

**NEW SPECIES OF AMPITHOIDAE (CRUSTACEA, AMPHIPODA, COROPHIOIDEA)
FROM THE EASTERN ANDAMAN SEA**

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ABSTRACT

Four new species of herbivorous amphithoid amphipods from shallow waters off southeastern Phuket Island in the Andaman Sea, Thailand, are described. Three of the four species are in the genus *Cymadusa*, and the other is in the genus *Ampithoe*. These species *Ampithoe rachanoi* sp. nov., *Cymadusa aungtonyae* sp. nov., *Cymadusa chalongana* sp. nov. and *Cymadusa panwa* sp. nov. are the first records of amphithoid amphipods from the Andaman Sea.

INTRODUCTION

In December 1998, the Phuket Marine Biological Center (PMBC), Phuket, Thailand and the Zoological Museum, University of Copenhagen (ZMUC) under the DANIDA Scientific Co-operation program organised a Workshop on the Biodiversity of Crustaceans in the Andaman Sea. This paper describes four new species of amphithoid amphipods collected during the workshop from locations around Cape Panwa, Phuket Island and the islands just offshore. These are the first records of amphithoid amphipods from the Andaman Sea.

The genus *Cymadusa* in particular is documented as a predominately tropical group (J.L. Barnard, 1972; Barnard and Karaman, 1991). This is supported by the proportion of *Cymadusa* species to *Ampithoe* species in this study. There are quite a few published records of amphithoid amphipods from the Indo-West Pacific (11 records from the Indian Ocean and 22 records from the western Pacific region). However, there are only six species described for the first time from the north-eastern Indian Ocean, five from New Caledonia, four from Fiji and one each from the Caroline Islands, Vietnam and the Philippines. The nearest records

(not necessarily the original description) of amphithoids to the Andaman Sea are three species from Hainan Island, Vietnam: *Cymadusa mauritiensis* (Ledoyer, 1978), *Peramphithoe orientalis* (Dana, 1853) and *Sunamphithoe plumosa* Stephensen, 1944 (all documented in Huang, 1994; Lowry, 2000); one species from the Bay of Nha-Trang, Vietnam: *Cymadusa vadosa* Imbach, 1967 (in Lowry, 2000); one species recorded from the Moluccas in Indonesian waters: *Cymadusa brevidactyla* (Chevreux, 1907—in Ledoyer, 1979); and one species from Manila Bay in the Philippines: *Peramphithoe orientalis* (Dana, 1853).

The holotype and some paratypes of each species are deposited at the PMBC Reference Collection. The remainder of the material is deposited at the Australian Museum (AM). The descriptions and diagnoses were produced using the taxonomic database package DELTA (Dallwitz *et al.*, 1995 onwards). The following abbreviations were used on the plates: **A**, antenna; **EPIM**, epimeron; **G**, gnathopod; **LL**, lower lip; **MD**, mandible; **MX**, maxilla; **MXP**, maxilliped; **P**, pereopod; **T**, telson; **U**, uropod; **UL**, upper lip; **l**, left; **r**, right; **♂**, male; **♀**, female.

Ampithoidae Stebbing, 1899

Ampithoe Leach, 1814

Ampithoe rachanoi sp. nov.
(Figs 1–4)

Material examined

Holotype: PMBC 15747, male, 5 mm, Racha Noi Island, south of Phuket Island, Thailand, Andaman

Sea, 07°30'N, 098°20'E, living on old rope, 10 m, coll. R. Peart and J.K. Lowry, 14.12.1998.

Paratypes: PMBC 15748, female, 6 mm, with the same collection data as the holotype; AM P57336, 20 specimens, with the same collection data as holotype; AM P57337, 12 specimens, Racha Noi Island, south of Phuket Island, Thailand, Andaman Sea, 07°30'N, 098°20'E, living on red gorgonacean, 10 m, coll. R. Peart and J.K. Lowry, 14.12. 1998.

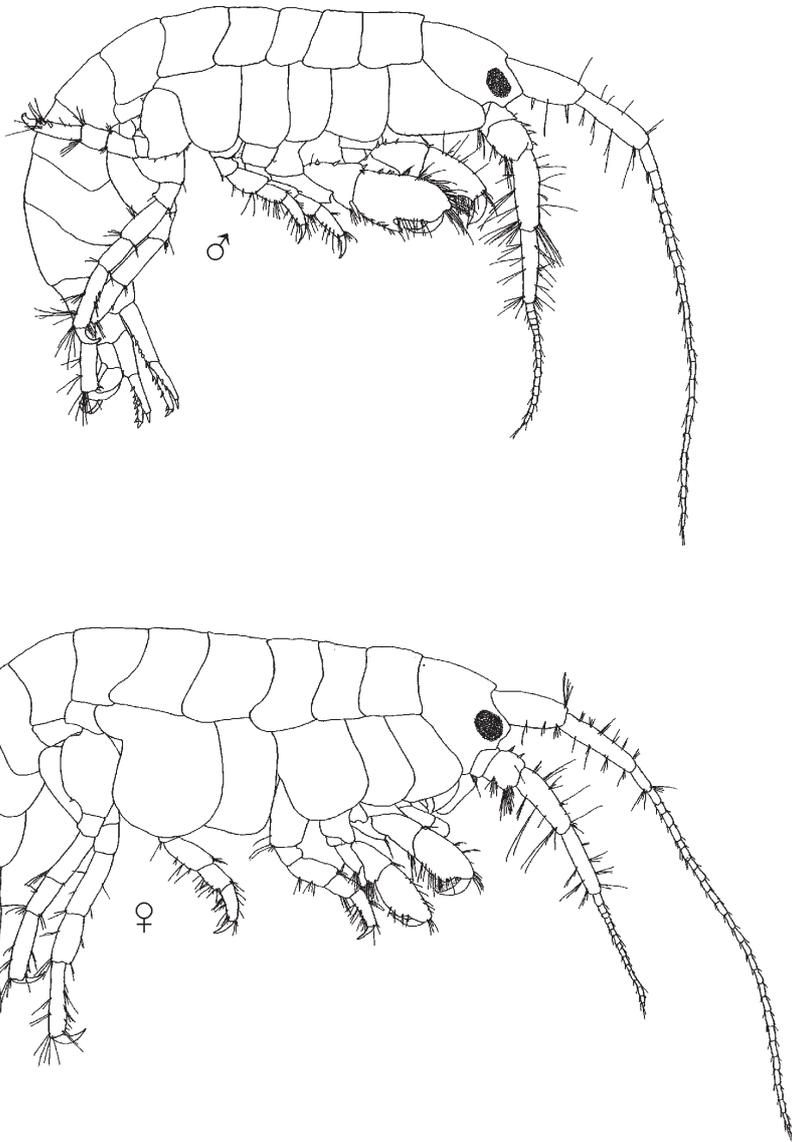


Figure 1 *Ampithoe rachanoi* sp. nov. Holotype male, 5 mm, PMBC15747. Paratype female, 6 mm, PMBC 15748, Andaman Sea.

Type locality

Racha Noi Island, south of Phuket Island,
Thailand, Andaman Sea, 07°30'N, 098°20'E.

Diagnosis

Gnathopod 1 coxa ventral margin with row of small setules; carpus shorter than propodus, carpal lobe truncated; palm convex, midmedial

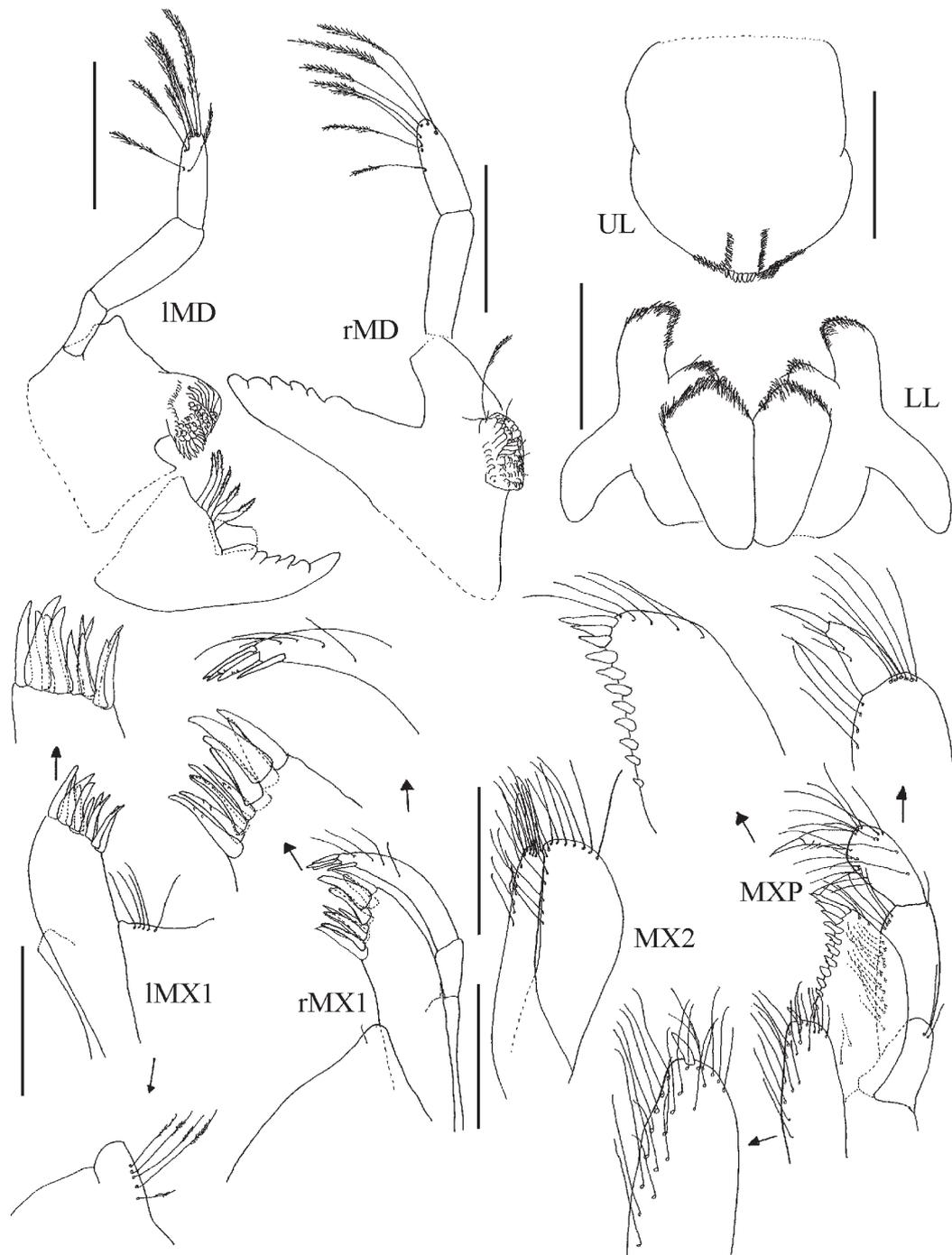


Figure 2 *Ampithoe rachanoi* sp. nov. Holotype male, 5 mm, PMBC 15747, Andaman Sea. Scale represents 0.2 mm. The right mandible (rMD) is damaged and so the setal row is not shown but is present.

tooth absent, defining posterodistal tooth absent. *Gnathopod 2* coxa ventral margin with row of small setules; palm excavate, midmedial tooth absent. *Uropod 1* distoventral peduncular tooth absent. *Uropod 3* outer ramus subequal to inner ramus. *Telson* distally subacute.

Description

Based on holotype male, 5 mm. *Epistome* and *upper lip* angled nearly straight down, around 90 degrees. *Antenna 1* longer than antenna 2; peduncular article 1 subequal to article 2 (1.05 x); article 2 longer than article 3 (3 x); article 3 shorter than article 1 (0.31 x); primary flagellum with 22 articles; accessory flagellum absent. *Antenna 2* slender, similar to antenna 1; not densely setose on ventral margin; peduncular article 4 subequal to article 5; flagellum 14 articulate. *Mandible*, molar well developed; palp stout, long, setose along posterior margin, article 1 shorter than article 2 (0.5 x); article 2 longer than article 3 (1.2 x); article 3 longer than article 1 (1.5 x). *Upper lip* distally setose. *Lower lip* outer plate notched, with lateral lobe longer than medial lobe; mandibular lobe with curved margins, rounded apically. *Maxilla 1* palp well developed, with apical robust setae. *Maxilla 2* inner plate narrow, outer plate broader.

Pereon. *Coxae* longer than broad. *Gnathopod 1* smaller than gnathopod 2, without densely setose margins; coxa larger than coxa 2, anterior margin concave, anteroventral margin produced, rounded, ventral margin with row of small setules; carpus shorter than propodus (0.8 x), anterior margin with 4 robust setae; carpal lobe truncated; propodus narrow, length 1.6 x width, palm acute, convex, without midmedial tooth, with a single robust setae near inner base of dactylus, without a posterodistal tooth defining palm, but with 1 robust seta defining palm; dactylus overreaching palm, inner margin denticulate. *Gnathopod 2* without densely setose margins; coxal ventral margin with a row of small setules; carpus shorter than propodus (0.7 x), anterior margin with 3 robust setae; propodus broad, length 1.1 x width, produced into an anterodistally setose lobe; palm acute, excavate, without midmedial tooth, with a single robust setae near inner base of dactylus, with an apically subacute posterodistal tooth and without a robust

seta defining palm; dactylus shorter than palm, tapering evenly, acute, inner margin denticulate. *Pereopod 3* basis narrow; merus narrow. *Pereopod 4* basis similar to pereopod 3. *Pereopods 5–7* weakly prehensile. *Pereopod 5* with slender distal articles; propodus not expanded distally, with 2–3 distal robust setae; dactylus slightly curved. *Pereopod 6* basis, posterior margin evenly curved, distal articles slender; propodus not expanded distally, with 3 distal robust setae; dactylus strongly curved. *Pereopod 7* similar to pereopod 6, with slender distal articles.

Pleon. *Epimeron 3*, posteroventral corner rounded. *Uropod 1* reaching to the tip of the rami of uropod 2; peduncle without distoventral spur; rami subequal in length. *Uropod 2* without peduncular laterodistal projection; rami subequal in length. *Uropod 3* peduncle longer than broad (length 1.5 x breadth), peduncle 2.0 x rami length; rami broad, outer ramus subequal to inner ramus, with 2 large recurved robust setae, with patch of small conical spines. *Telson* subtriangular, distally subacute, apical cusps small.

Female. Based on paratype female, 6 mm. *Antenna 1* longer than antenna 2; peduncular article 1 equal to article 2 (1.0 x); article 2 longer than article 3 (3.0 x); article 3 shorter than article 1 (0.3 x); primary flagellum with 27 articles; accessory flagellum absent. *Antenna 2* slender, similar to antenna 1; not densely setose on ventral margin; peduncular article 4 subequal to article 5; flagellum 17 articulate.

Gnathopod 1 subequal to gnathopod 2; without densely setose margins; coxa subequal to coxa 2, anterior margin straight, anteroventral margin weakly produced and rounded, ventral margin with a row of small setules; carpus longer than propodus (1.1 x), anterior margin with 1 robust seta; carpal lobe truncated; propodus narrow (length 1.7 x width); palm acute, convex, without midmedial tooth, with a single robust setae near inner base of dactylus, without posterodistal tooth but with 1 robust seta defining palm; dactylus overreaching palm, inner margin denticulate. *Gnathopod 2* without densely setose margins; coxal ventral margin with a row of small setules; carpus longer than propodus (1.3 x), anterior margin with 1 robust seta; propodus broad (length 1.2 x width),

not produced into an anterodistally setose lobe, palm acute, entire, without midmedial tooth, with a single robust setae near inner base of dactylus,

without posterodistal tooth but with 1 robust seta defining palm; dactylus tapering evenly, acute, inner margin denticulate, overreaching palm.

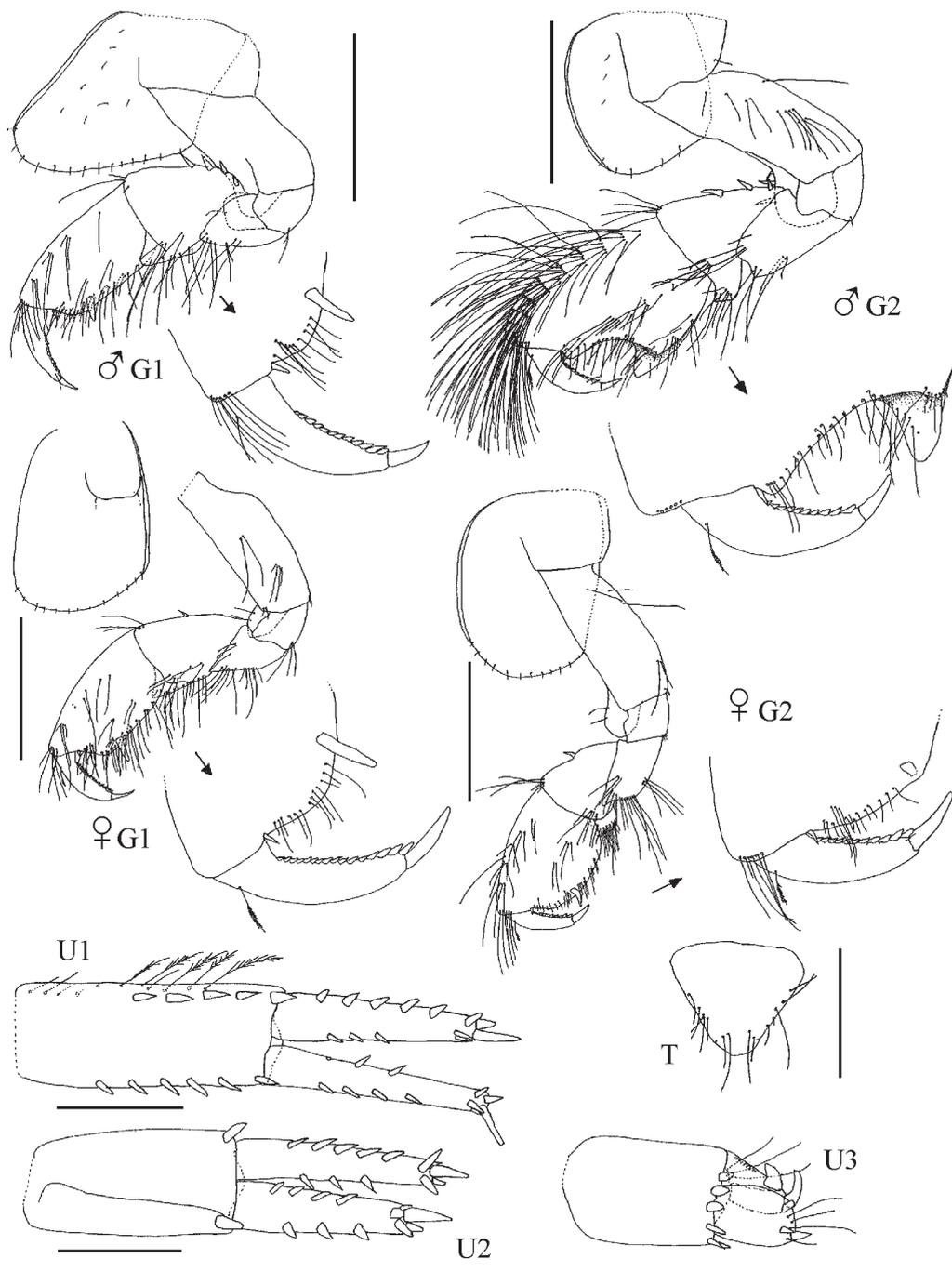


Figure 3 *Ampithoe rachanoi* sp. nov. Holotype male, 5 mm, PMBC 15747. Paratype female, 6 mm, PMBC 15748, Andaman Sea. Scale for G1-2 (male and female) represents 0.5 mm. Scale for U1-3, T represents 0.2 mm.

Etymology

Derived from the type location, Racha Noi Island, an island to the south of Phuket Island.

Remarks

Ampithoe rachanoi is morphologically close to *Ampithoe guaspere* J.L. Barnard, 1979 from the Galapagos Islands and *Ampithoe platycera* Sivaprakasam, 1970 from the southern tip of India

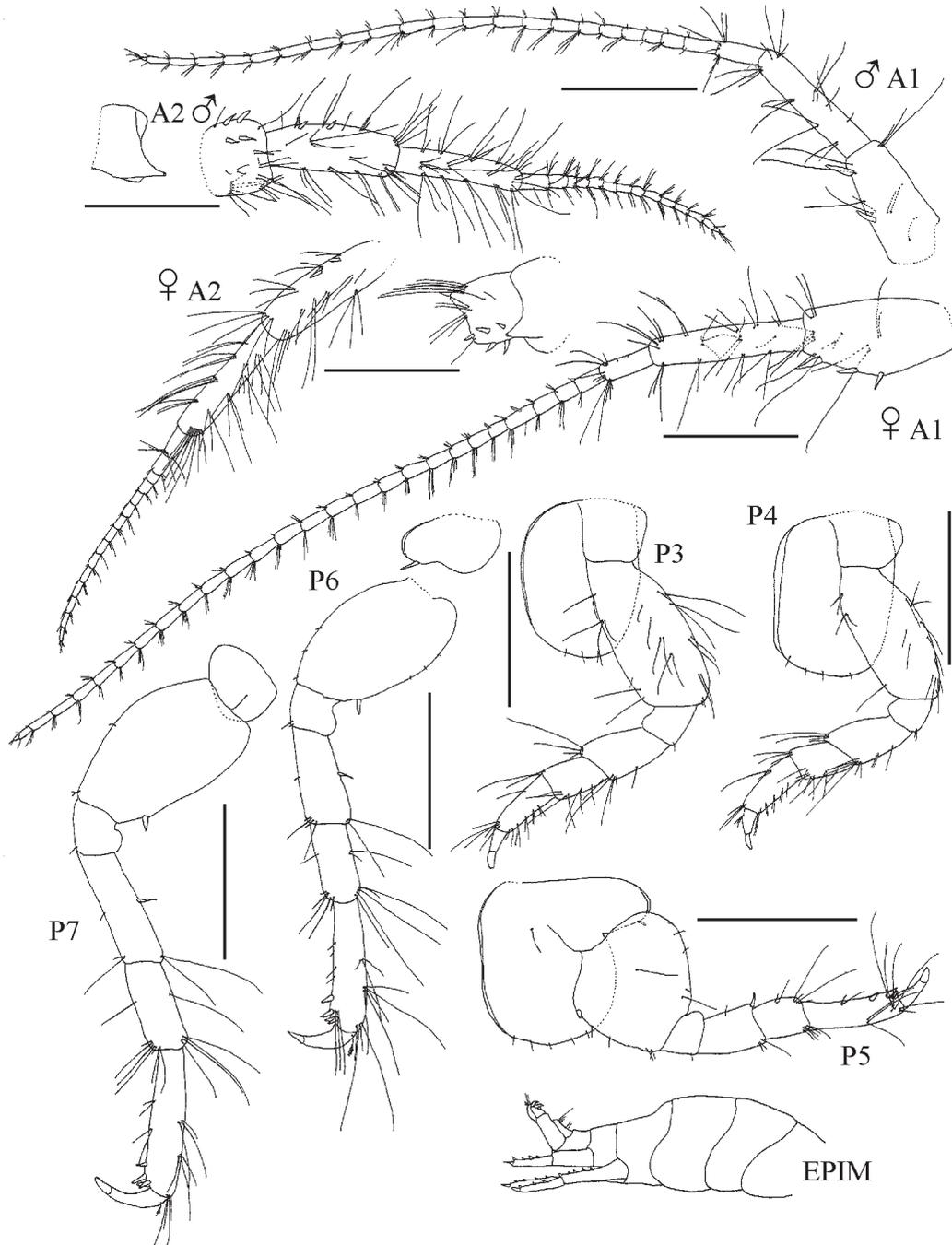


Figure 4 *Ampithoe rachanoi* sp. nov. Holotype male, 5 mm, PMBC 15747. Paratype female, 6 mm, PMBC 15748, Andaman Sea. Scale represents 0.5 mm.

both of which have a produced setose anterodistal lobe on the propodus of gnathopod 2. *Ampithoe rachanoi* differs from *A. platycera* in a number of ways: in *A. rachanoi* antenna 2 is slender (*A. platycera* is robust); the mandibular palp is setose on the posterior margin (apically setose) and article 2 is longer than article 3 (subequal to article 3); gnathopod 1 is smaller than gnathopod 2 (equal in size to gnathopod 2); gnathopod 1 coxa is larger than coxa 2 (subequal in size to coxa 2); gnathopod 1 palm is convex with no defining tooth (excavate and is defined by a small subacute tooth); gnathopod 2 is not setose and the dactylus is shorter than the palm (setose and the dactylus the same length as the palm) and the telson is distally subacute (rounded).

Ampithoe rachanoi differs from *Ampithoe guaspere* as follows: in *A. rachanoi* the palm of gnathopod 1 is convex (*A. guaspere* is straight); the palm of gnathopod 2 is excavate (entire); the dactylus of gnathopod 2 is shorter than the palm (subequal to the palm); and the epimeron 3 is narrowly rounded (subquadrate).

Distribution

Racha Noi Island, Phuket Island, Thailand, Andaman Sea.

Cymadusa Savigny, 1816

Cymadusa aungtonyae sp. nov.
(Figs 5–8)

Material examined

Holotype: PMBC 15749, male, 4 mm, Racha Noi Island, south of Phuket Island, Thailand, Andaman Sea, 07°30'N, 098°20'E, living on old rope, 10 m, coll. R. Peart and J.K. Lowry, 14.12.1998.

Paratypes: PMBC 15750, female, 4 mm, paratype with the same collection data as the holotype; AM P57342, 3 specimens, paratypes with the same collection data as the holotype.

Type locality

Racha Noi Island, south of Phuket Island, Thailand, Andaman Sea, 07°30'N, 098°20'E.

Diagnosis

Antenna 1 accessory flagellum 1 articulate. *Gnathopod 1* coxal ventral margin with a fringe of long, simple setae present; carpus shorter than propodus; carpal lobe subacute; palm entire, midmedial tooth present, posterodistal defining tooth absent. *Gnathopod 2* coxal ventral margin with fringe of long simple setae present; palm entire, rounded midmedial tooth present. *Uropod 1* distoventral peduncular spur present. *Uropod 3* outer ramus shorter than inner ramus. *Telson* distally rounded.

Description

Based on holotype male, 4 mm. *Epistome and upper lip* directed nearly straight down, around 90 degrees. *Antenna 1* longer than antenna 2; peduncular article 1 longer than article 2 (1.5 x); article 2 longer than article 3 (2.8 x); article 3 shorter than article 1 (0.3 x); primary flagellum with 22 articles; accessory flagellum present, 1 articulate. *Antenna 2* slender, similar to antenna 1; not densely setose on ventral margin; peduncular article 4 longer than article 5; flagellum 9 articulate. *Mandible* molar well developed; palp stout, long, apically setose; article 1 longer than article 2 (1.4 x); article 2 shorter than article 3 (0.7 x); article 3 subequal to article 1 (1.1 x). *Upper lip* distally setose. *Lower lip* outer plate notched, with medial and lateral lobes equal in size; mandibular lobe with curved margins, rounded apically. *Maxilla 1* palp well developed, with apical robust setae. *Maxilla 2* inner and outer plates narrow.

Pereon. *Coxae* longer than broad. *Gnathopod 1* smaller than gnathopod 2; without densely setose margins; coxa subequal to coxa 2; anterior margin convex, anteroventral margin produced, rounded, ventral margin with fringe of long, slender, simple setae; carpus shorter than propodus (0.8 x), anterior margin with 0 robust setae; carpal lobe subacute; propodus narrow (length 1.7 x width); palm acute, entire, with subquadrate midmedial tooth, with a single robust setae near inner base of dactylus, without posterodistal tooth but with 1 robust seta defining palm; dactylus overreaching palm, inner margin denticulate. *Gnathopod 2* without densely setose margins; ventral margin of coxa with fringe of long, slender, simple setae;

carpus shorter than propodus (0.8 x), anterior margin without any robust setae; propodus broad (length 1.3 x width), not produced into an anterodistally setose lobe; palm acute, excavate, with rounded midmedial tooth, with a single robust setae near inner base of dactylus, with an apically subacute posterodistal tooth and 1 robust seta defining palm; dactylus subequal in length to palm, tapering evenly, acute, inner margin denticulate. *Pereopod 3* basis narrow; merus narrow. *Pereopod 4* basis similar to pereopod 3. *Pereopods 5–7* weakly prehensile. *Pereopod 5* distal articles are broad; propodus not expanded distally, with 3 distal robust setae; dactylus hooked. *Pereopod 6* basis, posterior margin evenly curved, distal article are slender; propodus slightly expanded distally, with 4 distal robust setae; dactylus strongly curved. *Pereopod 7* similar to pereopod 6, distal articles are slender.

Pleon. *Epimeron 3* posteroventral corner broadly rounded. *Uropod 1* reaching to the tip of the rami of uropod 2; peduncle with large, acute distoventral spur; inner ramus slightly longer than outer. *Uropod 2* no peduncular laterodistal projection; inner ramus slightly longer than outer. *Uropod 3* peduncle longer than broad (length 1.3 x breadth); peduncle 1.8 x rami length; rami broad; outer ramus shorter than inner ramus, with 2 large recurved robust setae, with patch of small conical spines. *Telson* subtriangular distally rounded; apical cusps small.

Female: Based on paratype female, 4.0 mm. *Antenna 1* longer than antenna 2; peduncular article 1 longer than article 2 (1.2 x); article 2 longer than article 3 (2.5 x); article 3 shorter than article 1 (0.3 x); primary flagellum 22 articles; accessory flagellum present, 1 articulate. *Antenna 2* slender, similar to antenna 1; not densely setose on ventral

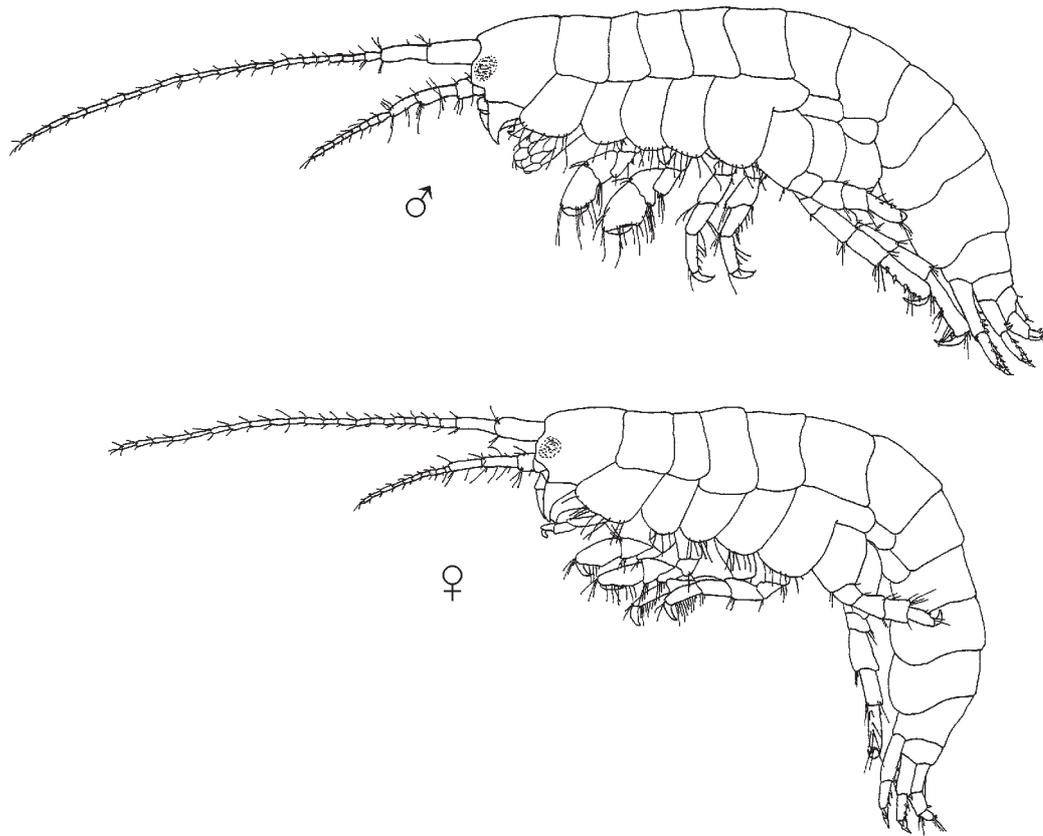


Figure 5 *Cymadusa aungtonyae* sp. nov. Holotype male, 4 mm, PMBC 15749. Paratype female, 4 mm, PMBC 15750, Andaman Sea.

margin; peduncular article 4 longer than article 5; flagellum 12 articulate.

Gnathopod 1 subequal to gnathopod 2; without densely setose margins; coxa larger than coxa 2; anterior margin convex, anteroventral

margin produced, rounded, ventral margin with fringe of long, slender, simple setae; carpus subequal to propodus (0.9 x), anterior margin without robust setae; carpal lobe subacute; propodus narrow (length 1.6 x width); palm acute,

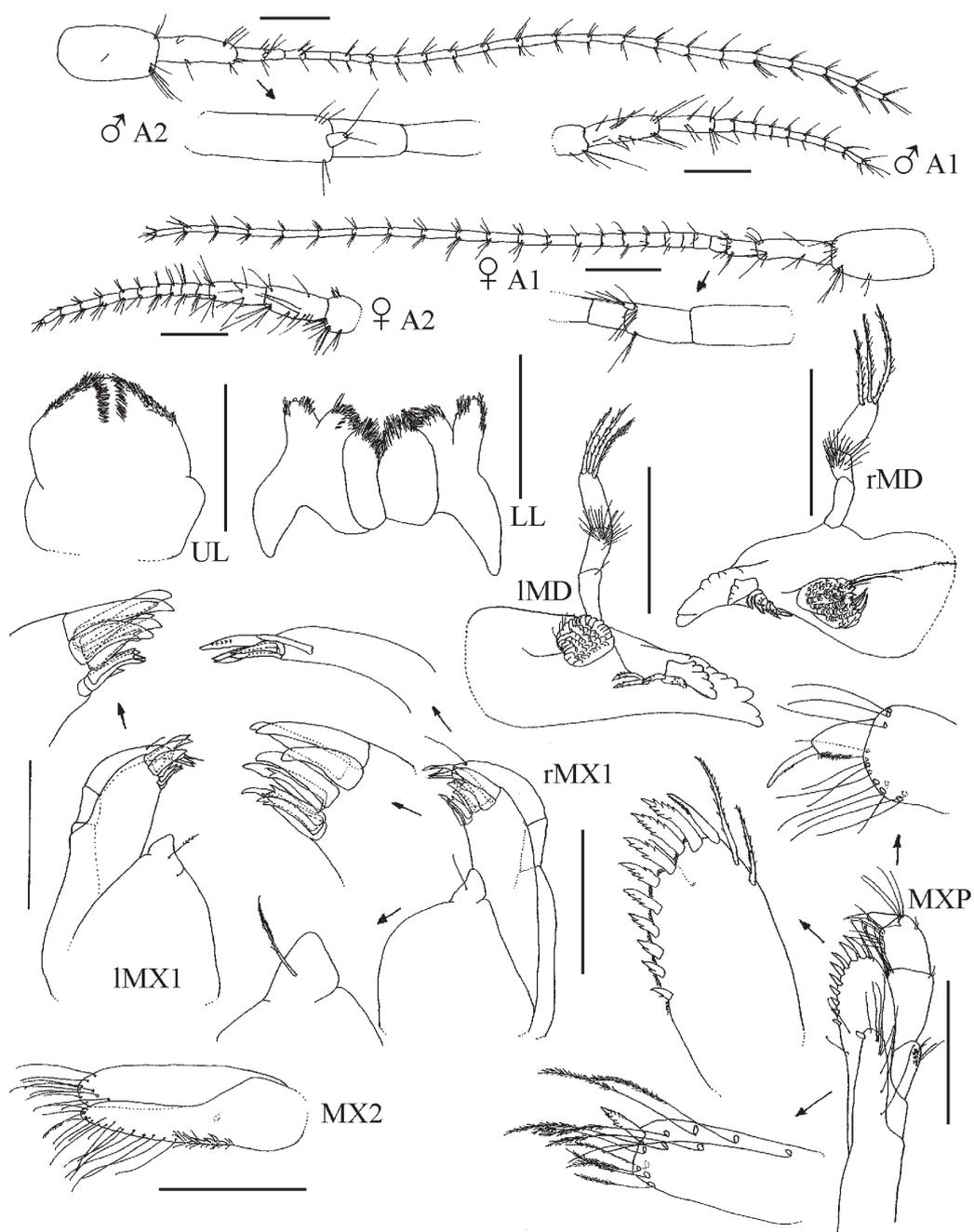


Figure 6 *Cymadusa aungtonyae* sp. nov. Holotype male, 4 mm, PMBC 15749. Paratype female, 4 mm, PMBC 15750, Andaman Sea. Scale represents 0.2 mm.

convex, without midmedial tooth, with a single robust setae near inner base of dactylus, without posterodistal tooth but with 1 robust seta defining

palm; dactylus subequal in length to palm, inner margin denticulate. *Gnathopod 2* without densely setose margins; ventral margins of coxa with fringe

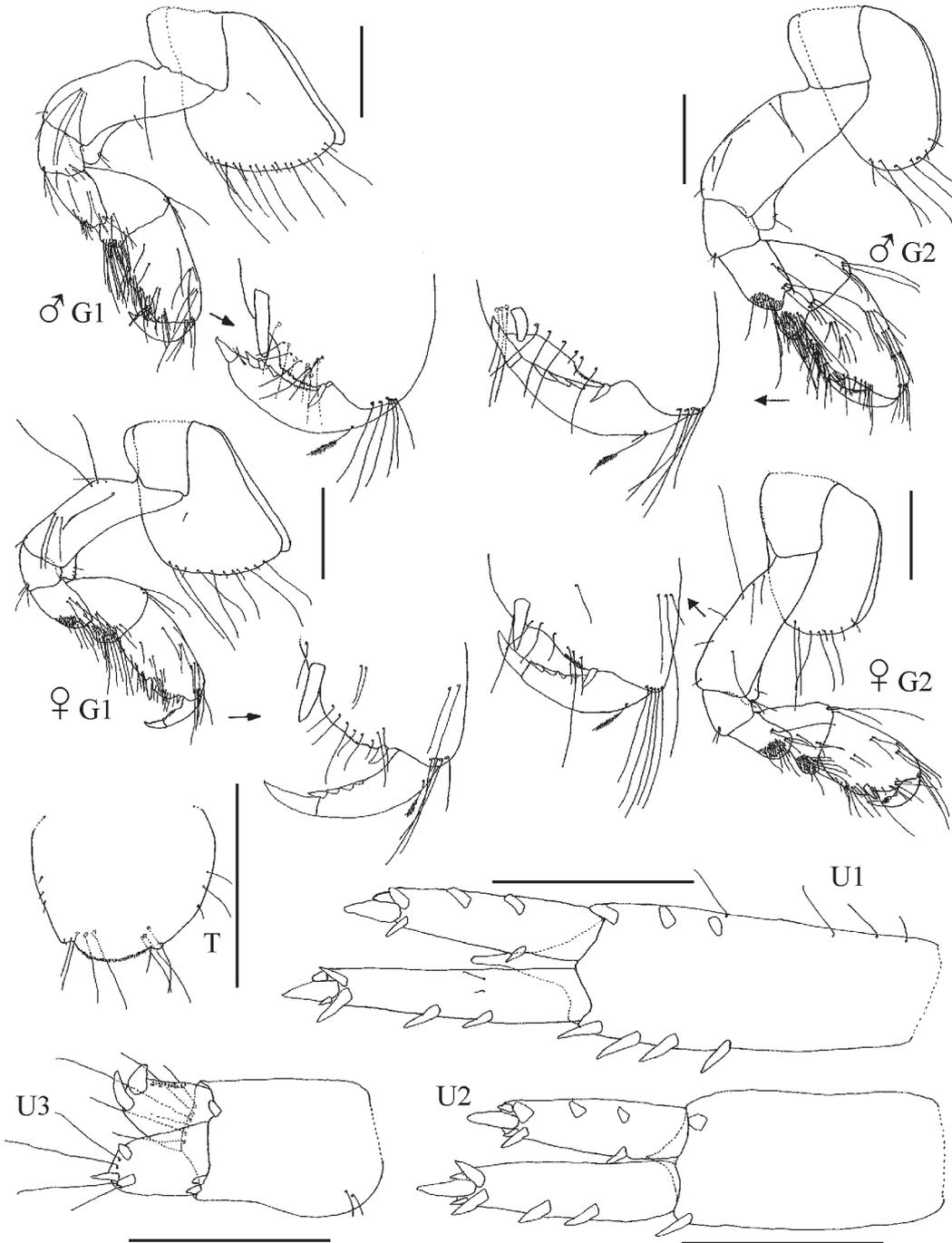


Figure 7 *Cymadusa aungtonyae* sp. nov. Holotype male, 4 mm, PMBC 15749. Paratype female, 4 mm, PMBC 15750, Andaman Sea. Scale represents 0.2 mm.

of long, slender, simple setae; carpus shorter than propodus (0.8 x), anterior margin without any robust setae; propodus narrow (length 1.3 x width), not produced into an anterodistally setose lobe; palm acute, entire, with rounded midmedial

tooth, with a single robust setae near inner base of dactylus, without a posterodistal tooth but with 1 robust seta defining palm; dactylus subequal in length to palm, tapering evenly, acute, inner margin denticulate.

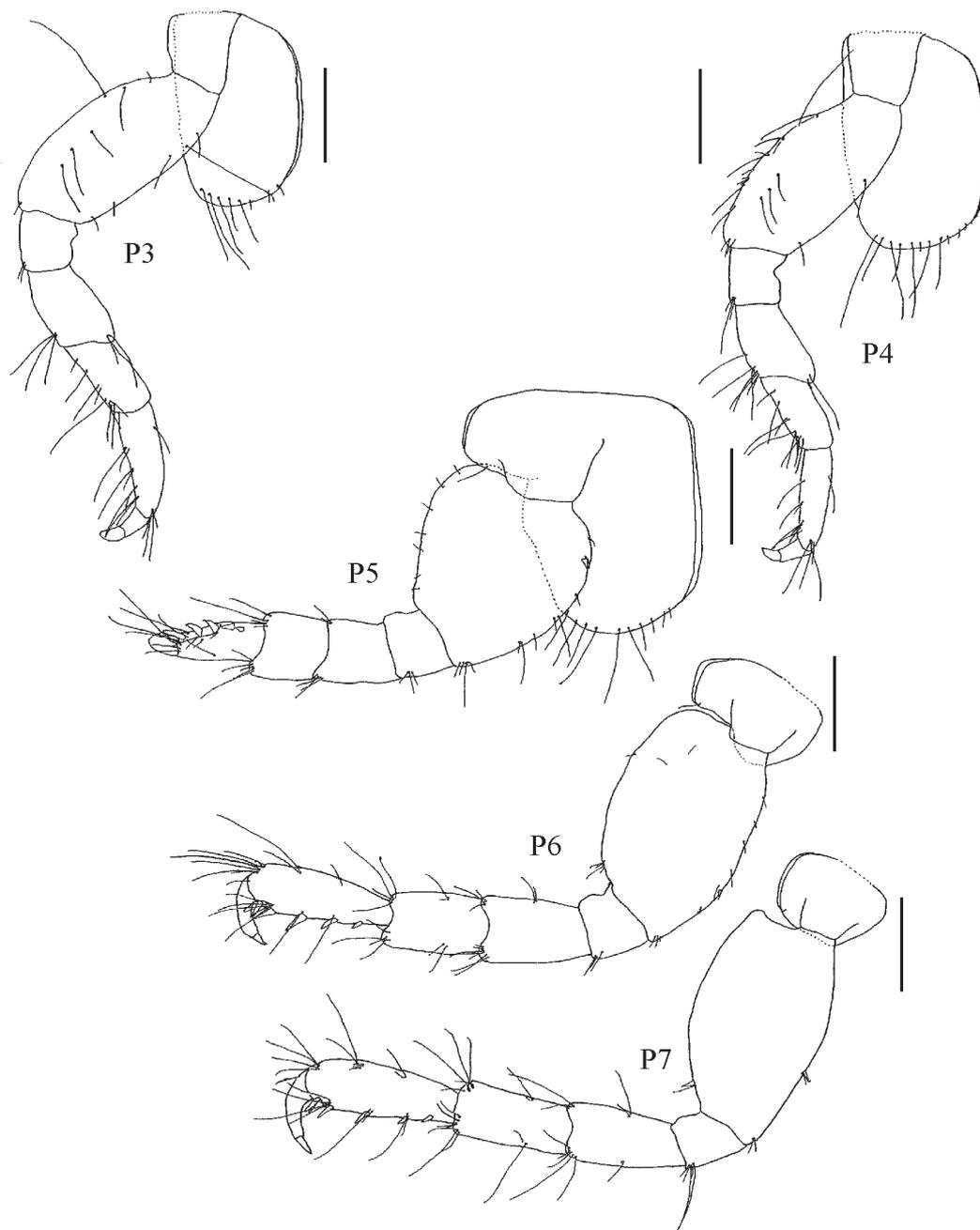


Figure 8 *Cymadusa aungtonyae* sp. nov. Holotype male, 4 mm, PMBC 15749, Andaman Sea. Scale represents 0.2 mm.

Etymology

This species is named for Charatsee Aungtonya who assisted in organising and running the Crustacean Biodiversity Workshop.

Remarks

Cymadusa aungtonya is most similar to *Cymadusa mauritiensis* (Ledoyer, 1978) which has been recorded from Mauritius, Madagascar and Vietnam. This appears to be a reasonably disjunct distribution for *Cymadusa mauritiensis*. However, the record from Vietnam could easily be *C. aungtonya* as these two species are close morphologically. Unfortunately, the record from Vietnam was just a name in a checklist (Huang, 1994; Lowry, 2000) and was never illustrated or described, therefore it is difficult to determine the true distribution.

The two species are similar in that they both have a setal fringe on the coxae of gnathopods 1 and 2; a midmedial tooth on both the palms of gnathopods 1 and 2; and strong robust setae on the dactyli of gnathopods 1 and 2. They are distinguishable as follows: in *Cymadusa aungtonya* the mandibular palp article 1 is longer than article 2 (*C. mauritiensis* is subequal), large tuft of setae on article 2 present (setal tuft absent); gnathopod 1 is smaller than gnathopod 2 (the same size); the coxa of gnathopod 1 is the same size as coxa 2 (larger than coxa 2); the palm of gnathopod 1 has a strongly subquadrate midmedial tooth (subacute midmedial tooth); the dactylus of gnathopod 1 is longer than the palm (subequal to the palm); the palm of gnathopod 2 is slightly excavate (entire); the basis of pereopod 3 is expanded (linear); the outer ramus of uropod 3 is subequal to the inner ramus (smaller than); the telson is distally rounded (subacute) and has apical cusps (cusps absent).

The similarities between *Cymadusa aungtonya* and *Cymadusa mauritiensis* are very strong and depending on the results of a phylogenetic analysis should be considered as sister species.

There appears to be a strongly disjunct distribution of the records of the sister species, *Cymadusa mauritiensis*.

Distribution

Racha Noi Island, Phuket Island, Thailand, Andaman Sea.

Cymadusa chalongana sp. nov.
(Figs 9–12)

Material examined

Holotype: PMBC 15751, male, 10 mm, beach south-west of Cape Panwa, Chalong Bay, Phuket Island, Thailand, Andaman Sea, 07°45'N, 098°24'E, from *Padina* sp. living on old ropes on sand flats, intertidal, coll. R. Peart and J.K. Lowry, 07.12.1998.

Paratypes: PMBC 15752, female, 9 mm, with the same collection data as holotype; [PMBC 15753, male, 11 mm, with the same collection data as holotype;] AM P57338, AM P57339, 5 specimens, with the same collection data as the holotype.

Type locality

Beach northwest of Cape Panwa, Chalong Bay, Phuket Island, Thailand, Andaman Sea, 07°45'N, 098°24'E, intertidal.

Diagnosis

Antenna 1 accessory flagellum 1 articulate. *Gnathopod 1* coxal ventral margin without setae; carpus longer than propodus, carpal lobe truncated; palm entire, no midmedial tooth, with an apically subacute posterodistal tooth defining palm. *Gnathopod 2* coxal ventral margin without setae; palm entire with subquadrate midmedial tooth. *Uropod 1* with large acute distoventral peduncular spur. *Uropod 3* outer ramus shorter than inner ramus. *Telson* distally truncated.

Description

Based on holotype male, 10 mm. *Epistome* and *upper lip* angled nearly straight down, around 90 degrees to head. *Antenna 1* longer than antenna 2; peduncular article 1 equal to article 2 (1.0 x); article 2 longer than article 3 (4.1 x); article 3 shorter than article 1 (0.2 x); primary flagellum 41 articles; accessory flagellum present, 1 articulate. *Antenna 2* slender, similar to antenna 1; not densely setose on ventral margin; flagellum 21 articulate.

Mandible: molar well developed; palp stout, long, setose along posterior margin; article 1 shorter than article 2 (0.6 x); article 2 shorter than article 3 (0.6 x); article 3 longer than article 1 (2.4 x). *Upper lip* distally setose. *Lower lip* outer plate notched; with lateral lobe longer than medial lobe; mandibular lobe with curved margins, rounded

apically. *Maxilla 1* palp well developed with apical robust setae. *Maxilla 2* inner and outer plates narrow.

Pereon. *Coxae* longer than broad. *Gnathopod 1* subequal to gnathopod 2; without densely setose margins; coxa larger than coxa 2, anterior margin convex, anteroventral margin produced, rounded;

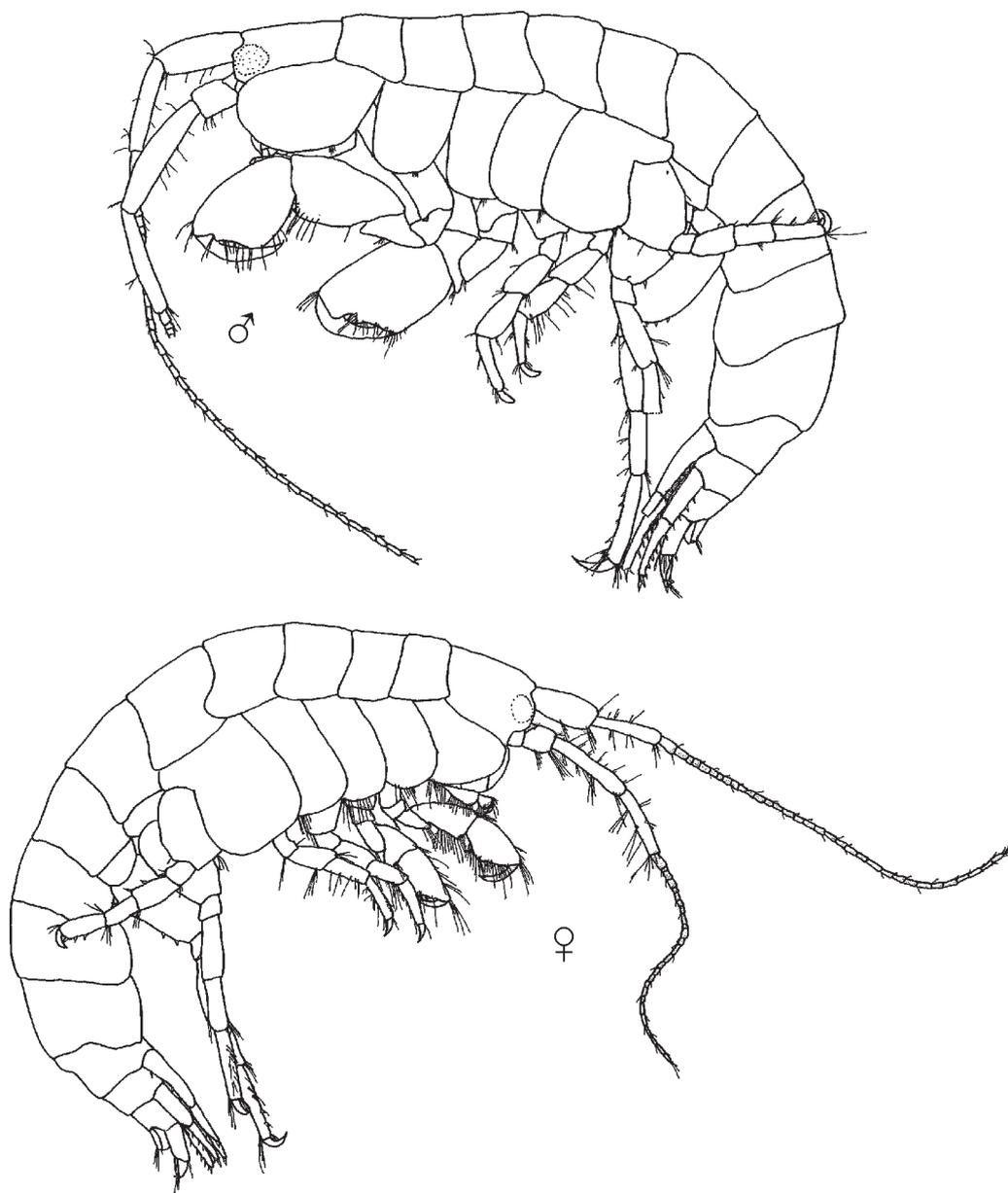


Figure 9 *Cymadusa chalongana* sp. nov. Holotype male, 10 mm, PMBC 15751. Paratype female, 9 mm, PMBC 15752, Andaman Sea.

ventral margin without setae; carpus longer than propodus (1.1 x), anterior margin without any robust setae; carpal lobe truncated; propodus broad (length 1.3 x width), palm acute, entire, without midmedial tooth, with a single robust setae near

inner base of dactylus, with a posterodistal tooth and 1 robust seta defining palm; dactylus overreaching palm, inner margin denticulate. *Gnathopod 2* without densely setose margins; coxal ventral margin without setae; carpus much shorter

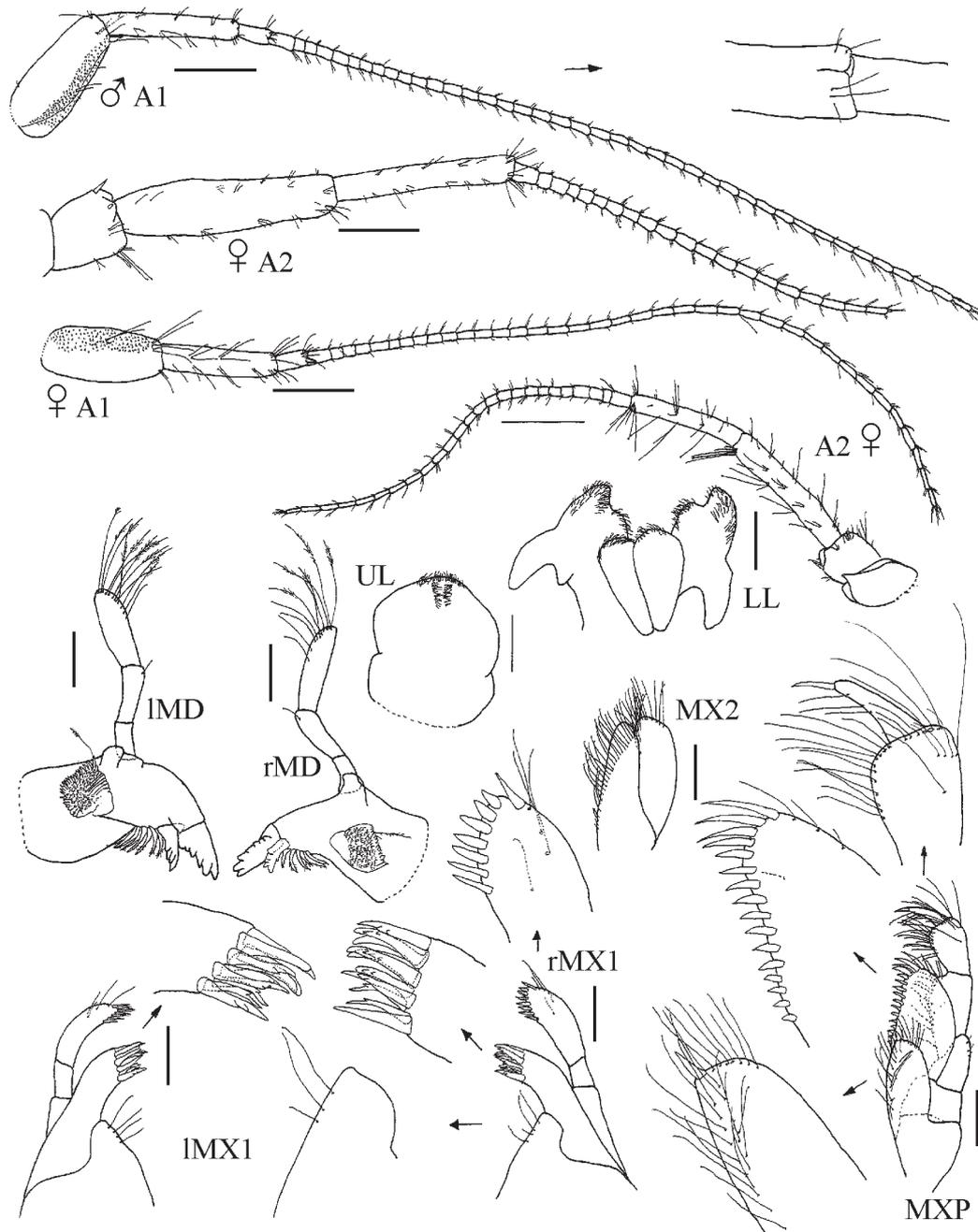


Figure 10 *Cymadusa chalongana* sp. nov. Holotype male, 10 mm, PMBC 15751. Paratype female, 9 mm, PMBC 15752, Andaman Sea. Scale for A1-2 (male and female) represents 0.5 mm. Scale for all others represents 0.2 mm.

than propodus (0.4 x), anterior margin without any robust setae; propodus broad (length 1.0 x width), not produced into an anterodistally setose lobe, palm acute, entire, with subquadrate midmedial

tooth, with a single robust setae near inner base of dactylus, and with an apically subacute posterodistal tooth and 0 robust setae defining palm; dactylus subequal in length to palm, tapering evenly, acute,

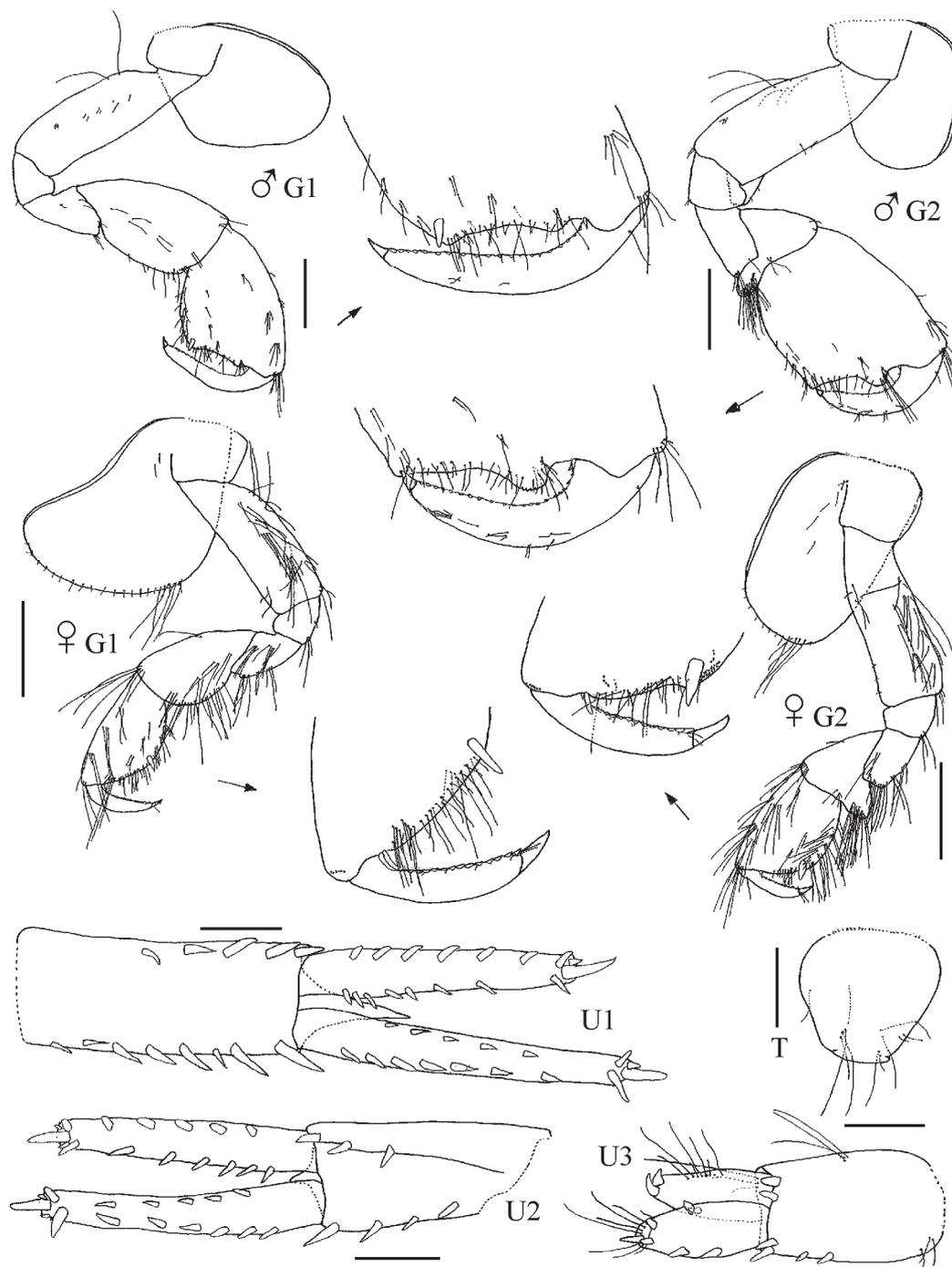


Figure 11 *Cymadusa chalongana* sp. nov. Holotype male, 10 mm, PMBC 15751. Paratype female, 9 mm, PMBC 15752, Andaman Sea. Scale for G1-2 (male and female) represents 0.5 mm. Scale for U1-3, T represents 0.2 mm.

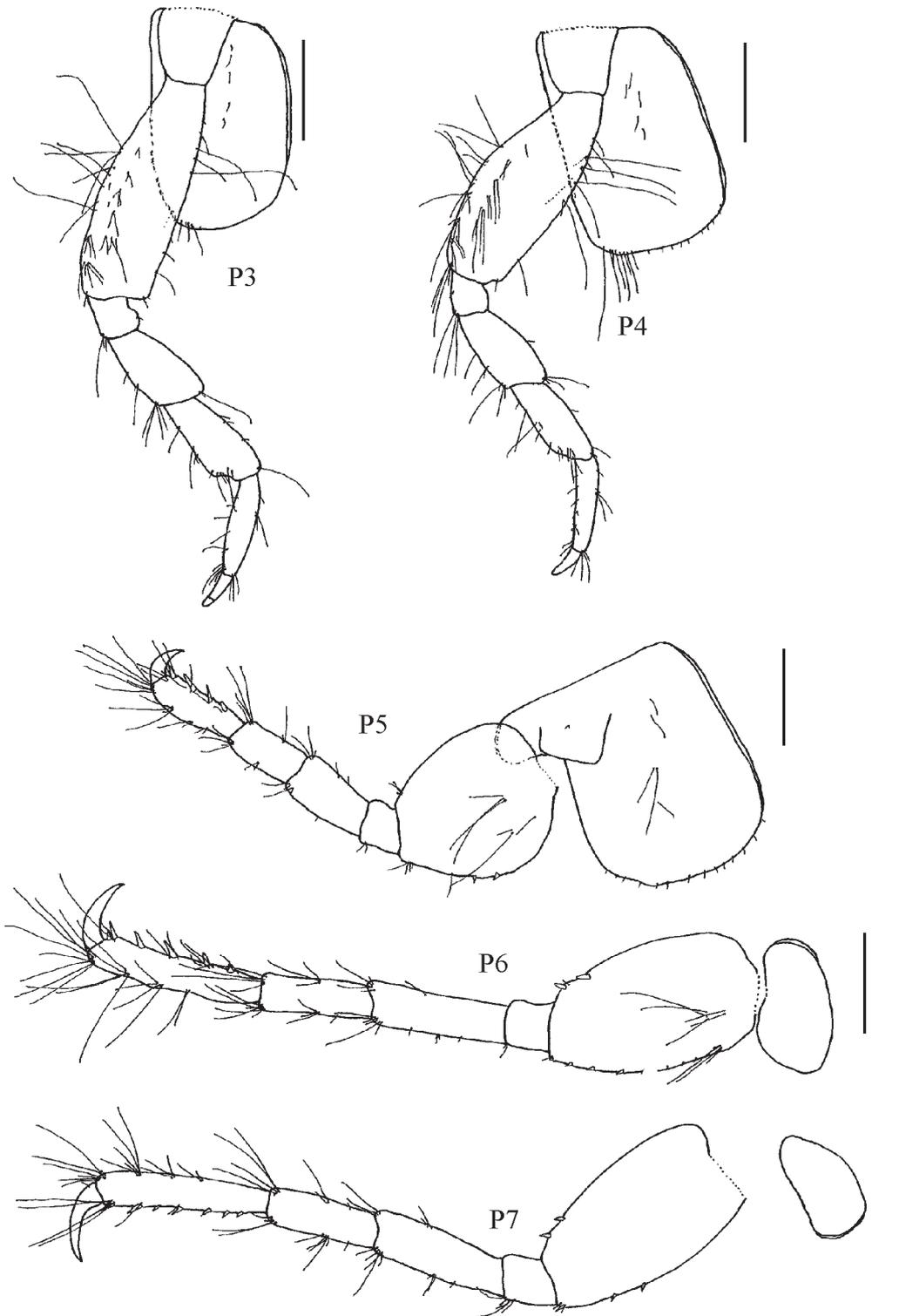


Figure 12 *Cymadusa chalongana* sp. nov. Holotype male, 10 mm, PMBC 15751. Paratype female, 9 mm, PMBC 15752, Andaman Sea. Scale represents 0.5 mm.

inner margin denticulate. *Pereopod 3* basis narrow; merus narrow. *Pereopod 4* basis similar to pereopod 3. *Pereopods 5–7* weakly prehensile. *Pereopod 5* distal articles slender; propodus not expanded distally, with 2 distal robust setae; dactylus slightly curved. *Pereopod 6* basis, posterior margin rounded proximally, straight distally; distal articles slender. *Pereopod 7* similar to pereopod 6, distal articles are slender.

Pleon. *Epimeron 3* posteroventral corner rounded. *Uropod 1* reaching to the tip of rami of uropod 2; peduncle with large, acute distoventral spur; inner ramus slightly shorter than outer. *Uropod 2* no peduncular laterodistal projection on male; inner ramus slightly shorter than outer. *Uropod 3* peduncle longer than broad (length 1.6 x breadth), peduncle 1.4 x rami length; rami broad; outer ramus shorter than inner ramus, with 2 large recurved robust setae, without patch of small conical spines. *Telson* subtriangular distally truncate, apical cusps small.

Female. Based on paratype female, 9 mm. *Antenna 1* longer than antenna 2; peduncular article 1 subequal to article 2 (1.0 x), article 2 longer than article 3 (3.1 x), article 3 shorter than article 1 (0.3 x); primary flagellum 38 articles; accessory flagellum present, 1 articulate. *Antenna 2* slender, similar to antenna 1, not densely setose on ventral margin; peduncle article 4 longer than article 5; flagellum 21 articulate.

Gnathopod 1 subequal to gnathopod 2, without densely setose margins, coxa larger than gnathopod 2 coxa, anteroventral margin produced, rounded, anterior margin concave, ventral margin with tuft of long, slender setae on the posterior corner; carpus longer than propodus (1.2 x), anterior margin without any robust setae; carpal lobe rounded; propodus narrow (length 1.6 x width), palm acute, entire, without midmedial tooth, with a single robust setae near inner base of dactylus, without a posterodistal tooth but with 1 robust seta defining palm; dactylus subequal in length to palm, inner margin denticulate. *Gnathopod 2* without densely setose margins; ventral margin of coxa with a tuft of long, slender setae on the posterior corner; carpus shorter than propodus (0.8 x), anterior margin without any robust setae; propodus narrow (length 1.3 x width), not

produced into an anterodistally setose lobe, palm acute, entire, without midmedial tooth, with a single robust setae near inner base of dactylus, without a posterodistal tooth but with 1 robust seta defining palm; dactylus overreaching palm, tapering evenly, acute, inner margin denticulate.

Etymology

Derived from the type locality Chalong Bay, Phuket Island, Thailand, Andaman Sea.

Remarks

This species is in the Indian Ocean group of the *Cymadusa filosa* Savigny, 1816 species complex. It is similar to *Cymadusa cavimana* Sivaprakasam, 1970, *Cymadusa filosa* (sensu stricto), and *Cymadusa imbroglio* Rabindranath, 1972. It is in this group because of the strong, often subquadrate midmedial tooth and a small subacute posterodistal tooth on the palm of the second gnathopod. It differs from *C. filosa* by not having densely setose antennae and gnathopods and having a short gnathopod 1 (*C. filosa* has an elongate gnathopod 1).

Cymadusa chalongana is similar to *C. imbroglio* and *C. cavimana*. There are two forms of *C. imbroglio*. The original description was from Indian waters but there is a second record of this species recorded from Fijian waters (Myers, 1985). The Fijian population of *C. imbroglio* is significantly different morphologically from the Indian population. These differences are listed in Myers (1985). *Cymadusa chalongana* differs from *C. imbroglio* (Indian Ocean record) in a number of ways: in *Cymadusa chalongana* antenna 1 is longer than antenna 2 (*C. imbroglio* of the Indian Ocean has antenna 1 subequal to antenna 2); the coxae of gnathopods 1 and 2 have no setae on the margins (have a setal fringe); and the gnathopod 1 carpus is truncated (rounded).

Cymadusa chalongana differs from *Cymadusa imbroglio* of Myers 1985 (Fijian Islands) also in a number of ways: in *Cymadusa chalongana* the antenna 1 is longer than antenna 2 (in *C. imbroglio* of the Fijian Islands it is subequal to antenna 2); the mandibular palp article 2 is shorter than article 3 (subequal to article 3); maxilla 2 inner plate is the same size as the outer plate (narrower than the

outer plate); gnathopod 1 is subequal to gnathopod 2 (smaller than gnathopod 2); gnathopods 1 and 2 coxae have the setal fringe absent (with setal fringe present) and the uropod 3 outer ramus is shorter than the inner ramus (subequal to the inner ramus). These differences indicate that *C. chalongana* is most similar to the Indian Ocean record of *C. imbroglia*.

Cymadusa chalongana is also similar to *C. cavimana*. There are a few small differences: in *C. chalongana* gnathopods 1 and 2 coxae have no setal fringe (*C. cavimana* has a setal fringe present); the gnathopod 1 carpus is longer than the propodus (subequal to the propodus), the midmedial tooth on the palm of gnathopod 1 is absent (midmedial tooth present); the palm of gnathopod 2 is entire (excavate); the dactylus of gnathopod 2 is subequal to the palm and also tapering evenly and acutely (shorter than the palm and does not taper but ends bluntly); and the epimeron 3 is narrowly rounded (subquadrate with a small acute tooth).

Distribution

Chalong Bay, Phuket Island, Thailand, Andaman Sea.

Cymadusa panwa sp. nov. (Figs 13–16)

Material examined

Holotype: PMBC 15754, male, 11 mm, beach south-west of Cape Panwa, Chalong Bay, Phuket Island, Thailand, Andaman Sea, 07°45'N, 098°24'E, from *Padina* sp. living on old ropes on sand flats, intertidal, coll. R. Peart and J.K. Lowry, 7.12.1998.

Paratypes: PMBC 15755, female, 11 mm; PMBC 15756, male, 8 mm; AM P573403, male, 3 female; AM P57341, 14 specimens, all with the same collection data as the holotype.

Type locality

Beach north-west of Cape Panwa, Chalong Bay, Phuket Island, Thailand, Andaman Sea, 07°45'N, 098°24'E, intertidal.

Diagnosis

Antenna 1 accessory flagellum 1–2 articulate. *Gnathopod 1* coxal ventral margin with row of small setules with a small tuft of short slender setae on the posterior corner; carpus subequal to propodus; carpal lobe truncated; propodus palm entire, with midmedial tooth absent, posterodistal defining tooth absent. *Gnathopod 2* coxal ventral margin with row of small setules with a small tuft of short slender setae on the posterior corner; palm entire, midmedial tooth absent. *Uropod 1* large acute distoventral peduncular spur present. *Uropod 3* outer ramus subequal to inner ramus. *Telson* distally truncated.

Description

Based on holotype male, 11 mm. *Epistome and upper lip* directed nearly straight down, around 90 degrees. *Antenna 1* longer than antenna 2; peduncular article 1 equal to article 2 (1.0 x); article 2 longer than article 3 (4.7 x); article 3 shorter than article 1 (0.2 x); primary flagellum 27 articles (incomplete); accessory flagellum present, 1–2 articulate. *Antenna 2* slender, similar to antenna 1; not densely setose on ventral margin; peduncular article 4 longer than article 5. *Mandible* molar well developed; palp stout, long, setose along posterior margin; palp article 1 shorter than article 2 (0.4 x); article 2 shorter than article 3 (0.8 x); article 3 longer than article 1 (3.6 x). *Upper lip* distally setose. *Lower lip* outer plate notched; with lateral lobe longer than medial lobe; mandibular lobe with curved margins, rounded apically. *Maxilla 1* palp well developed, with apical robust setae. *Maxilla 2* inner plate narrow, outer plate broader.

Pereon. *Coxae* longer than broad. *Gnathopod 1* smaller than gnathopod 2; without densely setose margins; coxa larger than coxa 2, anterior margin straight, anteroventral margin produced, rounded, ventral margin with a row of small setules and a tuft of short, slender setae on the posterior corner; carpus subequal to propodus (0.9 x), anterior margin without any robust setae; carpal lobe truncated; propodus narrow (length 1.6 x width); palm acute, entire, without midmedial tooth, with a single robust setae near inner base of dactylus, without posterodistal tooth but with 1 robust seta defining palm; dactylus overreaching palm, inner

margin denticulate. *Gnathopod 2* without densely setose margins; coxa with a row of small setules and a tuft of short, slender, simple setae on the posterior corner; carpus shorter than propodus (0.5 x), anterior margin without any robust setae; propodus broad (length 1.3 x width), not produced into an anterodistally setose lobe; palm acute, entire, without midmedial tooth, with a single

robust setae near inner base of dactylus, with an apically subacute posterodistal tooth and 1 robust seta defining palm; dactylus subequal in length to palm, tapering evenly, acute, inner margin denticulate. *Pereopod 3* basis narrow; merus narrow. *Pereopod 4* basis similar to pereopod 3. *Pereopods 5–7* weakly prehensile. *Pereopod 5* distal articles are slender; propodus not expanded distally,

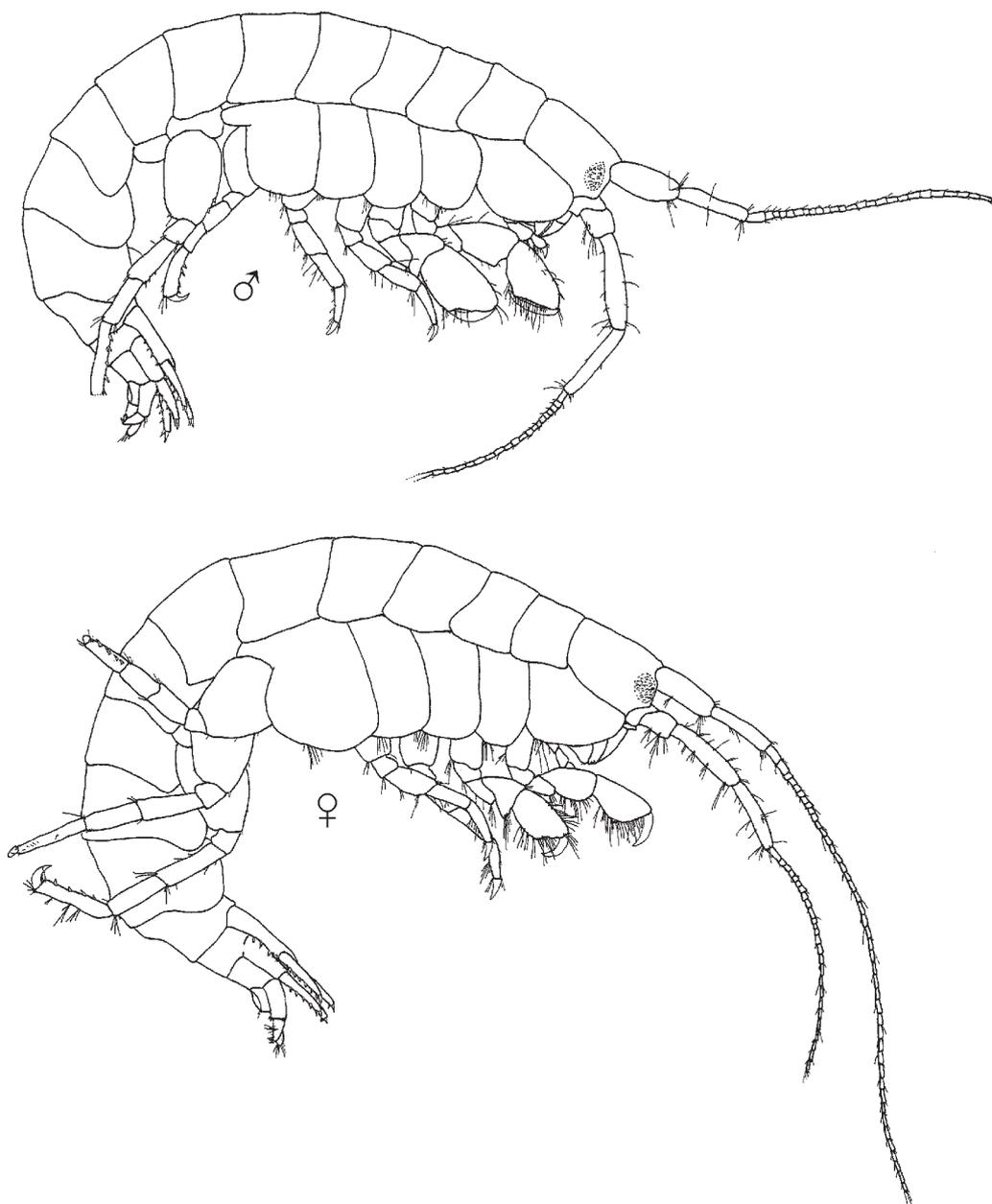


Figure 13 *Cymadusa panwa* sp. nov. Holotype male, 11 mm, PMBC 15754. Paratype female, 11 mm, PMBC 15755, Andaman Sea.

with 3 distal robust setae; dactylus slightly curved. *Pereopod 6* basis, posterior margin rounded proximally, straight distally; distal articles slender; propodus not expanded distally, with 2 distal robust setae; dactylus slightly curved. *Pereopod 7* similar to pereopod 6, distal articles slender.

Pleon. *Epimeron 3* posteroventral corner rounded. *Uropod 1* reaching to the tip of the rami of uropod 2; peduncle with large, acute distoventral spur; inner ramus slightly longer than outer. *Uropod*

2 no peduncular laterodistal projection on male; inner ramus slightly longer than outer. *Uropod 3* peduncle longer than broad (length 1.6 x breadth); peduncle 1.6 x rami length; rami broad, outer ramus subequal to inner ramus, with 2 large recurved robust setae, without patch of small conical spines. *Telson* subtriangular distally truncate; apical cusps small.

Female. Based on paratype female, 11 mm. *Antenna 1* longer than antenna 2; peduncular article

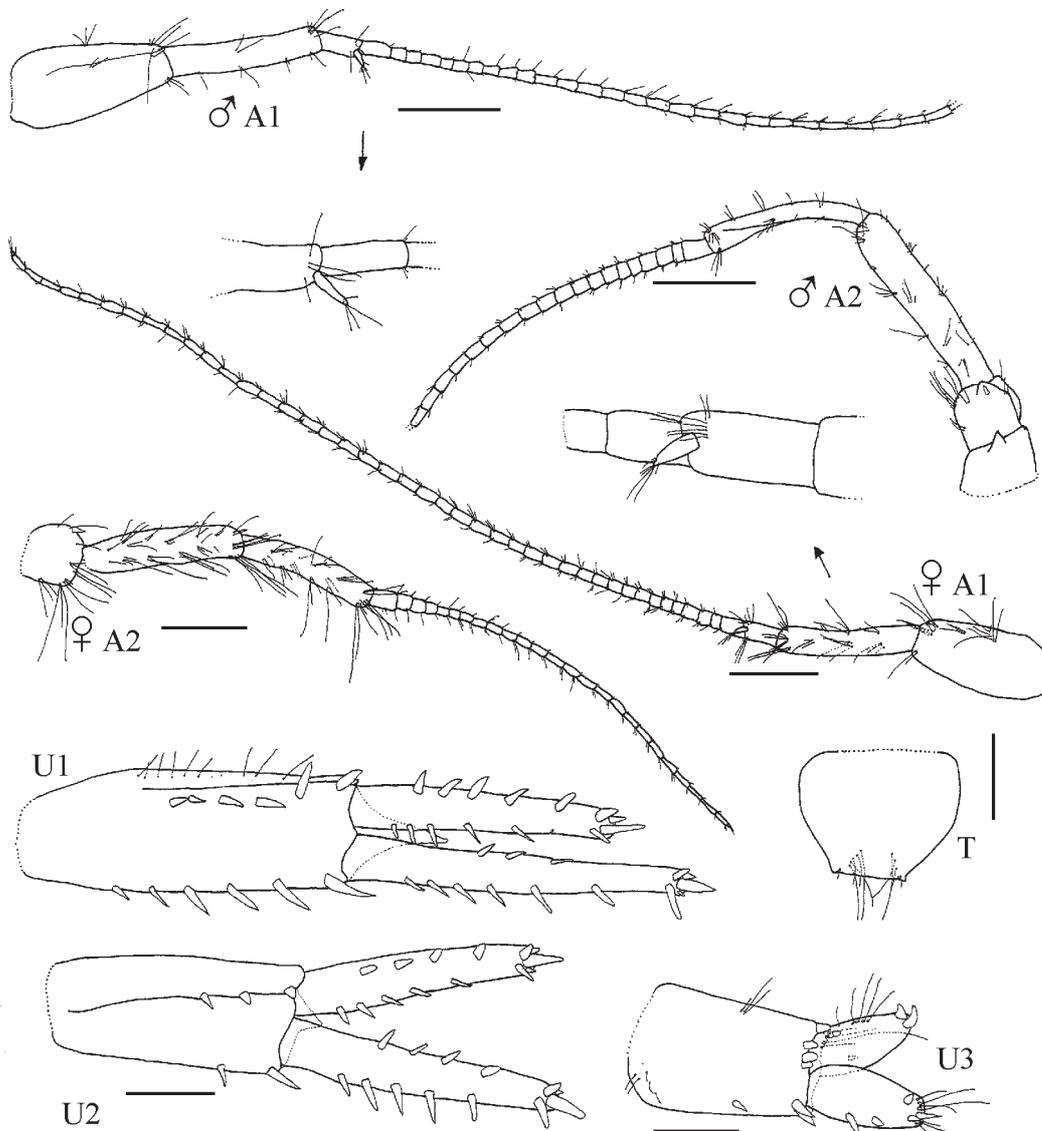


Figure 14 *Cymadusa panwa* sp. nov. Holotype male, 11 mm, PMBC 15754. Paratype female, 11 mm, PMBC 15755, Andaman Sea. Scale for A1-2 (male and female) represents 0.5 mm. All other scales represent 0.2 mm.

1 equal to article 2 (1.0 x); article 2 longer than article 3 (4.2 x); article 3 shorter than article 1 (0.2 x); primary flagellum with 43 articles; accessory flagellum present, 1–2 articulate. *Antenna 2* slender, similar to antenna 1; not densely setose on ventral margin; peduncular article 4 longer than article 5; flagellum 26 articulate.

Gnathopod 1 subequal to gnathopod 2, without densely setose margins; coxa larger than

coxa 2; anterior margin concave, anteroventral margin produced, rounded, ventral margin with row of small setules and a tuft of long, slender, simple setae on the posterior corner; carpus subequal to (1.0 x) propodus, anterior margin without any robust setae; carpal lobe rounded; propodus narrow (length 1.7 x width); palm acute, entire, without midmedial tooth, with a single robust setae near inner base of dactylus, without

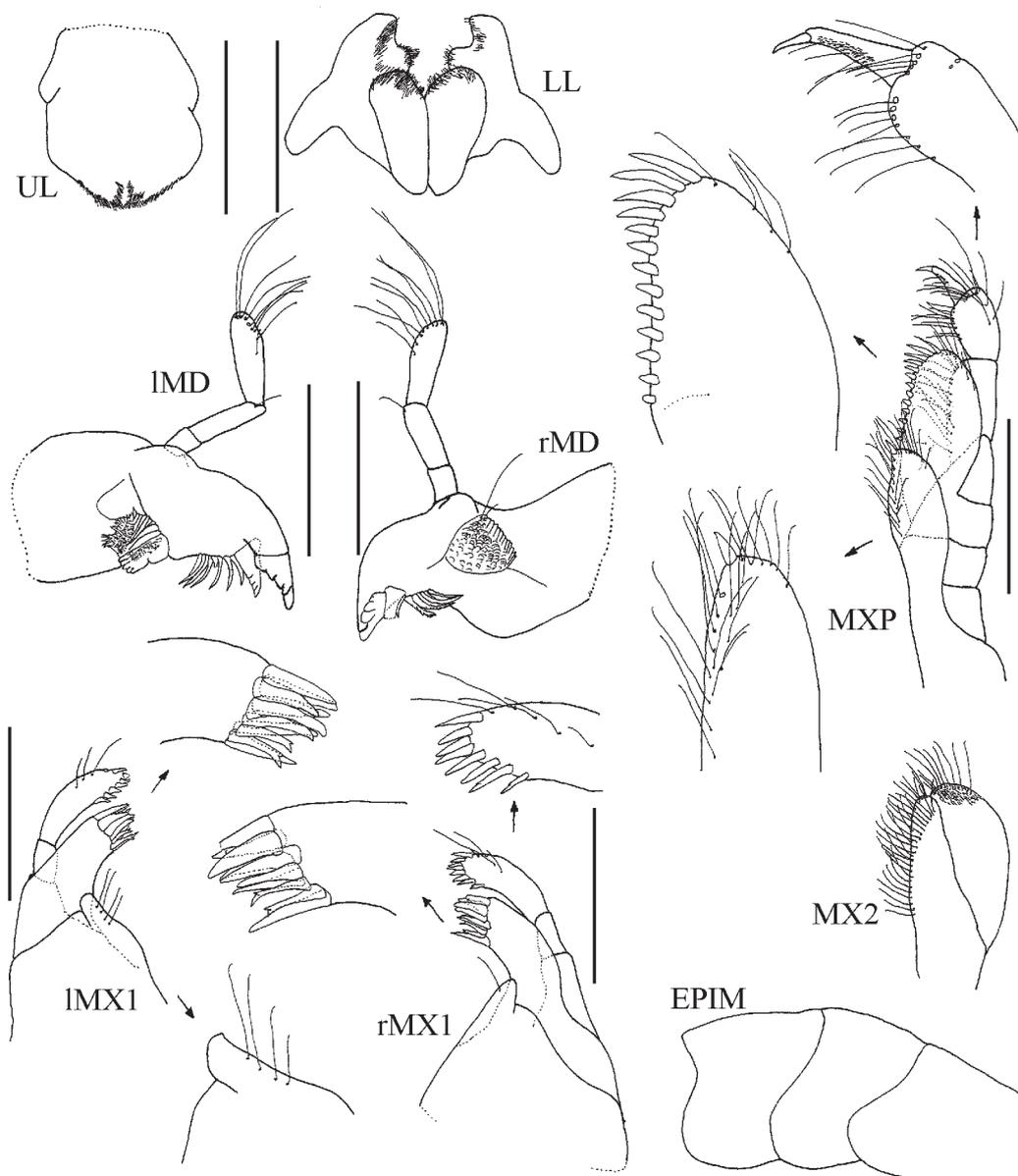


Figure 15 *Cymadusa panwa* sp. nov. Holotype male, 11 mm, PMBC 15754. Paratype female, 11 mm, PMBC 15755, Andaman Sea. Scale represents 0.5 mm.

posterodistal tooth but with 1 robust seta defining palm; dactylus subequal in length to palm, inner margin denticulate. *Gnathopod 2* without densely setose margins; coxa ventral margin with a row of small setules and a tuft of long, slender, simple setae on the posterior corner; carpus shorter than propodus (0.8 x); propodus broad (length 1.2 x

width), not produced into an anterodistally setose lobe; palm acute, without midmedial tooth, with a single robust setae near inner base of dactylus, with an apically subacute posterodistal tooth defining palm; dactylus subequal in length to palm, tapering evenly, acute, inner margin denticulate.

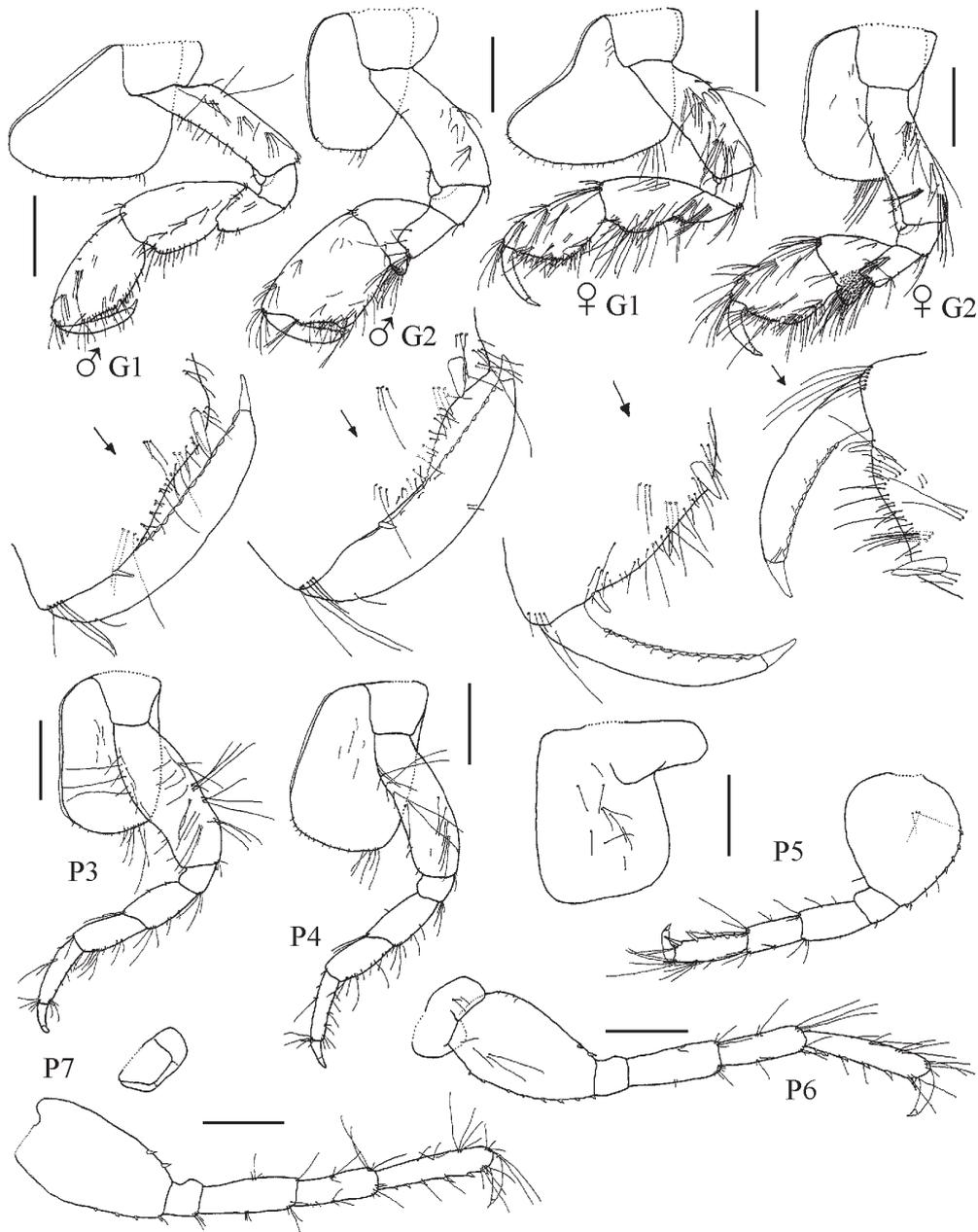


Figure 16 *Cymadusa panwa* sp. nov. Holotype male, 11 mm, PMBC 15754, Andaman Sea. Scale represents 0.5 mm.

Etymology

Named for Cape Panwa, the type locality (noun in apposition).

Remarks

Cymadusa panwa is most similar to *Cymadusa vadosa* Imbach, 1967 from the South China Sea (Imbach, 1967; Lowry, 2000). They differ as follows: in *C. panwa* antenna 2 peduncular article 4 is longer than article 5 (in *C. vadosa* it is subequal); gnathopod 1 is smaller than gnathopod 2 (the same size); the ventral margins of the coxae of gnathopods 1 and 2 do not have reduced setae present (having a setal fringe); the palms of gnathopods 1 and 2 have midmedial teeth absent (present); the palm of gnathopod 2 has a defining small subacute posterodistal tooth (absent defining tooth); epimeron 3 is narrowly rounded (subquadrate with a small acute tooth on the

corner); and outer ramus of uropod 3 is subequal to the inner ramus (shorter than the inner ramus).

Distribution

Cape Panwa and Chalong Bay, Phuket Island, Thailand, Andaman Sea.

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