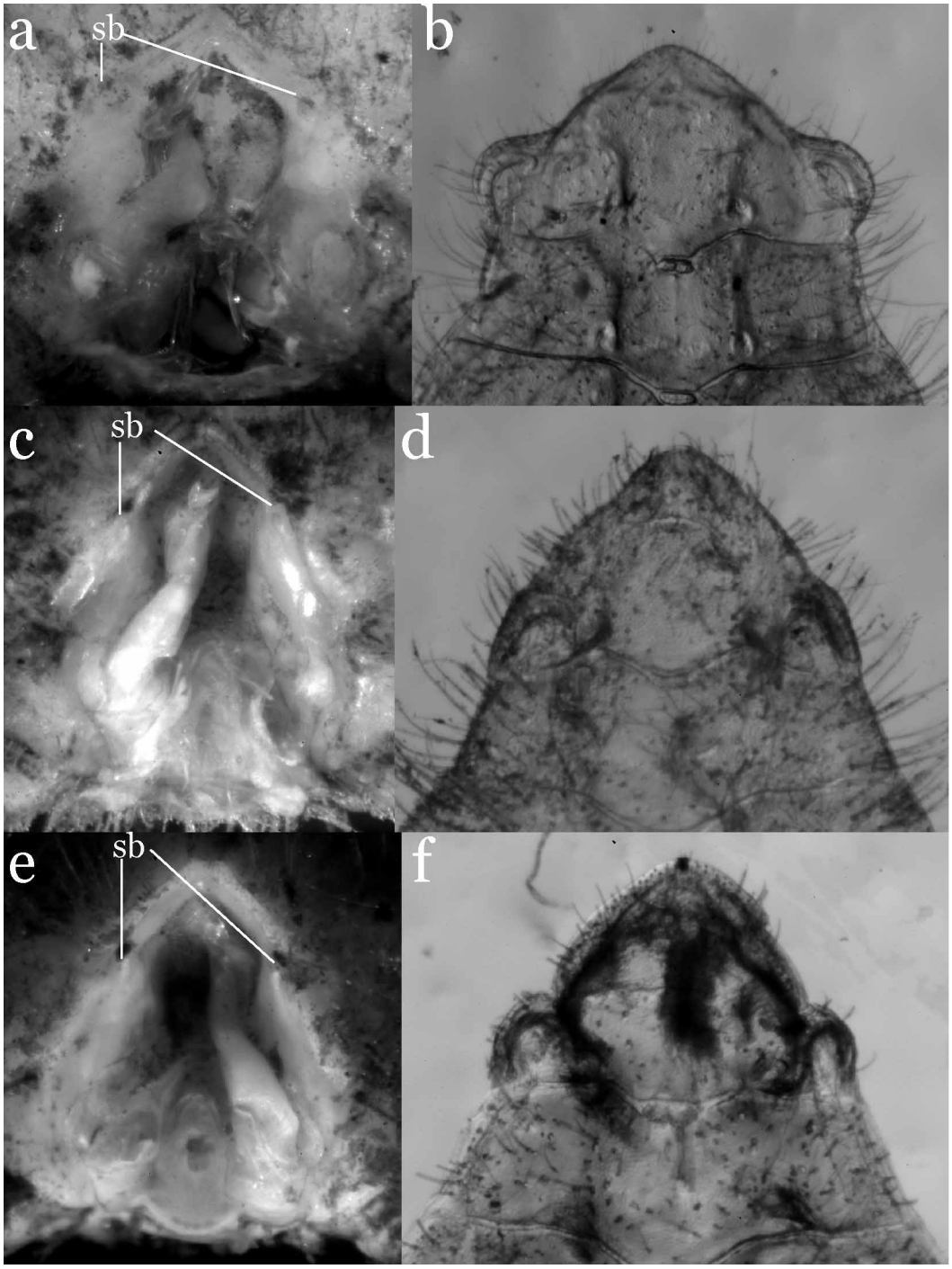

FIGURE 1. Male abdominal cavity and pleotelson of *Hymenicoides robertsi* **new species**, and *Limnopilos* species. a, b, *Hymenicoides robertsi* **new species** (paratype, ZRC 2007.0109, 5.0 × 6.2 mm); c, d, *L. naiyanetri* Chuang & Ng, 1991 (ZRC 1991.6521–6555, 4.9 × 5.3 mm); e, f, *L. sumatranus* **new species** (paratype, ZRC 2007.0114, 5.0 × 5.9 mm). a, c, e, male abdominal cavity with sternal button (sb) and G1; b, d, f, inner surface of male pleotelson.

Limnopilos naiyanetri Chuang & Ng, 1991 (type species of *Limnopilos* Chuang & Ng, 1991), *L. microrhynchus* (Ng, 1995) new combination, and *L. sumatranus* **new species**, all possess the sternal button and the pleotelson lateral cavity (Fig. 1c–f). The lateral cavities of these three species, however, are relatively smaller and the rim is more distal in position on the cavity when compared with those of *H. carteri* and *H. robertsi*. This may be due to the different shape of the G1 of *Hymenicoides*. The lateral cavity of *Hymenicoides* needs to be thickened along the external margins to effectively engage the sternal button, three sides (anterior, inner and posterior) which are surrounded by the G1 *in situ* (Fig. 1a). However, the sternal buttons of *Limnopilos* are placed more distantly from the distal outer angle of the G1 (Fig. 1c, e), and allow the lateral cavity to more easily lock onto the sternal button by way of the distally thickened rim.

The G1s of the *Hymenicoides* species (Fig. 2a, b, 5c, d) differ from those of *Limnopilos* in several key aspects: they have a proportionately stouter shaft (vs. moderately stout in *Limnopilos*), more prominent distal inner processes (vs. moderately stout in *Limnopilos*) and with the distal outer angle more swollen than in *Limnopilos* species (Fig. 8c; Ng & Chuang, 1996: Fig. 21H; Ng, 1995: Fig. 14A, B).

The marked differences in the chela, abdomen and G1 lead us to now conclude that *Limnopilos* should be resurrected as a valid genus.

Hymenicoides carteri Kemp, 1917

(Fig. 2)

Hymenicoides carteri— Kemp, 1917: 268; Lucas, 1980: 197; Ng & Chuang, 1996: 50; Guinot & Richer de Forges, 1997: 462.

Material examined. **Lectotype** (present designation): male, 4.0 × 4.8 mm, NHM 1919.11.1.121 , R. Nughli, Sibpur, near Calcutta, India, coll. Annandale & S. Kemp, Jan. 1917.

Paralectotypes: 1 male, 4.0 × 4.8 mm, 1 female, 3.2 × 3.7 mm, 1 ovigerous female, 3.0 × 3.7 mm, NHM 1919.11.1.122–123, data same as lectotype.

Others. 1 male, 2.2 × 2.4 mm, 2 females, 2.6 × 2.9 mm, 2.7 × 2.9 mm, ZRC 2007.0107, Tangail District, North Central region, Ganges basin, Bangladesh, 4 Nov. 1992.

Remarks. *Hymenicoides carteri* has not been collected since Kemp (1917) described the species from near Calcutta, India and near Khulna, Bangladesh, on the basis of 22 specimens. In this study, we have located only four of the syntypes in NHM (Paul Clark, pers. comm.); the rest are presumably still in the Zoological Survey of India (ex Indian Museum). The G1 of *H. carteri* was first described by Lucas (1980: 197), although no figure was provided. The G1 of the lectotype (Fig. 2a, b, NHM, 4.0 × 4.8 mm) is very broad, bent outwards medially and with a line of long stiff median setae along the inner part of the ventral side. The distal part of the G1 is a complicated structure; composed of a bifurcated, U-shaped projection on the distal inner angle, a denticulate lip-like margin on the distal outer angle and a long bursiform projection on the dorsal side of the base of the distal outer angle. *In situ*, the G1 sits completely in the deep sterno-abdominal cavity (Fig. 1a).

Of the three recent specimens of *H. carteri* from Bangladesh, the only male specimen is small (ZRC 2007.0107, 2.2 × 2.4 mm) but it is basically similar to the type series of *H. carteri* (NHM 1919.11.1.121–123 3.0 × 3.7 - 4.0 × 4.8 mm) except for the G1 and the chela. The G1 is present but is still relatively undeveloped. The G1 of the lectotype specimen (NHM 1919.11.1.121, 4.0 × 4.8 mm) possesses a long bursiform projection on the dorsal side of the base of the distal outer angle (Fig. 2b), which is not observed in the small male Bangladesh specimen. The cheliped of the Bangladesh male specimen is proportionally small and the tubercle on the manus is very low. These differences, however, are possibly associated with size and growth. Larger series of the specimens from Bangladesh may help to better understand the degree of variation in this species.

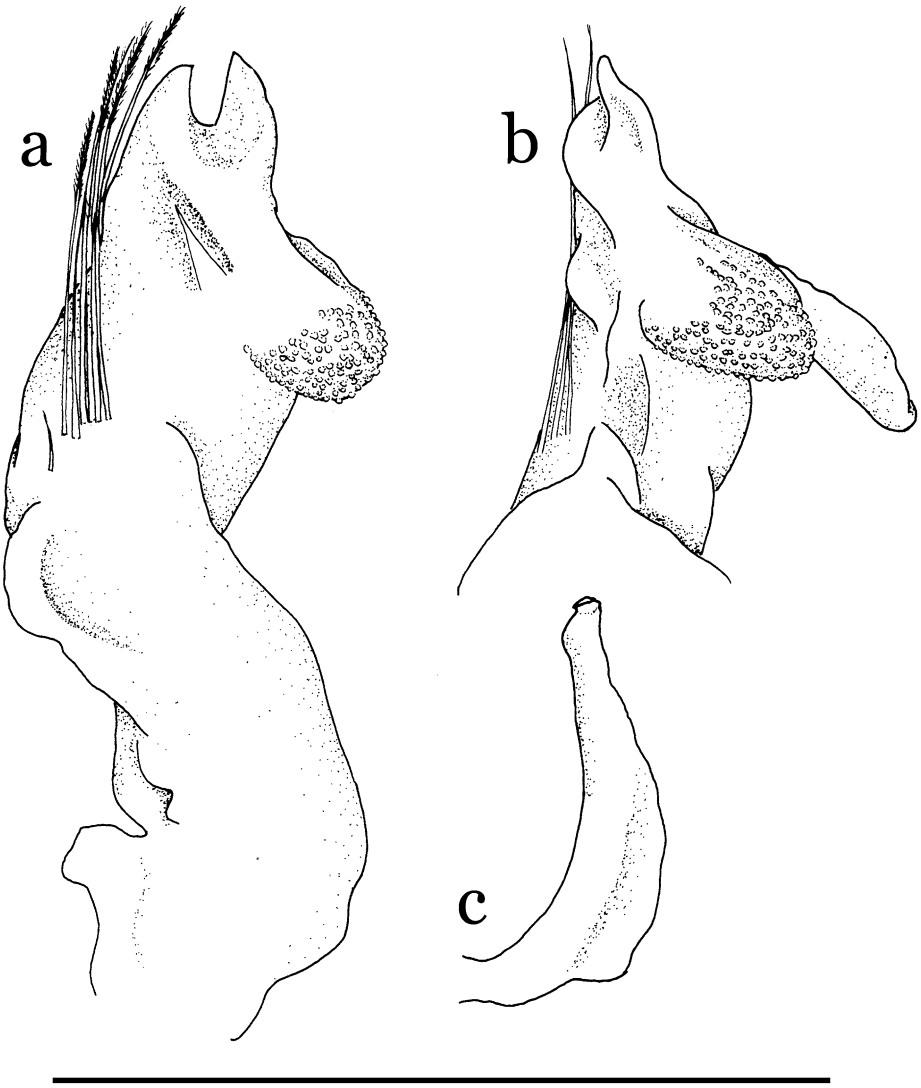

FIGURE 2. Male first and second gonopods of *Hymenicoides carteri* Kemp, 1917. Lectotype, male (NHM 1919.11.1.121), 4.0 × 4.8 mm. a, left G1, ventral view; b, left G1, outer view; c, left G2. Scale bar, 1 mm.

***Hymenicoides robertsi* new species**
(Figs. 1a, b, 3–6)

Material examined. **Holotype**: 1 male, 4.9 × 6.0 mm, ZRC 2007.0108, Kyaukdaw market on lower Kaladan River (tidal), Rakhine, Myanmar, coll. T. R. Roberts, 26 Mar. 2004.

Paratypes: 1 male, 5.0 × 6.2 mm, ZRC 2007.0109; 42 males, 3.0 × 3.3 – 5.2 × 6.2 mm, ZRC 2007.0110; 1 female, 4.8 × 5.6 mm, ZRC 2007.0111; 4 females, 3.9 × 5.5 mm – 4.8 × 5.6 mm, ZRC 2007.0112; 16 ovig., 4.1 × 4.9 mm – 4.5 × 5.4 mm, ZRC 2007.0113; 5 males, 4.2 × 5.0 – 5.0 × 5.8 mm, 2 ovig., 3.8 × 4.2, 3.8 × 4.3 mm, NHM 2007.600–606; 5 males, 4.0 × 4.8 – 4.9 × 5.7 mm, 2 ovig., 3.8 × 4.4 mm, 4.2 × 4.8 mm, MNHN-B30393. All paratypes were collected together with the holotype.

Description. Carapace (Fig. 4a) oval, CW 1.13–1.24 times CL (mean 1.18, n = 9) CL; dorsal surface flat, surrounded by continuous rim, regions well demarcated by grooves, H-shaped gastric groove continuous with cervical groove, cervical groove branching anteriorly, branches confluent with anterolateral rim. Rostrum vestigial, triangular. Lateral margin of carapace lacking tooth or lobe, side wall of posterolateral region slightly

expanded laterally, with longitudinal groove along posterolateral rim below. Conical tooth present between antennules, completely disconnected from vestigial rostrum; orbit indiscernible, without tooth on outer part of eye. Epistome long, placed anterior-dorsally to buccal cavern, ischium of third maxilliped partially covering posterior margin; posterior margin with trapezoidal convexity with median notch.

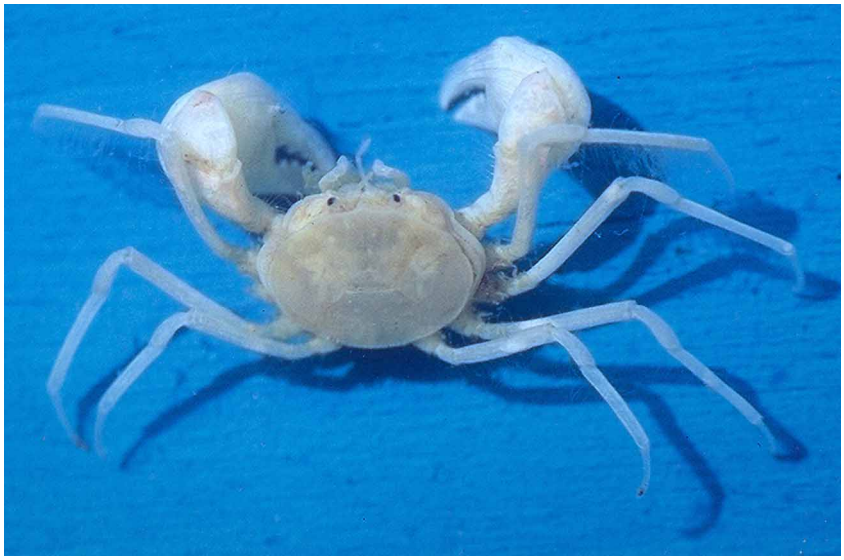

FIGURE 3. Live colour of *Hymenicoides robertsi* **new species**. Photograph was taken by Tyson Roberts.

Eyes moderately developed, visible dorsally. Antennule with long coxa and basis; basis more than half length of coxa. Third maxilliped (Fig. 4b) narrow, covering about one-quarter of buccal cavern; mid-length of ischium about three-quarters of merus, distal inner angle produced; palp long, propodus about half length of dactylus, dactylus as long as merus, tip of dactylus almost reaching proximal end of ischium *in situ*; exopod short, reaching about proximal two-thirds of merus, with distinct flagellum.

Male with relatively wide abdominal cavity (Fig. 1a), sternal button narrow, high, just posterior to imaginary line joining inner ends of sutures between sternites 5 and 6. Female thoracic sternite 3 separated from sternite 4 by posteriorly convex rim, sterites 4–8 medially fused, vulva on imaginary line joining inner ends of sutures between sternites 5 and 6 on medial fused plate of thoracic sternum, vulva with longitudinally elliptical basal mount.

Chelipeds symmetrical, relatively stouter in males; male cheliped with short merus, ventral outer margin with subdistal tooth, inner margin of merus to carpus lined with long stiff setae, outer surface of carpus rounded, not strongly elevated, outer margin with subdistal tooth; chela (Fig. 4c, d) with rounded palm, almost glabrous, outer surface inflated, with dorso-ventrally flattened tubercle on outer surface of proximal lower part of base of immovable finger, tubercle absent in females; fingers with ovoid gape when closed, tips slightly hoof-like; immovable finger with ca. 6 low teeth; teeth of movable finger similar to those of immovable finger.

Ambulatory legs (Fig. 4a) slender, long, second longest, inner margin of propodi to dactyli fringed densely lined with long plumose setae; meri slightly longer than respective propodi, distal anterior angle not produced; dactyli (Fig. 4e) terminating in sharp tooth, with subterminal inner tooth placed far from distal tooth.

Male abdomen-pleotelson (Fig. 5a) 6-segmented; first segment thick, hard, distal margin widely concave; second to fifth segments with distal margin concave medially, third segment widest; pleotelson trilobed, lateral lobes distinct, auriculate, inner surface of lateral lobes thickened externally, forming socket for sternal button on inner surface (Fig. 1a, b). G1 (Fig. 5c, d) stout, strongly bent on distal half, with longitudinal line of

long, stiff setae on distal to medial inner angle of shaft; distal inner end with beak-like chitinous projection, distal outer angle swollen, covered by tiny granule, distal outer angle dorsally connected with thumb-like projection. G2 (Fig. 5e) short, less than half length of G1. Female abdomen-pleotelson (Fig. 5b) demarcated to 6 segments, boundary between second to fifth segments movable, more or less fixed in other boundaries; second to fifth segments with corneous wide ridge medially, that of pleotelson only on proximal half, pleotelson longest; pleopods (Fig. 6) on second to fifth segments, long, biramous from near base, developing from distal outer angle of inner surface of each segment.

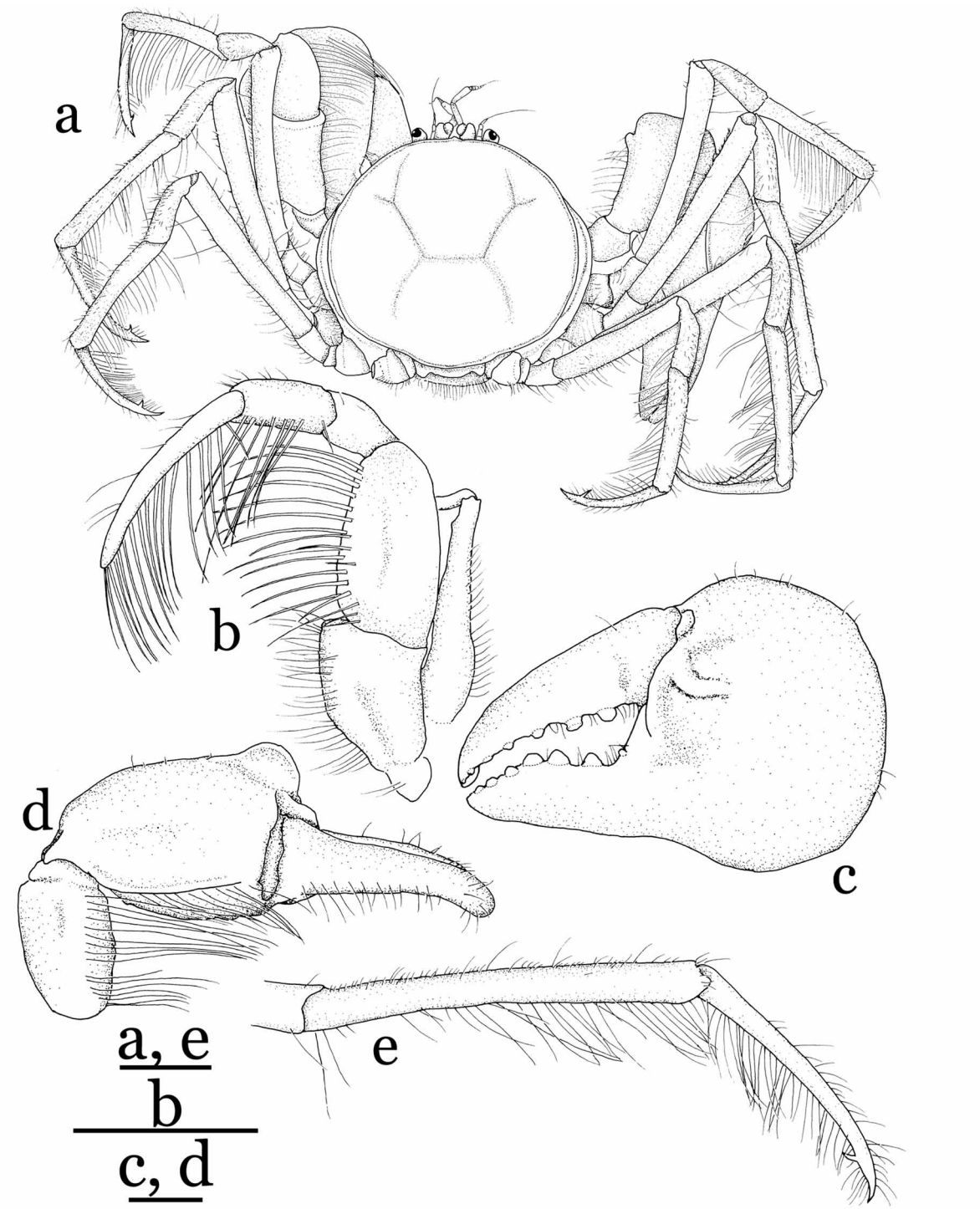

FIGURE 4. *Hymenicoides robertsi* **new species**. a, habitus; b, left third maxilliped; c, male left chela, outer view; d, male left chela, dorsal view; e, right second ambulatory dactylus. a, c–e, holotype male (ZRC 2007.0108), 4.9 × 6.0 mm; b, paratype, male (ZRC 2007.0109), 5.0 × 6.2 mm. Scale bars, 1 mm.

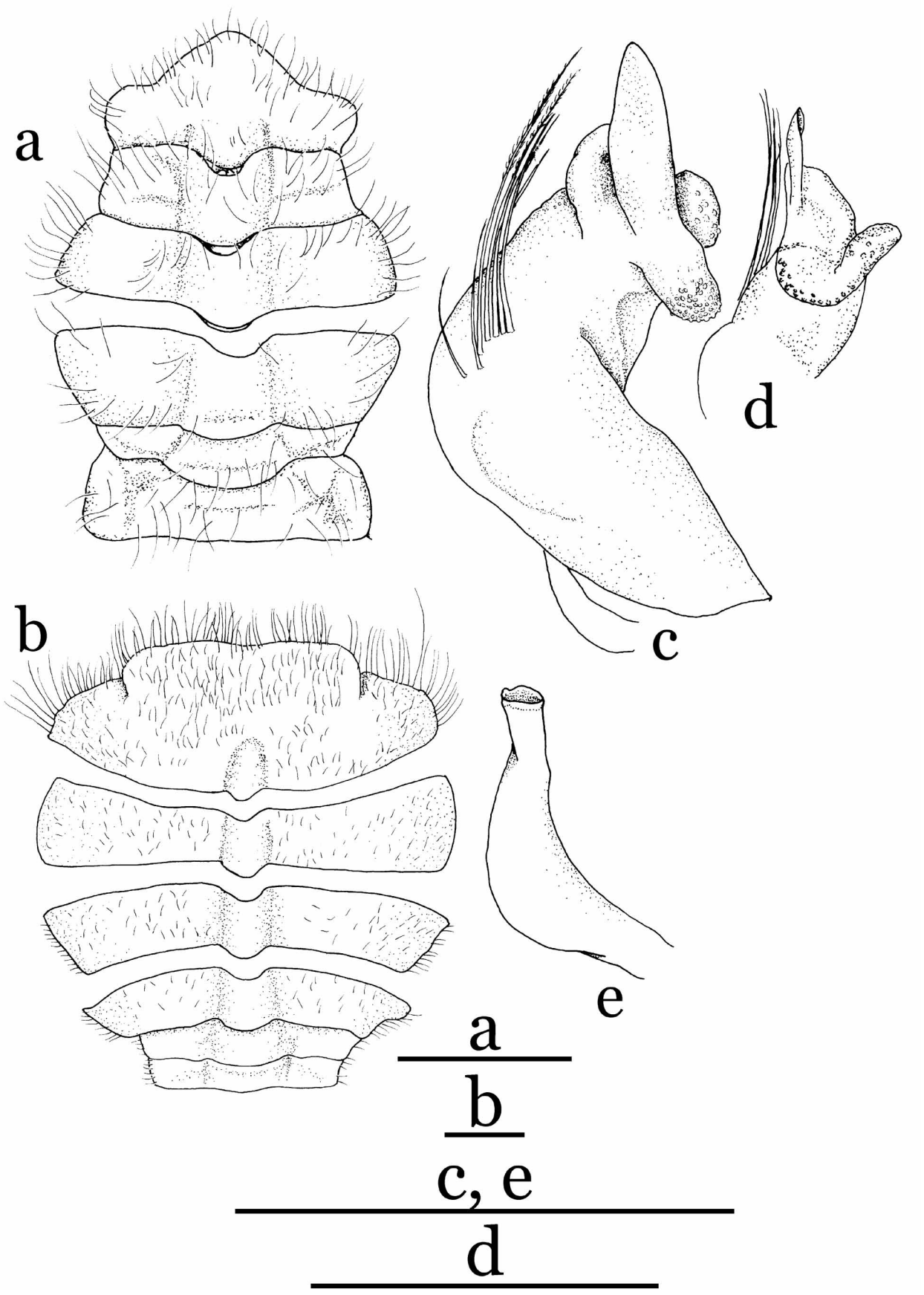

FIGURE 5. *Hymenicoides robertsi* **new species**. a, male abdomen-pleotelson; b, female abdomen-pleotelson; c, left G1, ventral view; d, left G1, outer view; e, left G2. a, paratype, male (ZRC 2007.0109), 5.0 × 6.2 mm; b, paratype, female (ZRC 2007.0111), 4.8 × 5.6 mm; c–e, holotype, male (ZRC 2007.0108), 4.9 × 6.0 mm. Scale bars, 1 mm.

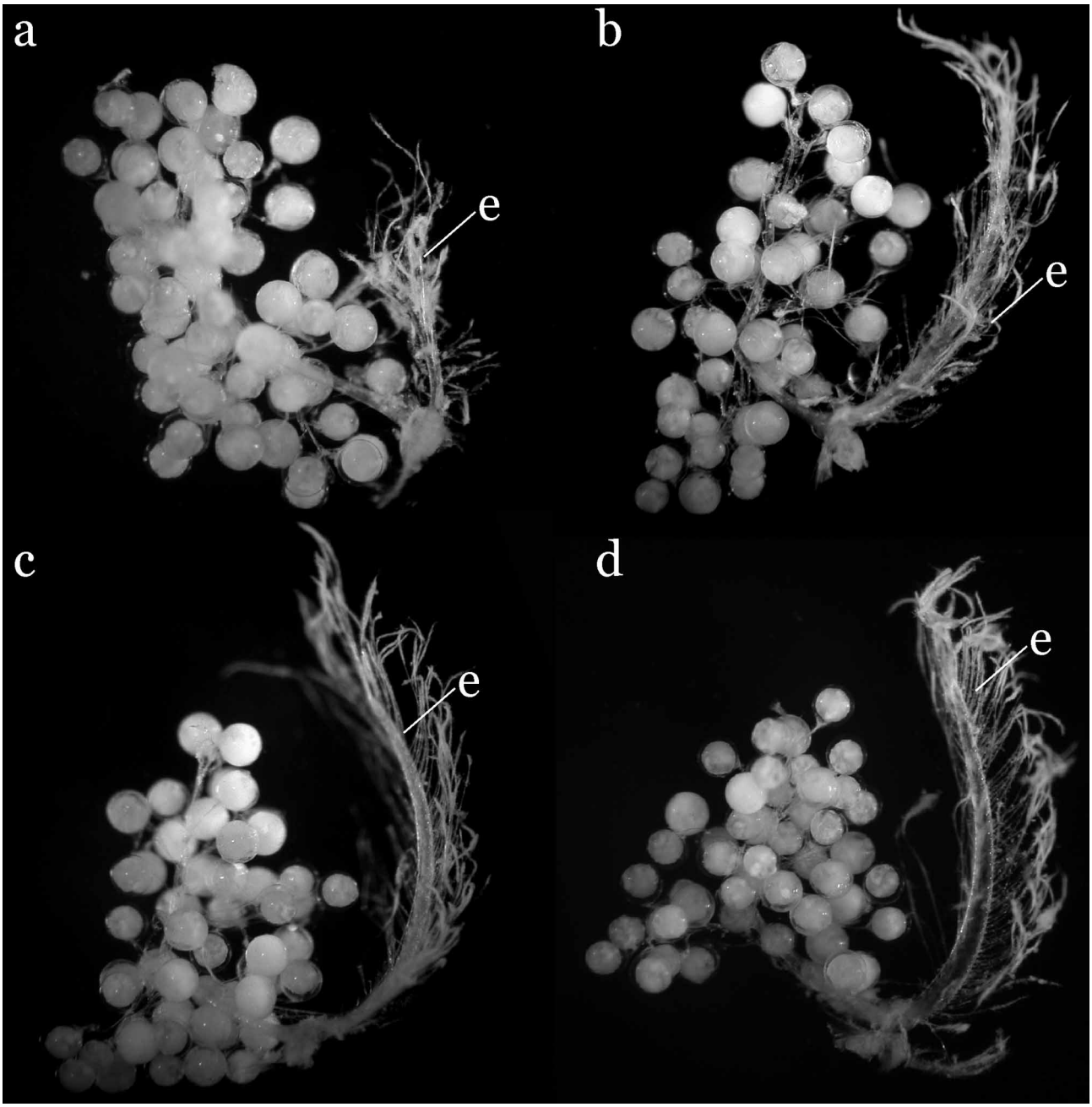

FIGURE 6. *Hymenicoides robertsi* **new species**. a–d, right second to fifth pleopods; e, exopods. Paratype, ovigerous female (ZRC 2007.0113), 4.2 × 5.0 mm.

Eggs spherical, small, diameter 0.27 – 0.30 mm [mean = 0.28, n = 15 from three females (3.9 × 4.4 mm, 4.1 × 4.7 mm, 4.2 × 5.0 mm)], attached on endopods of pleopods, exopods growing inwards, partially covering dome-shaped abdomen.

Habitat and distribution. All specimens of *Hymenicoides robertsi* were obtained from the Kyaukdaw market on the lower Kaladan River (with tidal influence), Rakhine, Myanmar. The specimens were found crawling over a large number of young *Pisodonophis* snake eels in a tray in the market (T. R. Roberts, pers. comm.) and had been apparently collected in the nearby area. The species is known only from Myanmar at present.

Etymology. We are pleased to name this species for the well known ichthyologist, Tyson R. Roberts, who very generously provided the specimens of this new species as well as those of *H. carteri* from Bangladesh for our study.

Remarks. *Hymenicoides robertsi* **new species**, is clearly different from *H. carteri* in its proportionately more slender ambulatory legs (Fig. 3a; Kemp, 1917: Fig. 17). In addition, both species can be distinguished by the armature of the inner margin of the ambulatory dactyli. In *H. robertsi*, all the dactyli have only one subterminal tooth, which is placed some distance from the tip, while in *H. carteri*, the third to fifth dactyli have 3–11 small teeth (posterior legs with fewer teeth) and a subdistal large tooth which is placed closer to the tip. Another major difference is the single beak-like chitinous projection of the G1 of *H. robertsi* (biramous shorter projection in *H. carteri*) (Figs. 2a, b, 4a, e, 5c, d; Kemp, 1917: Figs. 17, 20).

Limnopilos Chuang & Ng, 1991

Limnopilos Chuang & Ng, 1991: 363.
Hymenicoides— Ng & Chuang, 1996: 50 (part); Guinot & Richer de Forges, 1997: 460 (part).

Type species. *Limnopilos naiyanetri* Chuang & Ng, 1991, by original designation and monotypy; gender of genus masculine.

Diagnosis. Carapace circular, pilose, dorsal surface concave; grooves distinct; rostrum absent or very weak; antenna with proximal portion of basal article posterior to inner section of proximal portion of eye; eyes, antennae, antennules visible dorsally; third maxillipeds narrow, not covering more than three-quarters of mouth field when closed, merus rectangular, dactylus styliform, approximately twice length of propodus; male chelae relatively stout, outer surface evenly convex, partially covered by dense setae , without tubercle. Female vulva placed on imaginary line joining inner ends of sutures between sternites 5, 6 on medial fused plate of thoracic sternum, vulva with basal mount. Male abdomen-pleotelson 6 segmented, pleotelson slightly trilobed, inner surface thickened distally, forming socket for sternal button (Fig. 1c, d). G1 stout, bent outwards medially; distal part with distal inner processes, tuberculate distal outer angle. Female abdomen-pleotelson with six distinctly demarcated segments, boundary between first and second (*L. sumatranus*) or between second and third segments (*L. naiyanetri*) movable; long, biramous pleopods on second to fifth segments, developed from distal outer end of inner surface of each segment.

Remarks. Several characters clearly distinguish *Limnopilos* from *Hymenicoides* (see Remarks for *Hymenicoides* above). In addition to *L. naiyanetri*, the type species, *H. microrhynchus* Ng, 1995, and *L. sumatranus* **new species**, all possess the diagnostic characters of the genus and are therefore transferred to *Limnopilos*.

In the case of *L. microrhynchus*, only male specimens are known thus far, and the female characters diagnosed above are therefore not known for this species.

Limnopilos sumatranus new species
(Figs. 1e, f, 7-9)

Material examined. **Holotype**: male, 4.7 × 5.5 mm, MZB Cru 1650, Jambi, Sg. Hitam, near junction into black water reserve, along Batang Hari, Sumatra, Indonesia (1°15´9.3" S, 104°6´49.6" E), coll. H. H. Tan et al., 5 Jun. 1996.

Paratypes: 1 male, 5.0 × 5.9 mm, ZRC 2007.0114; 21 males, 2.1 × 2.3 mm – 5.1 × 6.0 mm, ZRC 2007.0115; 7 females, 2.8 × 3.0 – 3.7 × 4.0 mm, ZRC 2007.0116; 28 ovig., 2.8 × 3.1 – 4.0 × 4.6 mm, ZRC 2007.0117; 3 males, 3.5 × 4.0 mm – 4.1 × 4.8 mm, 1 ovig., 3.8 × 4.3 mm, MNHN-B30394; 1 male, 4.6 × 5.1 mm, 1 female, 5.4 × 6.3 mm, MNHN-B30395; 3 males, 3.3 × 3.7 mm – 3.8 × 4.2 mm, 1 ovig., 3.5 × 4.0 mm, MZB Cru 1651. All paratypes were collected together with holotype.

Comparative material. *Limnopilos naiyanetri* (Chuang & Ng, 1991): 1 male, 5.9 × 6.0 mm, ZRC 1993.6520, holotype, Mae Nam Nakhon Chaisi, Amphoe Nakhon Chaisi, Changuat Nakhom Pathom, Thailand, coll. Naunsri, 1998; 19 males, 3.1 × 3.6 – 5.4 × 6.4 mm, 13 females, 2.9 × 3.1 – 4.5 × 5.0 mm, ZRC 1991.6521–6555, paratypes, same data as holotype. *Limnopilos microrhynchus* (Ng, 1995): 1 male, 2.6 × 2.8 mm, QM W21466, Bengalon River, east Kalimantan, Indonesia (0°42´ S, 117°38´ E), coll. R. Powell & J. Powell, 16 Mar. 1996.

Description. Carapace (Fig. 7a) circular, CW 1.1–1.2 times CL (mean 1.13, n = 14); dorsal surface flat, surrounded by circular rim, regions well demarcated by grooves, H-shaped gastric groove continuous with cervical groove, cervical groove branching anteriorly, branches confluent with anterolateral rim. Rostrum vestigial, anterior median part of rim projecting slightly, tip with a few long setae. Lateral margin of carapace lacking tooth or lobe, side wall of posterolateral region slightly expanded laterally, with posterior longitudinal groove along posterolateral rim. Laterally flattened sharp tooth between antennules, completely disconnected from vestigial rostrum; orbit indiscernible, with a sharp conical tooth on outer part of eye, tooth visible from dorsal view. Epistome long, placed dorsally compared to buccal cavern, ischum of third maxilliped partially covering posterior margin.

Eyes moderately developed, visible dorsally. Antennule with long coxa, about twice length of basis. Third maxilliped (Fig. 7b) narrow, covering about one-quarter of buccal cavern; merus long, about one-half times of ichium, narrower than ischium; palp long, propodus slightly longer than half length of dactylus, dactylus longer than merus, tip of dactylus almost reaching proximal end of ischium; exopod short, reaching about proximal two-third of merus, with distinct flagellum.

Male with relatively wide abdominal cavity (Fig. 1e), sternal button present on just posterior to imaginary line joining inner ends of sutures between sternites 5 and 6. Female thoracic sternite 3 separated from sternite 4 by posteriorly convex rim, sternites 4–8 medially fused, vulva on imaginary line joining inner ends between sternite 6 on medial fused plate of thoracic sternum, vulva with longitudinally elliptical basal mount.

Cheliped symmetrical, more massive in males; cheliped of male with short merus, as long as carpus, ventral outer margin lined with long plumose setae, with subdistal tooth, ventral inner margin sparsely lined with low granules, inner surface of merus to carpus lined with long stiff setae, outer surface of carpus rounded, not strongly elevated, outer margin with small subdistal tooth; chela (Fig. 7c) with rounded palm, covered densely with long plumose setae from distal part of upper, lower margin of palm to both fingers; fingers with ovoid gape when closed; immovable finger with 3 teeth on proximal two-thirds, with subdistal tooth connected to tip of finger by thin lobe, forming hoof; movable finger similar to immovable finger, except for tooth on proximal part.

Ambulatory legs (Fig. 7a, d–g) slender, long; second, third legs subequal, longer than others, fourth shortest, inner margin of legs fringed densely with long plumose setae, outer margin lined with short curly setae; meri slightly longer than respective propodi, distal anterior angle ending in conical tooth; dactyli terminating in sharp tooth, first subdistal tooth of inner margin stronger than terminal tooth, 6–8 teeth (n = 7) of inner margin arranged throughout in fourth leg, 6–9 teeth only on distal half in second and third legs (n = 6), 2–4 teeth limited to distal third in first leg (n = 5), teeth of males larger than those of females.

Male abdomen-pleotelson (Fig. 8a) 6-segmented; first segment of male abdomen thick, hard, distal margin widely concave; second to fifth segments with distal margin concave medially, third segment widest; pleotelson trilobed, lateral lobes small, low; 2 small concavities on posterior margin, distal margin thickened, forming socket for sternal button (Fig. 1f) on inner surface. G1 (Fig. 8c) stout, strongly bent on distal two-fifths, ventral outer surface longitudinally lined with long, stiff, distally plumose setae; distal inner end with 2 sharp processes, sub-inner process well separated from, larger than inner process, directed slightly lower than that of inner process, distal outer angle swollen, covered by tiny granule, outer ventral apex bat-like. G2 (Fig. 8d) short, base not strongly swollen. Female abdomen-pleotelson (Fig. 8b) demarcated to 6 segments, boundary between first and second segments movable, more or less fixed in other boundaries; second to fifth seg-

ments with corneous wide ridge medially, that of segment 6 only on proximal half, segment 6 longest, no suture separating pleotelson; pleopods (Fig. 9) on second to fifth segments, long, biramous from near base, developing from distal outer angle of inner side of each segment.

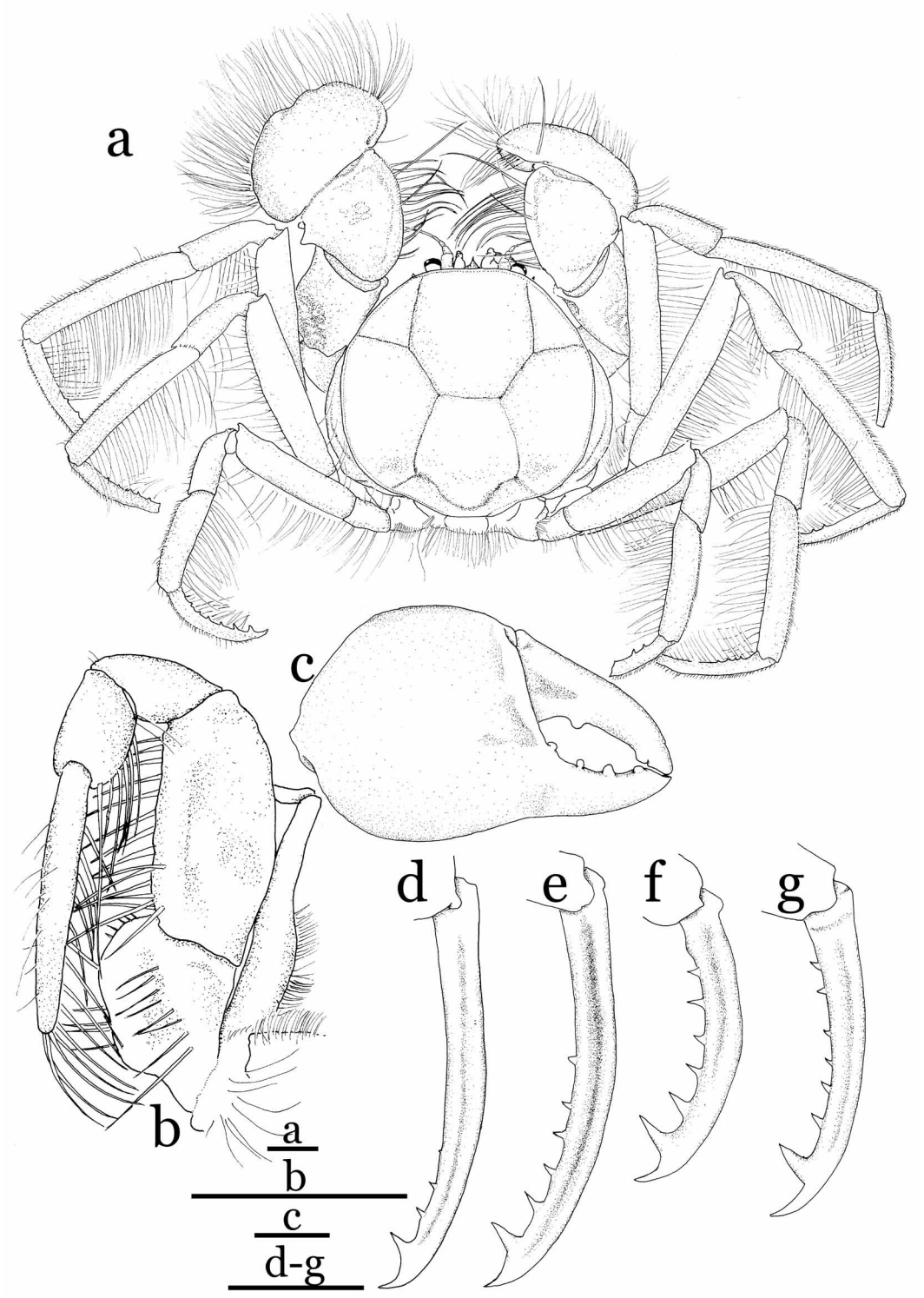

FIGURE 7. *Limnopilos sumatranus* **new species**. a, habitus; b, third maxilliped, left; c, male right chela; d–f, male right first, third, and fourth ambulatory dactyli; g, female right fourth ambulatory dactylus. a, holotype male (MZB Cru 1650), 4.7 × 5.5 mm; b–f, paratype male (ZRC 2007.0114), 5.0 × 5.9 mm; g, paratype female (MNHN-B30395), 5.4 × 6.3 mm. Scale bars, 1 mm.

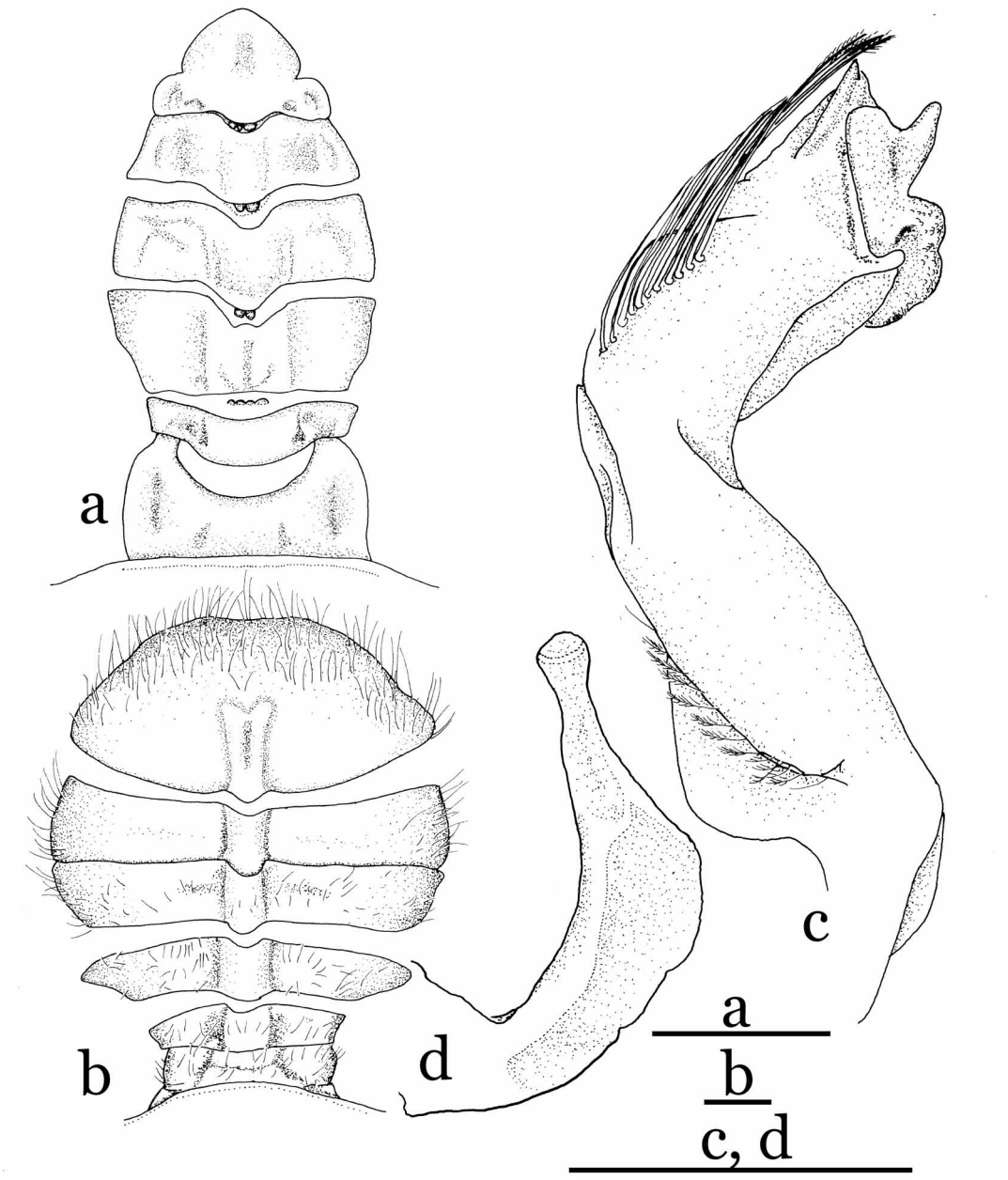

FIGURE 8. *Limnopilos sumatranus* **new species**. a, male abdomen-pleotelson; b, female abdomen-pleotelson; c, left G1; d, left G2. a, paratype male (ZRC 2007.0114), 5.0 × 5.9 mm; b, paratype female (MNHN-B30395), 5.4 × 6.3 mm; c, d, holotype male (MZB Cru 1650), 4.7 × 5.5 mm. Scales, 1 mm.

Eggs spherical, small, diameter 0.32 – 0.34 mm [mean = 0.33, n = 10 from two females (2.8 × 3.1 and 4.0 × 4.6 mm)], attached on endopods of pleopods, exopods growing inwards, partially covering dome-shaped abdomen.

Habitat and distribution. The specimens were all collected from among the roots of a mass of floating vegetation near the centre of the stream, from which catfishes (*Leiocassis* sp., Bagridae) were also collected. The tannin-coloured acidic waters were gently flowing.

Etymology. The species is named after the type locality, Sumatra, Indonesia.

Remarks. *Limnopilos sumatranus* **new species**, is very close to *L. microrhynchus* Ng, 1995, especially in having a vestigial rostrum. The main difference between the two species is the location of the sub-inner process of the distal end of the G1. It is more medially placed and directed more laterally in *L. sumatranus* than in

L. microrhynchus, where it is closer to the inner process and directed more anteriorly (Fig. 8c). This difference is constant for the good series of specimens examined and evident even when similar sized specimens are compared (*L. sumatranus*: 3 males, ZRC 2007.0115, 2.2 × 2.3–2.9 × 3.2 mm; *L. microrhynchus*: 1 male, QM W21466, 2.6 × 2.8 mm). In addition, small specimens of *L. sumatranus* have a distinct sharp subdistal tooth on the ventral outer margin of the cheliped merus (indiscernible in *L. microrhynchus*) and an anterolateral margin which is less divergent posteriorly than in *L. microrhynchus*. Large individuals of *L. sumatranus* show a similar divergence of the anterolateral margin as in *L. microrhynchus*, but their difference is still obvious when similar sized specimens are compared.

Limnopilos microrhynchus was described from eastern Sabah (Ng, 1995), and the present specimens from eastern Kalimantan, extend its range further southwards, as well as into Indonesia for the first time.

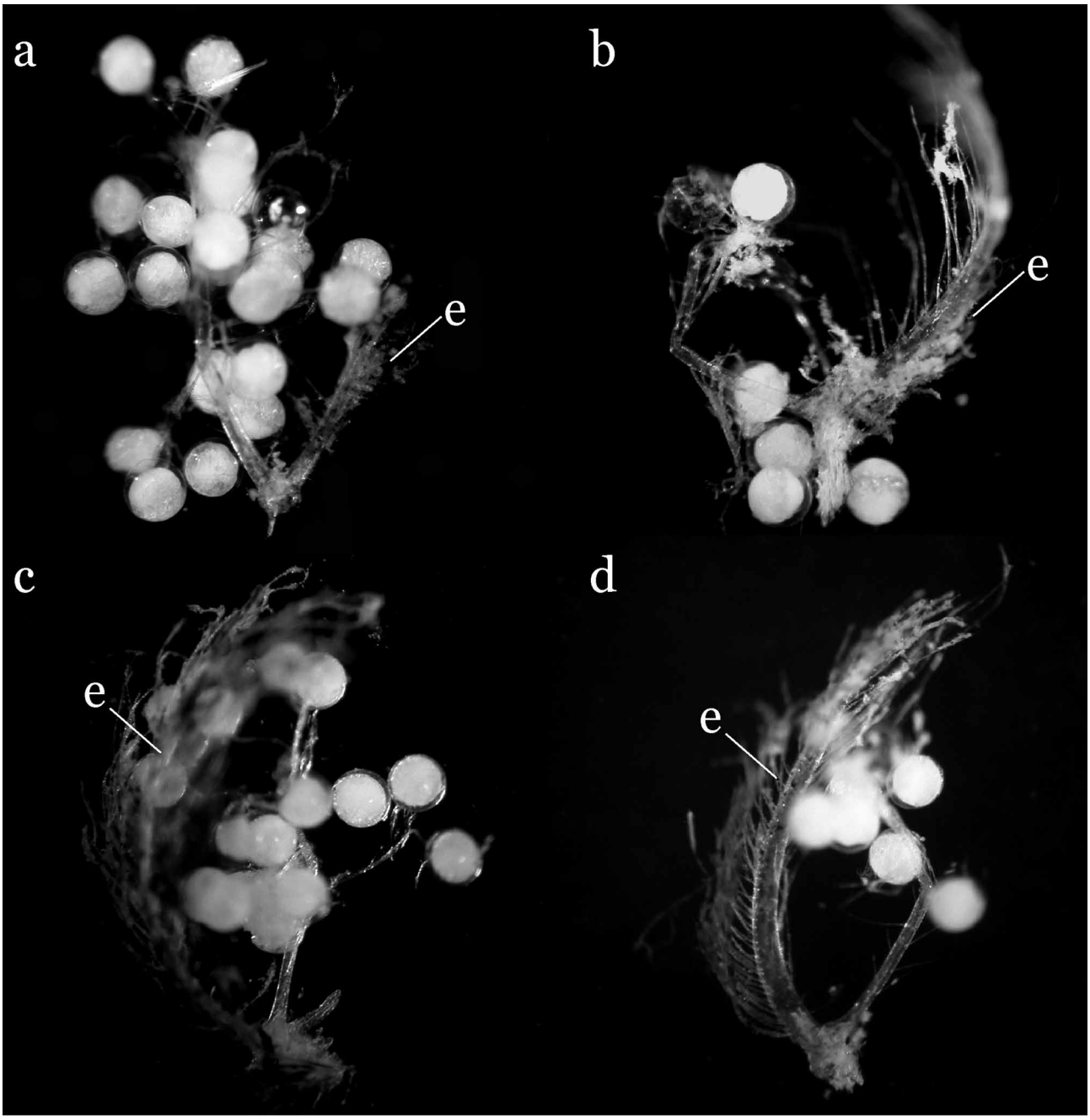

FIGURE 9. *Limnopilos sumatranus* **new species**. a, b, right second and third pleopods; c, d, left fourth and fifth pleopods; e, exopods. Paratype, ovigerous female (ZRC 2007.0117), 4.0 × 4.6 mm.

Key to the species of *Hymenicoides* and *Limnopilos*

1 Male pleotelson distinctly trilobate, lateral lobe auriculate, inner surface of lobe rimmed laterally; G1 very stout, with distal outer angle strongly swollen, sternal button placed between distal inner processes and distal outer angle of G1 when abdomen closed ..... *Hymenicoides* Kemp, 1917……2

- Male pleotelson with small lateral lobe, lateral cavity of inner surface thickened distally; G1 moderately stout, with distal outer angle less swollen, sternal button placed posterior to distal outer angle of G1 when abdomen closed ..... *Limnopilos* Chuang & Ng, 1991……3

2 Stout ambulatory legs, G1 with 2 distal inner processes ..... *H. carteri* Kemp, 1917

- Slender ambulatory legs, G1 with 1 distal inner process ..... *H. robertsi* **new species**

3 Rostrum completely absent..... *L. naiyanetri* (Chuang & Ng, 1991)

- Rostrum vestigial, present only as a very small but discernible knob..... 4

4 Sub-inner process of the distal end of the G1 close to inner process and directed more anteriorly; cheliped merus lacks distinct subdistal tooth on ventral outer margin ..... *L. microrhynchus* Ng, 1995

- Sub-inner process of the distal end of the G1 located medially and directed outwards; cheliped merus with sharp, distinct subdistal tooth on ventral outer margin..... *L. sumatranus* **new species**

Acknowledgements

The authors are grateful to Tyson R. Roberts for kindly providing us specimens from Bangladesh and Myanmar examined in the present study, as well as sharing his field information with us. Tan Heok Hui, Ng Heok Hee and Thomas Sim helped with field collections in Sumatra. We also thank Paul Clark (NHM) for his help in accessing the type material of *H. carteri*. Comments by Danièle Guinot and Peter Castro on the manuscript have been most helpful.

References

Chuang, C.T.N. & Ng, P.K.L. (1991) Preliminary descriptions of one new genus and three new species of hymenosomatid crabs from Southeast Asia (Crustacea: Decapoda: Brachyura). *Raffles Bulletin of Zoology*, 39(2), 363–368.

Guinot, D. & Richer de Forges, B. (1997) Affinités entre les Hymenosomatidae MacLeay, 1838 et les Inachoididae Dana, 1851 (Crustacea, Decapoda, Brachyura). *Zoosystema*, 19(2/3), 453–502.

Guinot, D. & Bouchard, J.-M. (1998) Evolution of the abdominal holding systems of brachyuran crabs (Crustacea, Decapoda, Brachyura). *Zoosystema*, 20(4), 613–694.

Kemp, S. (1917) Notes on Crustacea Decapoda in the Indian Museum. X. Hymenosomatidae. *Records of the Indian Museum*, 13, 243–279.

Lucas, J.S. (1980) Spider crabs of the family Hymenosomatidae (Crustacea; Brachyura) with particular reference to Australian species: systematics and biology. *Records of the Australian Museum*, 33(4), 148–247.

Ng, P.K.L. (1995) On a collection of freshwater decapod crustaceans from the Kinabatangan River, Sabah, Malaysia, with descriptions of two new genera and two new species. *Sabah Museum Journal*, 1(2), 73–92.

Ng, P.K.L. & Chuang, C.T.N. (1996) The Hymenosomatidae (Crustacea: Decapoda: Brachyura) of Southeast Asia, with notes on other species. *Raffles Bulletin of Zoology, Supplement*, 3, 1–82.