

Two New Species of Amphipods of the Superfamily Aoroidea (Crustacea: Corophiidea) from the Strait of Malacca, Malaysia, with a Description of a New Genus

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Bin Abdul Rahim Azman and Bin Haji Ross Othman (2012) Two new species of amphipods of the superfamily Aoroidea (Crustacea: Corophiidea) from the Strait of Malacca, Malaysia, with a description of a new genus. *Zoological Studies* 51(2): 232-247. A taxonomic study on the amphipods collected from muddy bottom habitats of the west coast of Peninsular Malaysia (Strait of Malacca) revealed 2 new species from the superfamily Aoroidea. *Klebang barnardi* gen. nov., sp. nov., and *Grandidierella melakaensis*, sp. nov., are described below. *Klebang barnardi* sp. nov. differs from the rest of its congeners in the combination of (1) a unique carpal configuration of gnathopod 2, (2) a largely expanded posterior margin of the carpus of gnathopod 1, and (3) a densely setose mandibular palp. *Grandidierella melakaensis* sp. nov., on the other hand, can be easily distinguished from other *Grandidierella* species in having (1) a distinctly projecting rostrum, (2) pereopod 5 with a merus and ischium of equal length, and (3) epimerons 1 and 2 with long plumose setae posteroventrally. <http://zoolstud.sinica.edu.tw/Journals/51.2/232.pdf>

Key words: Amphipoda, *Klebang barnardi*, *Grandidierella melakaensis*, New genus, Strait of Malacca.

In their revision of the suborder Corophiidea, Myers and Lowry (2003) divided the superfamily Aoroidea into the 2 families of the Aoridae and Uniciolidae. We found 2 new species of amphipods each belonging to these families. The new species were discovered in benthic fauna samples from muddy bottom habitats of the Strait of Malacca at a depth range of 15-20 m in the vicinity where *Listriella longipalma* was described by Othman and Morino (2006). Complete drawings of the appendages of the male and some important characters of the female are presented. In addition, comparisons of the new species with related species are made.

MATERIALS AND METHODS

This study is based on benthic materials collected from the muddy-sand substrata in the vicinity of the Port of Sungai Udang, Melaka (Fig. 1). Samples were collected using a Smith-McIntyre grab (0.05 m²) at depths ranging 15-20 m. Once hauled in, the contents of the grab were emptied into a container and wet sieved through a 0.05-mm-mesh sieve. The materials retained on the sieve were then carefully transferred into plastic containers and fixed with a 4% buffered formaldehyde-seawater solution. In the laboratory, animals were examined under a compound microscope and later selected for dissection. The appendages of the dissected specimens were examined and figures were produced under a Leica DMLB light microscope using a camera lucida.

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The following abbreviations are used: A, antenna; ABD, abdomen; G, gnathopod; HD, head; L, left; LL, lower lip; MD, mandible; MX, maxilla; MP, maxilliped; P, pereopod; PL, pleopod; r, right; T, telson; U, uropod; UR, urosome; UL, upper lip; ♂, male; ♀, female. The type materials of the new species are deposited at the Universiti Kebangsaan Malaysia Muzium Zoologi (UKMMZ), Bangi, Malaysia.

RESULTS

Corophiida Leach, 1814

Aoroidea Stebbing, 1899

Diagnosis (description based on Myers and Lowry 2003): Head rectangular, anterodistal margin recessed, lateral cephalic lobe weakly extended, eye, if present, situated proximal to lobe; anteroventral margin weakly recessed, moderately excavate. Mandible palp 3-articulated or absent, article 3, when present, asymmetrical, distally rounded, with setae extending along most of posterodistal margin, or approximately parallel-sided with distal setae only; posterior margin with setae of variable length, or with comb of short

setae and a few long, slender setae. Gnathopod 1 enlarged in both sexes, or only in males; coxa 1 enlarged, larger than coxa 2. Merus of gnathopod 2 not enlarged. Pereopods 5-7 without accessory spines on anterior margin. Pereopod 7 longer or much longer than pereopod 6. Urosomites not coalesced. Uropods 1 and 2 without a dense array of robust setae. Peduncle of uropod 3 relatively short, length usually ≤ 2 times breadth; with 2, 1, or no rami. Telson without hooks or denticles.

Aoridae Stebbing, 1899

Diagnosis: Anteroventral margin of head moderately excavate. Pereopod 7 very elongate, entire propodus extending beyond pereopod 6.

Grandidierella Coutière, 1904

Diagnosis: Eyes small to medium. Accessory flagellum of antenna 1 minute, 1-segmented. Inner plate of maxilla 1 vestigial. Coxae very small, relatively short, of various sizes and shapes. Gnathopod 1 (male) complexly subchelate and much larger than gnathopod 2. Gnathopod 2 subchelate. Dactylus of pereopods 6 and 7 elongate, falcate. Uropods 1 and 2 biramous; rami slightly subequal; peduncle with ventrodistal process. Uropod 3 uniramous. Telson entire.

Species composition: *Grandidierella* contains 40 species of *G. africana* Schellenberg, 1936; *G. bispinosa* Schellenberg, 1938; *G. bonnieroides* Stephensen, 1948; *G. cabindae* (Schellenberg, 1925); *G. chelata* K.H. Barnard, 1951; *G. chaohuensis* Hou and Li, 2002; *G. dentimera* Myers, 1970; *G. elongata* (Chevreux, 1926); *G. exilis* Myers, 1981; *G. fasciata* Ariyama, 1996; *G. gilesi* Chilton, 1921; *G. gravipes* K.H. Barnard, 1935; *G. grossimana* Ledoyer, 1967; *G. indentata* Ledoyer, 1979; *G. insulae* Myers, 1981; *G. ischienoplia* Bochert and Zettler, 2010; *G. japonica* Stephensen, 1938; *G. kanakensis* Myers, 1998; *G. koa* J.L. Barnard, 1977; *G. lignorum* K.H. Barnard, 1935; *G. longidactyla* Ledoyer, 1982; *G. lutosa* K.H. Barnard, 1952; *G. macronyx* K.H. Barnard, 1935; *G. mahafalensis* Coutière, 1904 (type species); *G. makena* J.L. Barnard, 1970; *G. melakaensis* sp. nov.; *G. nottoni* Shoemaker, 1935; *G. nyala* Griffiths, 1974; *G. osakaensis* Ariyama, 1996; *G. palama* J.L. Barnard, 1977; *G. perlata* Schellenberg, 1938; *G. propodentata* Moore, 1986; *G. rhizophorae* Myers, 2009; *G. robusta* Ledoyer, 1982; *G. spinicoxa* Myers, 1972; *G. taihuensis* Morino and Dai, 1990; *G. teres* Myers, 1981; *G.*

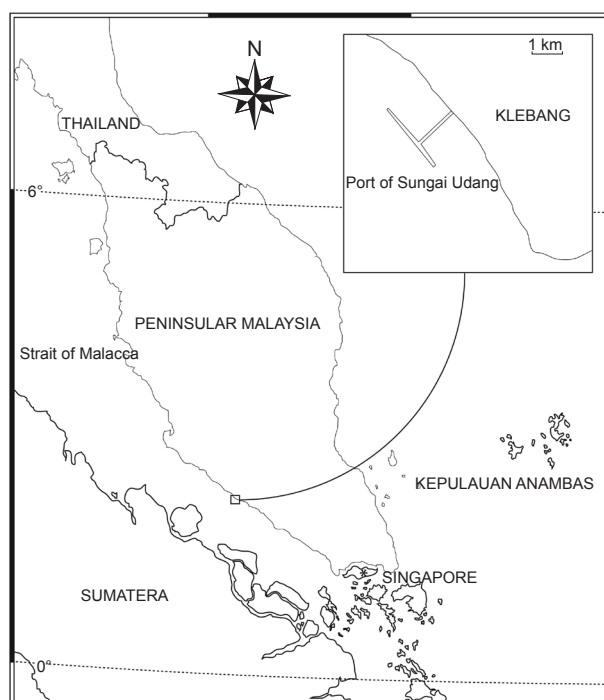


Fig. 1. Map showing the sampling area.

trispinosa Bano and Kazmi, 2010; *G. unidentata* Ren, 2006; and *G. vietnamica* Dang, 1968.

***Grandidierella melakaensis* sp. nov.**

(Figs. 2-5)

Material examined: Holotype. ♀, Malaysia, Strait of Malacca, Melaka, Port of Sungai Udang, (2°14'3"N, 102°7'43"E), 17 m, muddy bottom, 26 May 1995, C. Zaidi, M. Soed, S. Zuhaimi (Smith-McIntyre grab). UKM I.D. 3611 (UKMMZ-1273). Allotype. ♂, data same as for holotype. (UKMMZ-1274). Paratypes. Data same as for holotype, UKMMZ-1275 (2 ♂♂, 2 ♀♀); UKMMZ-1276 (3 ♂♂, 6 ♀♀); UKMMZ-1277 (5 ♂♂, 3 ♀♀).

Description: Female (holotype). Total body length 2.6 mm (from tip of rostrum to apex of telson). Head (HD, Fig. 3) with short, pointed rostrum, about as long as pereonites 1 and 2 combined, with triangular-shaped anterior head lobe, inferior antennal sinus deep, beyond middle of head. Eye small, oval, placed just behind anterior head lobe. Antenna 1 (A1, Fig. 3) much longer than antenna 2, with peduncle longer than flagellum, length ratio of 9: 11: 4; flagellum shorter than peduncle, composed of 15 articles, distal one of which vestigial, each article distally provided with tuft of long and short setae. Antenna 2 (A2, Fig. 3) short and stout, 4-segmented in ratio of 5: 7: 16: 14; 1st and 2nd peduncular articles very short, their combined length subequal to article 3, broader than those of antenna 1; flagellum very short, slightly longer than 1/2 length of peduncular article 4, 3-articulate, all articles setiferous, distalmost article apically armed with 2 stout spines surrounded by a tuft of setae. Apical margin of upper lip (UL, Fig. 3) broad, slightly concave medially, bearing minute bristle. Inner plate of lower lip (LL, Fig. 3) developed, broad and angular, minutely pubescent, outer plate with rounded shoulder, densely pubescent, and with strongly developed, rounded mandibular process. Incisor of mandible (MD, Fig. 3) well-developed, with 4 teeth on left mandible and 5 teeth on right one; lancinia mobilis armed with 4 teeth on both left and right mandibles; accessory blades 8 on left mandible and 7 on right one; right molar process developed, with circular apex, fringed with apically branched processes; palp triarticulate. Inner plate of maxilla 1 (MX1, Fig. 3) small and short, with setae; outer plate distally truncate; palp biarticulate, extending slightly beyond outer plate, with rounded apex. Inner plate of maxilla

2 (MX2, Fig. 3) broad medially, pointed distally, outer margin naked; outer plate extending just beyond inner one, both outer and inner margins naked. Inner plate of maxilliped (MP, Fig. 3) elongate, extending well beyond proximal article of palp, medially narrow, apically truncate; outer plate almost reaching end of palp article 2, inner margin straight and outer margin evenly convex, dense bristles on outer margin; palp consisting of 4 articles, article 4 small, subtriangular, tapering to truncate tip and ending in stout spine. Pereonites 1-5 subequal to each other in length, 6 and 4 of equal length, and 5-7 deeper than preceding ones, pereonite 1 anteroventrally roundly produced. Coxal plates small, shallow, separated.

Gnathopod 1 (G1 ♀, Fig. 2) subequal in size with gnathopod 2, length ratio of articles from basis to dactylus approximately 16: 3: 4: 15: 9: 7; basis stout, anterior margin straight; ischium short, subrectangular, anterior margin distally weakly produced and naked; merus slightly longer than ischium, distally tapering to become subtriangular, posterior margin and submargin throughout with numerous setae which are peculiarly very long and bristly; carpus about as long as basis, elongate, posterior margin weakly convex but crenulate and both its margin and submargin throughout densely covered with very long bristly setae; propodus narrower and slightly longer than 1/2 of carpus, slightly curved but with uniform width, densely covered with very long setae both anteriorly and posteriorly; dactylus shorter than propodus, stout, falcate, tapering to pointed tip, grasping margin minutely serrated medially. Length ratio of articles of gnathopod 2 (G2 ♀, Fig. 2) from basis to dactylus approximately 14: 3: 4: 9: 12: 3; brood plate narrow and elongate, about as broad as basis and about 1/2 as long as gnathopod 2; basis elongate and parallel-sided; ischium short, with distally slightly produced anterior margin and naked posterior margin; merus slightly longer than ischium, subcircular, as long as broad; carpus shorter than propodus, naked along its length; propodus elongate, as broad as and subequal to basis in length, palm transverse, defined by 3 stout spines, palm margin possessing some robust setae; dactylus stout, short, as long as palm, claw-like, grasping margin with a hump near proximal end. Pereopod 3 (P3, Fig. 4) longer than pereopod 4; brood plate elongate and lanceolate; length ratio of articles from basis to dactylus approximately 13: 3: 6: 4: 5: 8; basis linear; ischium short, subrectangular, anterior margin medially concave; merus longer than carpus, distally slightly broader;



Fig. 2. *Grandidierella melakaensis* sp. nov., holotype, female (UKMMZ-1273), 2.6 mm, allotype, male (UKMMZ-1274), 2.9 mm. Port of Sungai Udang, Melaka. Scale bars: G1 ♀ and G2 ♀ = 0.25 mm; G1 ♂ and G2 ♂ = 0.2 mm.

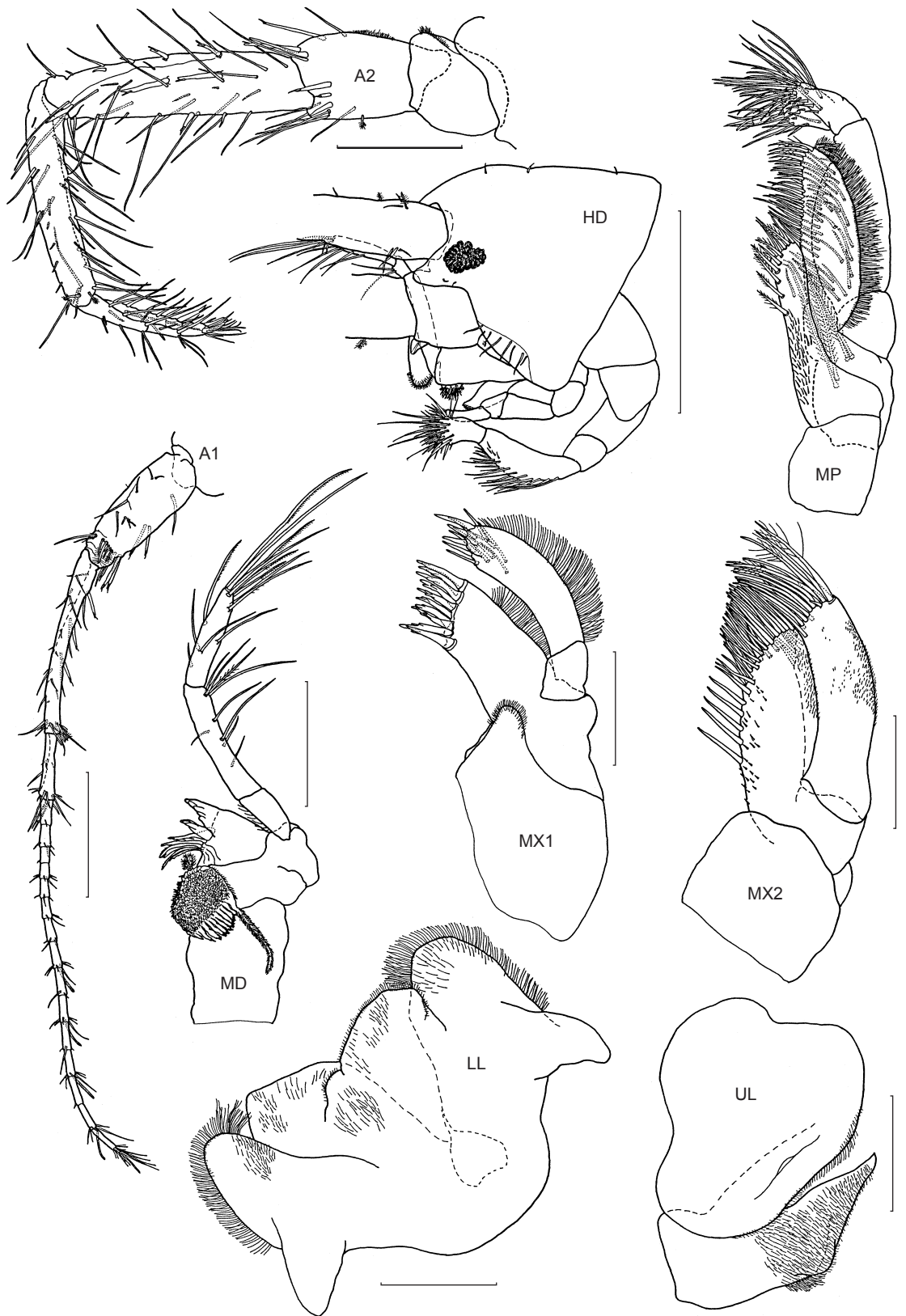


Fig. 3. *Grandidierella melakaensis* sp. nov., holotype, female (UKMMZ-1273), 2.6 mm. Port of Sungai Udang, Melaka. Scale bars: A2 = 0.25 mm; A1 and HD = 0.5 mm; MP and MD = 0.2 mm; UL, LL, MX1, and MX2 = 0.1 mm.

carpus shorter than propodus, anterior margin naked; propodus shorter than dactylus, rather narrower than preceding articles; dactylus very long and thin, slightly curved, slightly tapering to

tip, both anterior and posterior margins naked. Pereopod 4 (P4, Fig. 4) larger than pereopod 5; brood plate lanceolate, rather large, with row of very long setae; length ratio of articles from basis

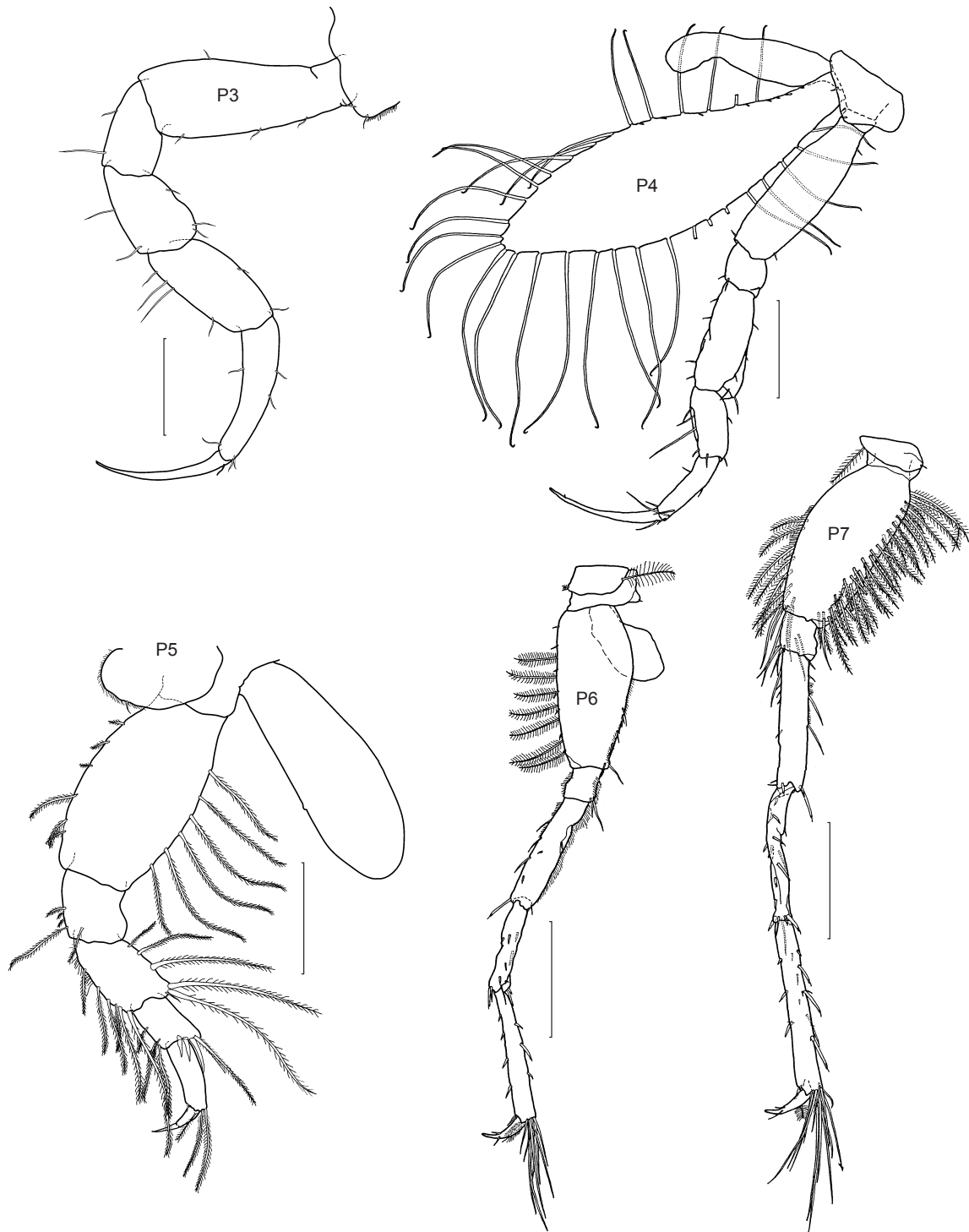


Fig. 4. *Grandierella melakaensis* sp. nov., holotype, female (UKMMZ-1273), 2.6 mm. Port of Sungai Udang, Melaka. Scale bars: P3 and P5 = 0.2 mm; P4, P6, and P7 = 0.5 mm.

to dactylus approximately 11: 3: 7: 5: 6: 8; basis a little more than 1/3 length of pereopod 4; ischium short, anterior margin slightly convex; merus larger than carpus, distally slightly broader; carpus subequal to propodus, slightly wider than propodus, anterior margin gently concave; propodus longer but narrower than carpus; dactylus rather long and thin, longer than propodus, falcate, tapering to pointed tip, anteroproximally with a seta. Pereopod 5 (P5, Fig. 4) shortest and smallest among all pereopods; length ratio of articles from basis to dactylus approximately 13: 6: 5: 5: 7: 3; basis 1/3 as long as pereopod 5, proximally wider; ischium longer than merus, rectangular, anterodistally with pair of setae; merus as long as carpus but broader; carpus narrower than merus; propodus rather long and narrow; dactylus short, abruptly curved at apex, anterodistally with spine tooth and posterodistally submargin (grasping submargin) with seta. Pereopod 6 (P6, Fig. 4) reaching end of telson, much longer than pereopod 5 but shorter than pereopod 7; length ratio of articles from basis to dactylus approximately 11: 2: 8: 6: 9: 3; basis slightly expanded anteriorly; ischium very short, rectangular, slightly narrower than basis; merus elongate, rectangular, longer than carpus; carpus narrower than merus but as broad as propodus; propodus elongate, longer than both carpus and merus; dactylus short and falcate, pointed anteriorly, proximally wider and tapering to pointed distal end, anteriorly grasping margin and posteriorly convex margin armed with a spine each at about subapex. Pereopod 7 (P7, Fig. 4) very long, extending well beyond telson, length ratio of articles from basis to dactylus approximately 11: 2: 9: 9: 12: 3; basis 1/4 as long as pereopod 7, anteriorly slightly expanded; ischium very short and rectangular; merus rather long, rectangular; carpus almost as long as merus, but narrower; propodus longest among articles, narrow and rectangular; dactylus short, stout, falcate, pointed forward, anteriorly grasping margin and posteriorly convex margin with thin spine each at subapex and plumose seta at proximal end of posterior margin. Pleopods (PL1, PL2, PL3, Fig. 5) well-developed. Pleonites 1 and 2 equally elongate, but each obviously shorter than pleonite 3. Epimerons 1 and 2 (ABD, Fig. 5) rectangular, but epimeron 3 obtusely produced to rear at posteroventral angle and dorsomedially posterior end with an acute process, posteroventral margins of epimerons 1 and 2 respectively bearing 4 and 7 plumose setae.

Uropod 1 (U1, Fig. 5) extending slightly beyond uropod 2; peduncle longer than rami; outer

ramus a little longer than inner one, with row of 5 robust setae on outer margin, row of 4 robust setae on inner margin, and 3 robust setae on apex; inner ramus with row of 5 robust setae on outer margin, and 3 stout spines on apex, middle one of which distinctly shorter. Peduncle of uropod 2 (U2, Fig. 5) a little longer than rami, outer margin bearing 2 robust setae, one at middle and one at distal end, distal 1/2 of inner margin with row of 3 long stout robust setae; outer ramus distinctly shorter and narrower than inner one, with row of 3 robust setae on outer margin, apex with 3 robust setae; inner ramus with row of 4 robust setae on outer margin, 2 robust setae on distal 1/2 of inner margin, and 3 long robust setae on apex, middle one longer. Uropod 3 (U3, Fig. 5) extending a little beyond uropod 2, uniramous, peduncle short and about 1/2 as long as ramus, with slightly convex lateral margins; ramus biarticulate but distal article vestigial, proximal article medially gently broader than its proximal and distal parts, both outer and inner margins with row of 4 long stiff setae each, and apically rounded margin with cross row of 3 submarginal robust setae; distally small article armed with 1 very long stiff seta. Combined length of urosomites 1-3 almost as long as pleonite 3, and successively smaller in size. Telson (T, Fig. 5) proximally wider, apical margin truncate, with a spine near dorsolateral angle.

Male (sexually dimorphic characters): (allotype – UKMMZ-1274) Total body length 2.9 mm (from tip of rostrum to apex of telson). Gnathopod 1 (G1 ♂, Fig. 2) carpochele, stouter and larger than gnathopod 2, coxal plate subquadrangular, length ratio of articles from basis to dactylus approximately 8: 2: 3: 11: 4: 3; basis stout, anterior margin straight and naked, posteriorly gently developed except at proximal end where basis narrowed, posterior margin with a seta in middle and another at distal end; ischium short, anterodistally slightly produced; merus longer than ischium, proximally broadest and tapering to tip, anterior margin naked, posterior margin rather convex; carpus very strong and massive, much longer than basis, nearly 2 times as long as broad, proximally narrow and distally uniformly broad, both anterior and posterior margins convex and carpus subovate, anterior margin naked except for minute seta near distal end, posterior margin covered throughout with several plumose setae on margin and submargins, posterodistal corner produced into very strong and large process which is outwardly deflected and ends in blunt tip, at base of which, on distal

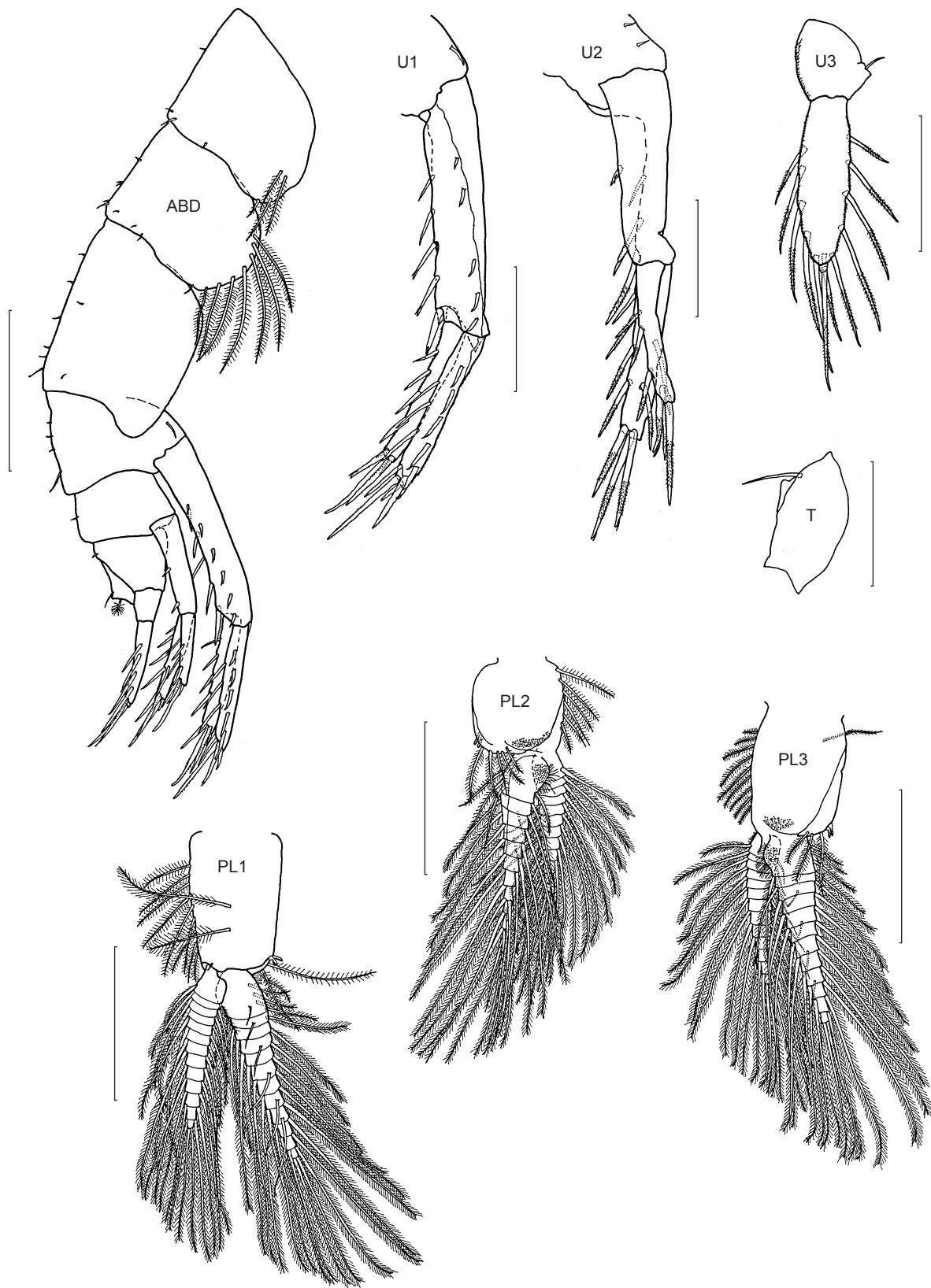


Fig. 5. *Grandierella melakaensis* sp. nov., holotype, female (UKMMZ-1273), 2.6 mm. Port of Sungai Udang, Melaka. Scale bars: T = 0.1 mm; U1 = 0.25 mm; U2 and U3 = 0.2 mm; ABD, and PL1-PL3 = 0.5 mm.

margin, with a group of several plumose setae; propodus much shorter and narrower than carpus, proximally and distally broader than medial part, anterior margin uneven, posterior concave margin medially produced forming strong and apically blunt process, throughout its length covered with several plumose setae; dactylus rather stout, somewhat straight, proximally wider and tapering to blunt tip, grasping margin proximally bearing single small tooth and subapically with 2 pairs of small teeth, anterior margin with pair of setae near proximal end. Gnathopod 2 (G2 ♂, Fig. 2) in both female and male rather similar except for length of basis which in male is distinctly longer than propodus (1.4 times as long as propodus).

Remarks: The genus *Grandidierella* Coutière, 1904, a member of amphipods of the family Aoridae, is characterized by a subcylindrical body, small- to medium-sized eyes, small coxae, gnathopod 1 larger than gnathopod 2, male gnathopod 1 carpochele, and with a uniramous uropod 3. According to Myers (1970), *Grandidierella* presumably originated from the old Tethys Sea and is considered to have a tropical affinity. Records of this genus appear scattered throughout the Caribbean Sea to Madagascar, Tanzania, and India (Myers 1970). To date, the genus *Grandidierella* is known to contain 40 species, with recent additions by Ren (2006), Myers (2009), Bochert and Zettler (2010), and Bano and Kazmi (2010). The present work reports on the 1st record of this genus occurring in Malaysian waters, along the coast of the state of Melaka, Peninsular Malaysia.

Grandidierella melakaensis sp. nov. can be easily distinguished from all other species in the genus by a set of characters known only in this species: (1) an obviously projecting rostrum, (2) pereopod 5 having a merus and ischium of equal lengths, and (3) epimerons 1 and 2 with long plumose setae posteroventrally. Nonetheless, the specimens examined resemble *G. elongata* in having a triangular ocular lobe; and *G. exilis*, *G. gilesi*, *G. mahafalensis*, *G. palama*, and *G. indentata* in bearing several very long plumose setae on the propodus, carpus, and merus of gnathopod 2 of both the male and female and possessing a single posterodistal spine on male gnathopod 1, but clearly differ in many other respects, especially in the form of gnathopod 1. Furthermore, the inflated uropod 3 peduncle and very short mandibular palp article 1 in *G. elongata*, the much inflated uropod 3 peduncle in *G. gilesi*, and the ventral pereon process on pereonite 1 in *G.*

exilis also differ.

Etymology: The new species of *Grandidierella* is named after its type locality, Melaka as *melakaensis*.

Unciolidae Myers and Lowry, 2003

Diagnosis (description from Myers and Lowry 2003): Anteroventral margin of head moderately excavate, or strongly excavate for receiving enlarged antenna 2. Pereopod 7 not very elongate, entire propodus not extending beyond pereopod 6. Included subfamilies/genera. Acuminodeutopinae: *Acuminodeutopus* J.L. Barnard, 1959; *Klebang* gen. nov.; *Rudilemboides* J.L. Barnard, 1959; and *Wombalana* Thomas and Barnard, 1991. Unciolinae: *Dryopoides* Stebbing, 1888; *Janice* Griffiths, 1973; *Liocuna* Myers, 1981a; *Neohela* Smith, 1881; *Orstomia* Myers 1998; *Pedicorophium* Karaman, 1981; *Pseudunciola* Bousfield, 1973; *Pterunciola* Just, 1977; *Ritaumius* Ledoyer, 1978; *Rildardanus* J.L. Barnard, 1969; *Uncinotarsus* L'Hardy and Truchot, 1964; *Unciola* Say, 1818; *Unciolella* Chevreux, 1911; and *Zoedeutopus* J.L. Barnard, 1979.

Remarks: Myers and Lowry (2003) established the family Unciolidae and included it together with the existing Aoridae Stebbing in the superfamily Aoroidea. It can easily be distinguished by a combination of characters that includes a moderate or strong excavation along the anteroventral margin of the head for receiving the enlarged antenna 2; antenna 1 article 3 short, $\leq 1/2$ the length of article 2; an enlarged gnathopod 1; pereopods 5, 6, and 7 in a regular length progression; and all urosomites free. Currently, the Unciolidae is composed of the 2 subfamilies of the Acuminodeutopinae with 3 genera and the Unciolinae with 14 genera and is distributed worldwide in both cold and warm waters.

Klebang gen. nov.

Type species: *Klebang barnardi* sp. nov., present designation.
Included species: *K. barnardi* sp. nov.

Diagnosis: Rostrum short, ocular lobes moderate, produced to front, pointed. Eyes moderate. Antenna 1 slightly longer than antenna 2, both slender; peduncular article 3 slightly shorter than article 1, article 2 longest, accessory flagellum present. Peduncular article 3 of antenna 2 short, flagellum with only 3 or 4 articles. Mandibular palp

setose; article 2 longest. Male gnathopods 1 and 2 subequal, subchelate, and carpocheate. Outer ramus of uropod 1 with brush setae. Uropod 3 uniramous; peduncle short; ramus elongate with robust setae on both margins. Telson semicircular and lobed.

Remarks: The diagnosis of the new genus is based on the type-species described below. *Klebang* gen. nov. is closely related to *Grandidierella* Coutière, from which it shares several generic characters in having a sub-cylindrical body, an enlarged carpocheate gnathopod 1, free urosomites, and a uniramous uropod 3. A careful examination of the newly acquired material on the other hand, although closely similar morphologically to *Grandidierella*, suggests that it represents a new genus in the Aoroidea. Myers and Lowry (2003) provided a valuable updated key to the families and subfamilies of the Corophiidea. Some key characters show that our material naturally fits into the Acuminodeutopinae, like the short article 3 of antenna 1 at $\leq 1/2$ the length of article 2, uropod 3 lacking recurved robust setae, gnathopods 1 and 2 not together forming a sieving basket, free urosomites, an enlarged gnathopod 1, pereopods 5, 6, and 7 in a regular length progression, and most importantly the acute lateral cephalic lobes of the head. As shown by the excellent series of head drawings of selected genera in Myers and Lowry (2003), the acute head cephalic lobes are of special importance in the classification of this group (Fig. 4 in Myers and Lowry 2003). Currently, the acuminodeutopine clade includes only the 3 genera of *Acuminodeutopus*, *Rudilemboides*, and *Wombalano*, and all 3 share the characteristic of having the acute, triangular, lateral cephalic lobes. Clearly within this clade only *Wombalano* possesses the same distinctive generic characters shown in the *Klebang* gen. nov. material in having a uniramous uropod 3. However, the unique formation of the male gnathopod 2 (with an expanded basis and carpus) in *Wombalano* is an advanced character that separates it from the *Klebang* gen. nov. material. At the same time, *Klebang* gen. nov. is highly distinctive in having this combination of characters: (1) the unique carpal configuration of gnathopod 2, (2) a largely expanded posterior margin of the carpus of gnathopod 1, and (3) the densely setose mandibular palp that has not yet been formulated. Therefore, we consider the current species to be representative of a new genus.

Etymology: The name *Klebang* refers to

Pantai Klebang, Melaka, Malaysia the general area in Melaka where this genus was discovered.

***Klebang barnardi* sp. nov.**

(Figs. 6-8)

Material examined: Holotype. ♂, Malaysia, Strait of Malacca, Melaka, Port of Sungai Udang, St. CS, Petronas (2°14'43"N, 102°6'53"E), 20 m, muddy bottom, 22 Oct. 2003, C. Zaidi, M. Soed, S. Zuhaimi (Smith-McIntyre grab). UKM I.D. 7187 (ref: UKMMZ-1350). Paratypes. From the same sample as holotype, UKMMZ-1352 (7 ♂♂); UKMMZ-1353 (4 ♂♂); UKMMZ-1354 (8 ♂♂).

Description: Male (holotype). Total body length 6.7 mm (from tip of rostrum to apex of telson). Body rather slender. Head (HD, Fig. 6) broader and deeper than pereonite 1; rostrum not developed, anterior lateral head lobe (ocular lobe) extending forward and anteriorly pointed in triangular shape; inferior antennal sinus deep and straight vertically; eye distinct and located behind anterior head lobe. Antenna 1 (A1, Fig. 6) slightly longer than antenna 2, ratio of peduncular articles 1-3 as 1.1: 1.5: 1; article 1 with 4 postero-marginal setae; flagellum with 5 articles, 2 times as long as peduncle; accessory flagellum uni-articulate, short. Peduncular article 3 of antenna 2 (A2, Fig. 6) with 3 long and 1 short setae posterodistally; article 4 slightly shorter than article 5 with row of long setae along posterior margin; flagellum short, composed of 4 articles. Labrum of upper lip (UL, Fig. 7) broad, its apical margin weakly concave mid-ventrally and pubescent on each lobe. Inner plates of lower lip (LL, Fig. 7) highly developed and subtriangular, mandibular process narrow but well-developed; outer plates with bristly shoulders. Both mandibles (MD, Fig. 7) similar to each other except for number of accessory blades with 4 on right and 5 on left; incisor produced to interior, broad, with 5 teeth; lacinia mobilis on both sides 4-toothed, followed by 4 or 5 accessory blades; molar process medium, ridged distally and serrate marginally, with a single seta; palp triarticulate. Inner plate of maxilla 1 (MX1, Fig. 7) reduced; outer plate with truncate apical margin; palp extending beyond outer plate, biarticulate. Inner plate of maxilla 2 (MX2, Fig. 7) slightly shorter than outer one; outer plate larger than inner one, distally broadest and with rounded apical margin. Inner plate of maxilliped (MP, Fig. 7) short, not extending beyond tip of palmer proximal article; outer plate extending beyond 1/2 of palmer article 2, outer margin naked, evenly convex; palp 4-articulated,

terminal article distally tapering and ending in a long nail-like spine-tooth.

Gnathopod 1 (G1, Fig. 6) subchelate and carpochele, subequal to gnathopod 2 in size; coxa plate shallow, rhomboidal, smaller than others, anteroventral angle markedly produced; length ratio of articles from basis to dactylus approximately 14: 3: 4: 12: 10: 7; basis linear, almost parallel-sided; ischium short, posterior margin 3 times as long as anterior margin; merus subrectangular, longer than wide, anterior margin naked; carpus robust, mainly subrectangular except proximally small and short, with triangular ending, greatly wider and longer than propodus, posterodistally 3/4 margin throughout equally produced into widely expanded plate which is proximoventrally oblique and distoventrally pointing forwards and ending in a small tooth; propodus shorter and narrower than carpus, anterior evenly convex and posterior margin barely concave; dactylus stout, fairly curved, about 1/2 as long as carpus, tapering to pointed tip. Gnathopod 2 (G2, Fig. 6) longer than gnathopod 1, subchelate and carpochele; coxa plate shallow with ventral margins medially produced into triangular expansion; length ratio of articles from basis to dactylus 18: 3: 5: 10: 14: 6; basis linear; ischium shortest of all articles, subrectangular; merus slightly longer than ischium, posterodistal angle with triangular spine-tooth; carpus at mid-length twice as long as merus but shorter than propodus, proximally narrowing into triangular end and distally widening with truncate apical margin, distal 1/2 of posterior margin produced into large elongated expansion which is proximally wider, distally tapering to rounded tip, outwardly deflected, and reaching near distal margin of propodus; propodus rather long and stout, proximally narrow and distally obviously broader, palm strongly transverse, with minutely serrated marginal spines; dactylus fitting on palm, stout, tapering to pointed tip, anteroproximally with long setae. Pereopod 3 (P3, Fig. 8) thin and elongate; coxa plate shallow with ventral margins medially produced into triangular expansion; length ratio of articles from basis to dactylus approximately 20: 3: 8: 9: 10: 8; basis linear, almost uniform in width, 1/3 as long as pereopod 3; ischium short, subrectangular; merus shorter than carpus, anterodistally weakly produced; carpus rectangular; propodus narrower than carpus; dactylus rather long, 4/5 as long as propodus, gently curved, tapering to pointed tip, anteroproximally armed with a seta. Pereopod 4 (P4, Fig. 8) rather similar to pereopod 3 but slightly

shorter, coxa plate with ventral margins medially produced into triangular expansion; length ratio of articles from basis to dactylus approximately 15: 3: 7: 7: 8: 5; and with less setation than pereopod 3. Pereopod 5 (P5, Fig. 8) slightly longer than pereopod 4; coxa posteroventrally expanded into long and narrowly obtuse angle; length ratio of articles from basis to dactylus approximately 20: 3: 11: 9: 9: 3; basis slightly expanded in proximal part, about 1/3 as long as pereopod 5; ischium short, anterior margin longer than posterior one; merus longer than carpus, uniform in width, apical margin anteriorly produced into triangular process; carpus subequal to merus in width, parallel-sided except near proximal end; propodus about as long as carpus; dactylus short, 1/3 as long as propodus, weakly curved, tapering to pointed tip, bearing 1 plumose seta at anterior proximal end and 1 thin spine in middle of grasping margin. Pereopod 6 (P6, Fig. 8) rather long, extending well beyond end of telson and uropods; coxa with posteriorly produced fairly narrow and rounded lobe, anteriorly and anteroventrally rounded; length ratio of articles from basis to dactylus approximately 12: 2: 10: 5: 7: 4; basis almost linear and uniform in width, about 1/3 as long as pereopod 6; ischium short, posterodistally slightly produced; merus 2 times longer than carpus, distinctly narrower than basis, twisted near distal end; carpus shorter than propodus, anterior and posterior margins curved forward forming a groove along its length; dactylus about 1/2 as long as propodus, tapering to sharply pointed tip, posterior margin with long slender spine at 2/3 from proximal end. Pereopod 7 (P7, Fig. 8) extremely long, extending well beyond end of pereopod 6; coxa comparatively shallower; length ratio of articles from basis to dactylus 7: 1: 8: 4: 6: 3; basis weakly expanded, 1/4 as long as pereopod 7; ischium short, posterior margin distally slightly produced; merus longer but narrower than basis; anterior and posterior margins of carpus curved to rear forming a groove; propodus elongate and rather slender; dactylus 1/2 as long as propodus, weakly curved, tapering to pointed tip, with 1 long thin spine at 2/3 from proximal end.

Epimeron 1 (ABD, Fig. 6) subrectangular, 2 posteriorly evenly rounded, and 3 with roundly produced antero- and posteroventral angles. Urosomites 1-3 in combined length as long as epimeron 3.

Pleopods 1-3 (PL1, PL2, PL3, Fig. 8) similar to each other; peduncles cylindrical and anterodistally with plumose setae, each one distinctly shorter than inner ramus but equal to

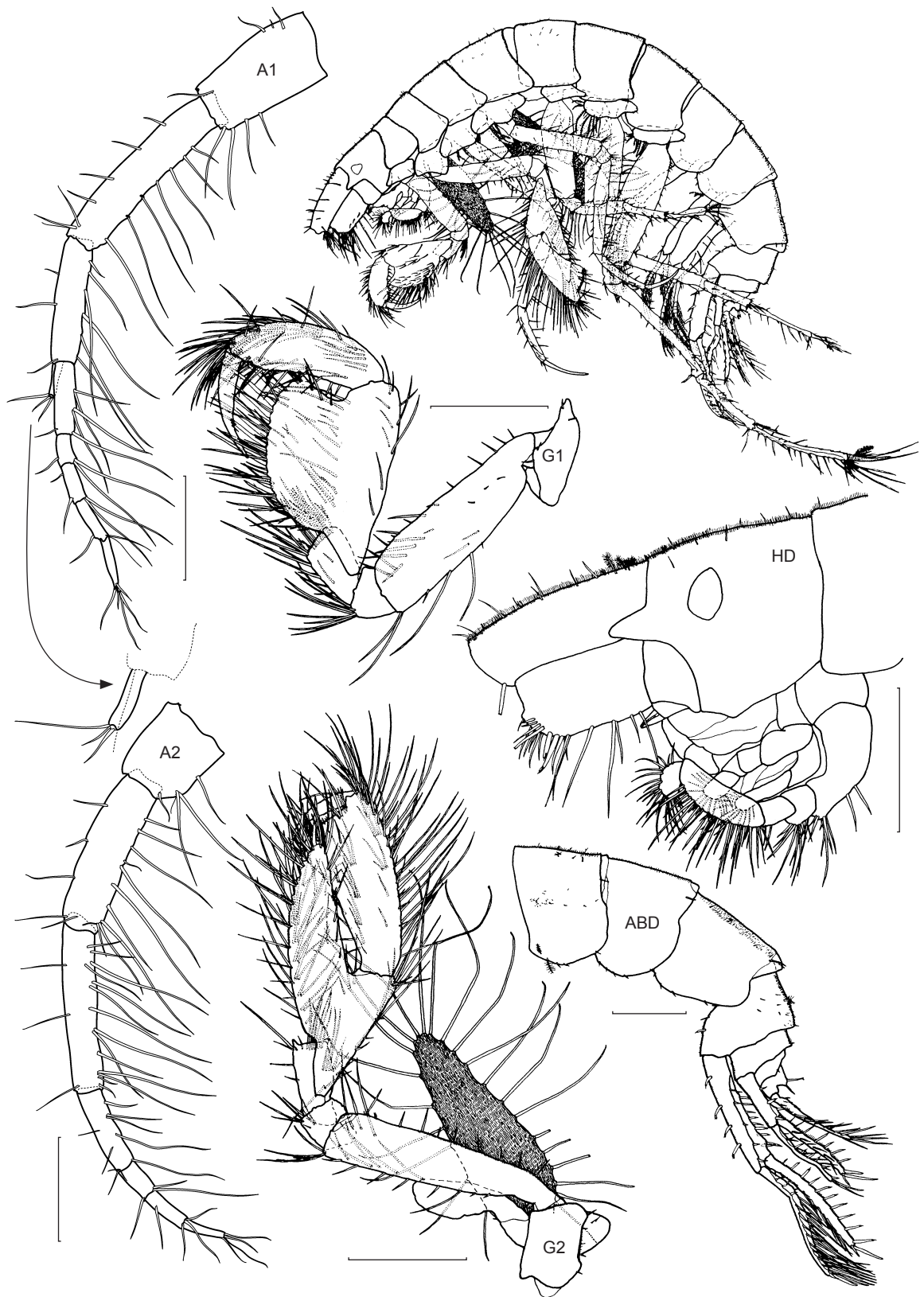


Fig. 6. *Klebang barnardi* sp. nov., holotype, male (UKMMZ-1350), 6.2 mm. Port of Sungai Udang, Melaka. Scale bars: G1, G2, ABD, and HD = 0.5 mm; A1 and A2 = 0.2 mm.

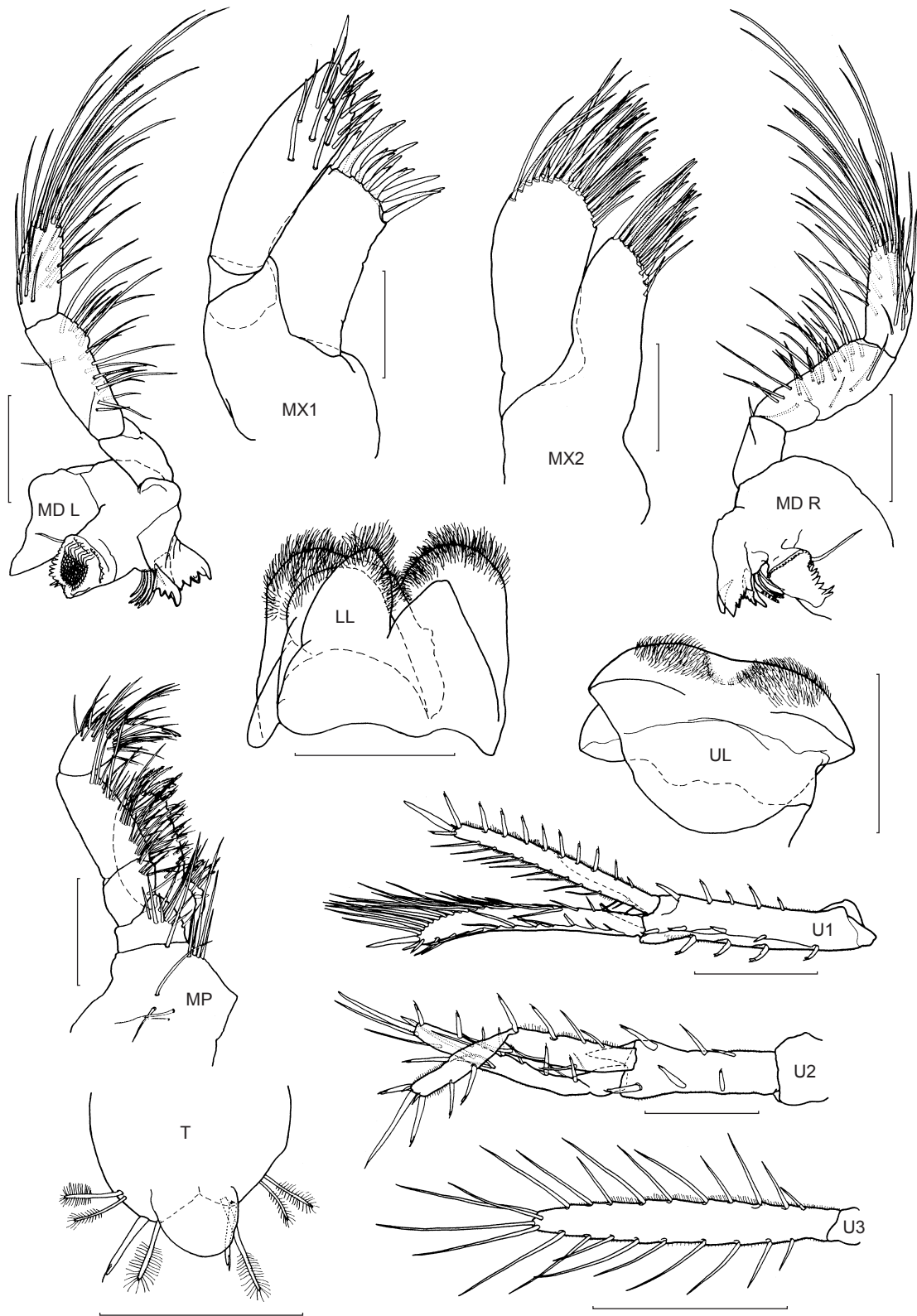


Fig. 7. *Klebang barnardi* sp. nov., holotype, male (UKMMZ-1350), 6.2 mm. Port of Sungai Udang, Melaka. Scale bars: MP, MD L-R, U2, U3, and T = 0.25 mm; MX1 and MX2 = 0.1 mm; UL and LL = 0.2 mm; U1 = 0.5 mm.

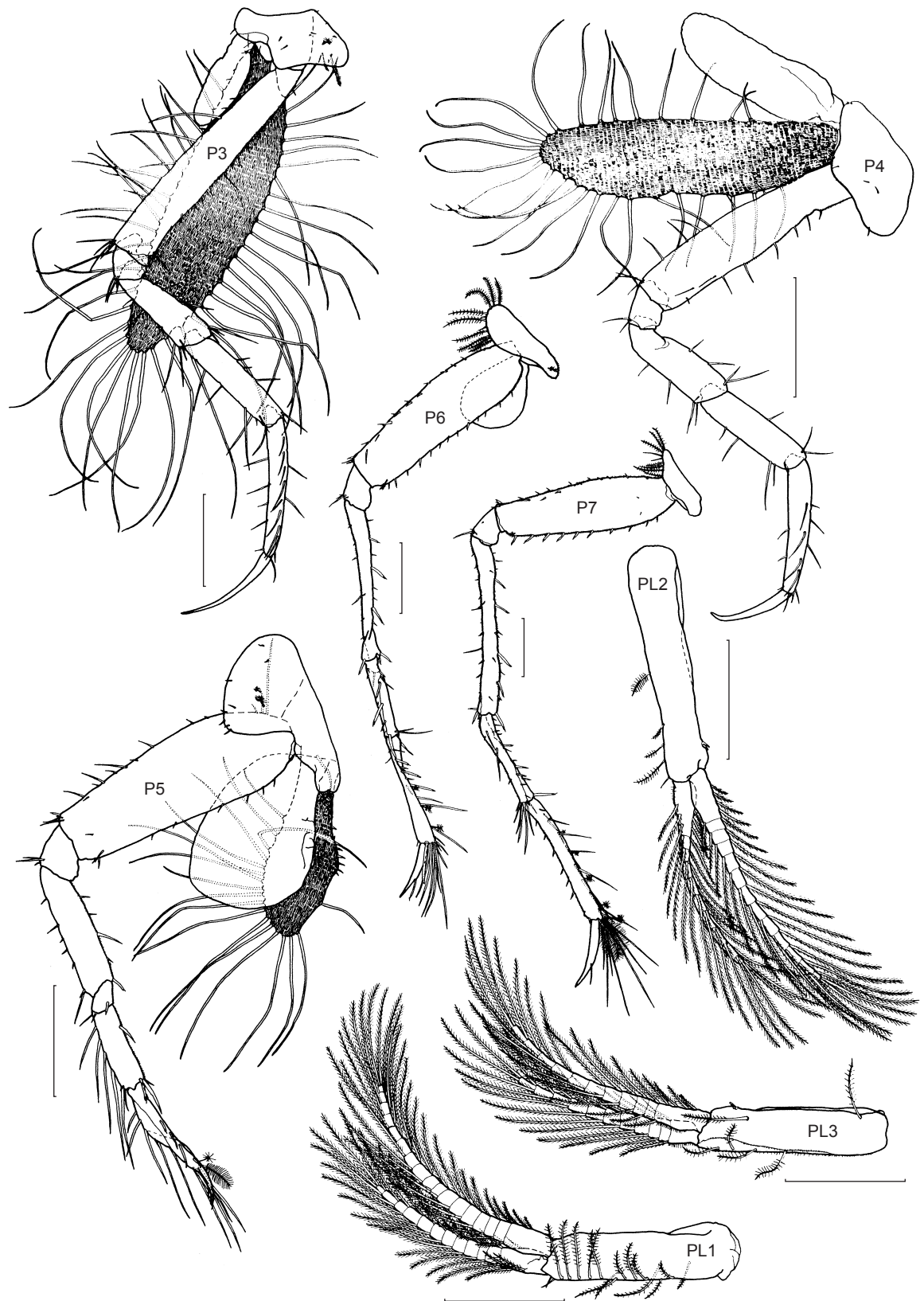


Fig. 8. *Klebang barnardi* sp. nov., holotype, male (UKMMZ-1350), 6.2 mm. Port of Sungai Udang, Melaka. Scale bar: P3-P7 = 0.5 mm; PL1-PL3 = 0.5 mm.

or slightly longer than outer one; rami densely covered with rather long swimming setae.

Uropod 1 (U1, Fig. 7) extending well beyond ends of other uropods; peduncle longer than both rami; outer ramus slightly longer and broader than inner ramus, outer margin lined with row of spines, inner margin with row of robust setae, distal margin rounded and bearing set of 1 long and 2 short robust setae; inner ramus of almost uniform width, outer margin with row of spines and apically with group of 3 large and 1 very small robust setae. Uropod 2 (U2, Fig. 7) slightly extending beyond uropod 3; peduncle shorter than both rami, both outer and inner margins with row of robust setae; peduncular apex bearing triangular inter-ramal process, outer ramus subequal to inner one in length and apical margin with several robust setae; apical margin of inner ramus with group of robust setae. Uropod 3 (U3, Fig. 7) uniramous, peduncle extremely short, about 1/10 as long as ramus; ramus elongate, medially slightly wider, both outer and inner margins with row of robust setae; apex with 4 long stiff setae. Telson (T, Fig. 7) short, not reaching tip of uropod 3 peduncle, semicircular, ending in smaller medium circular lobe, with 2 telsonic angles bearing robust seta plus 2 or 3 plumose setae on each one.

Remarks: Although *Klebang* resembles *Acuminodeutopus*, *Rudilemboides*, and *Wombalano* as mentioned above, it can be readily separated from the remaining genera by having (1) the unique carpal configuration of gnathopod 2, (2) the largely expanded posterior margin of the carpus of gnathopod 1, and (3) the setose mandibular palp.

Etymology: The species is named in honor of the late J. Laurens Barnard for his exceptional work on world gammaridean amphipods.

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