

**DESCRIPTION OF *CRINOTONIA ANASTASIAE*, NEW GENUS, NEW SPECIES,
A NEW CRINOID ASSOCIATED PONTONIINE SHRIMP (CRUSTACEA: CARIDEA)
FROM NHA TRANG BAY, VIETNAM, WITH INCLUSION OF
PERICLIMENES ATTENUATUS BRUCE, 1971, IN THE NEW GENUS**

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ABSTRACT. – *Crinotonia anastasiae*, new genus, new species, is described on the basis of several specimens collected from a shallow water crinoid, *Phanogenia gracilis* (Hartlaub, 1893), in Nha Trang Bay, Vietnam. *Crinotonia*, new genus, differs from other pontoniine genera in the combination of several morphological features, including the absence of a podobranch on the second maxilliped, an arthrobranch on the third maxilliped; the presence of several robust disto-lateral and ventro-mesial teeth on the first segment of the antennular peduncle; the extreme dimorphism of the second pereopods; third pereopod with propodus having a serrated ventral margin, without distoventral spines, with a specialized dactylus. *Crinotonia*, new genus, is similar to the genus *Pontoniopsis* Borradaile, 1915 (type species *P. comanthi* Borradaile, 1915) which is also associated with crinoid hosts. All referred morphological features are also present in *Periclimenes attenuatus* Bruce, 1971, which is therefore assigned to *Crinotonia*, new genus. *Crinotonia anastasiae*, new species, differs from *Crinotonia attenuatus* (Bruce, 1971), new combination, mainly in the stouter body and appendages, and the presence of several spines along the ventral margin of dactylus of the third pereopod.

KEY WORDS. – Caridea, Pontoniinae, crinoid associated, new genus, new species, new combination, Nha Trang, Vietnam.

INTRODUCTION

Indo-Pacific crinoids are harbored with a lot of associates (Clark, 1921; Jangoux, 1990) including 15 species of pontoniine shrimps (Bruce, 1982). Presently, 11 of the species are attributed to the genus *Periclimenes* Costa, three species respectively in monotypic genera *Araiopontonia* Fujino & Myiake, *Parapontonia* Bruce, *Pontoniopsis* Borradaile and one species to the genus *Palaemonella* Dana. Most of the species are well adapted to live on crinoids and possess special coloration and morphology (Bruce, 1982). The genus *Periclimenes* (type species *P. amethysteus* (Risso, 1827)) is considered as being distinctly polyphyletic (Bruce et al. 2005). New sibling species were described inside the genus, at the same time some new genera were excluded (e.g. Bruce, 2004a; Bruce et al., 2005; Duris & Bruce 1995). An aberrant pontoniine shrimp *Periclimenes attenuatus* Bruce, 1971 was described from crinoid hosts from the Bismarck Archipelago

and later reported from other localities in Indo-Pacific (e.g. Bruce, 1983a, 1983b; Chace & Bruce, 1993; Li, 2004). Bruce (1971) reported that the species occupies an isolated position in the genus *Periclimenes* having a small size, very slender body, short rostrum, extreme asymmetry between the left and right second pereopods and a special form of unguis of dactylus of third pereopod. These features are unique in the genus *Periclimenes* but show resemblances to other crinoid-associated species (Bruce, 1971). A pair of specimens similar to *Periclimenes attenuatus* Bruce but differing in several features was found among collections of symbionts from Vietnamese crinoids. These specimens are described here as new species for which a new genus, together with *P. attenuatus*, has been erected. Postorbital carapace length (PCL, in mm) is used as a standard measurement of size. Material used in this study was fixed and deposited in the collections of the Zoological Museum of the Moscow State University, Moscow, Russia (ZMMU).

TAXONOMY

FAMILY PALAEMONIDAE RAFINESQUE, 1815

SUBFAMILY PONTONIINAE RAFINESQUE, 1815

Crinotonia, new genus

Diagnosis. – Symbiotic medium-sized shrimps associated with crinoids (feather stars). Carapace swollen, especially in females, and smooth, with antennal and small hepatic spines. Rostrum short, tapering, with well developed lamina bearing two-four dorsal teeth, ventral teeth absent, lateral lamina feebly developed, continuous with orbital margin posteriorly. Orbit feebly developed, inferior orbital angle rounded, slightly projecting. Pterygostomial margin bluntly angular. Abdominal somites smooth; pleura of first to fifth abdominal somites rounded, posterolateral angle of sixth abdominal somite pointed and posteroventral angle projecting and rounded. Telson with two pairs of dorsal and three pair of posterior spines. Eyes slightly projecting distally, with central corneal papillae. Antennule with large disto-lateral and one or two small teeth on distal medial lobe, robust ventral tooth in middle of medial border of basal segment. Antenna with disto-ventral tooth on basicerite and well developed blade of scaphocerite. Mouthparts without special features. Mandible without palp, with blade-like incisor process. Maxilla and maxillula with well developed palps. First maxilliped with distinct and well developed endites, large exopod with well developed caridean lobe bearing plumose setae, and epipod. Second maxilliped with well developed segments, exopod, epipod, without a podobranch. Third maxilliped with slender segments bearing setae, with well developed exopod and small epipod, without an arthrobranch. First pereopod slender, with robust chela and broad, swollen fingers. Second pereopods highly differ in size and shape; major pereopod with robust segments, with long subcylindrical long palm, with robust fingers, fixed finger bearing two teeth opposing into deep pits on the dactylus; minor pereopod is extremely slender, with simple slender fingers. Third pereopod with unarmed segments; propodus with serrated ventral margin; dactylus is biunguiculate, with slender and curved unguis, ventral margin setose, unarmed or bearing small teeth, preterminal accessory tooth is stout and triangular in shape. Pleopods are normal, endopod of second pleopods in males with well developed appendix masculina bearing numerous terminal spines. Uropods slender, exceeding telson, lateral border of endopod with small distal tooth and mobile spine.

Type-species. – *Crinotonia anastasiae*, new species.

Included species. – *Crinotonia anastasiae*, new species, and *Periclimenes attenuatus* Bruce, 1971.

Taxonomic remarks. – The new genus has a combination of morphological features which is unique in subfamily Pontoniinae: the absence of a podobranch on second maxilliped and an arthrobranch on the third maxilliped, the presence of several disto-lateral and robust mesial ventral teeth on the first antennular segment, the extreme second

pereopods dimorphism, the serrated ventral border of propodus of the third pereopod and the absence of disto-ventral propodal spines, specialized dactylar form and dactylar dentition. The combination of these features is not found in any other genus of the subfamily. The most morphologically similar genus is *Pontoniopsis* Borradaile, 1915 with type species *P. comanthi* Borradaile, 1915 associated with Indo-Pacific crinoids. *Pontoniopsis comanthi* possesses similar morphological features as short rostrum, absence of podobranch on second and arthrobranch on third maxilliped, occurrence of several disto-lateral and robust mesial ventral teeth on basal antennular segment, extreme second pereopods dimorphism and similar dactylar form and its dentition (Figs. 11, 12; see also Bruce, 1982). However, the genus *Pontoniopsis* clearly differs from *Crinotonia*, new genus, in having highly developed lateral rostral carina, toothless rostrum, absence on hepatic spine, subspatulate dactylus of minor second pereopod, absence of clear serration of ventral margin and presence of small disto-ventral tooth on propodus of third pereopod (Figs. 11, 12). Furthermore, representatives of *P. comanthi* are significantly smaller.

Etymology. – First part of the word “*Crino-*” dealing with the hosts of this genus – crinoids (feather stars), and second “*-tonia*” showed belonging to subfamily Pontoniinae. Gender: feminine.

Crinotonia anastasiae, new species

(Figs. 1-6)

Material examined. – Holotype: ovigerous female (PCL 3.8 mm)(ZMMU Ma 5459), South China Sea, Vietnam, Nha Trang Bay, Mun Island, depth 10-12 m., from crinoid *Phanogenia gracilis*, coll. I. Marin, 24 May.2004.

Allotype: male (PCL 2.6 mm)(ZMMU Ma 5460), same data as holotype.

Description. – Holotype female. Carapace swollen, smooth, with antennal and hepatic spines. Hepatic spine is distinctly smaller than antennal and directed horizontally. Rostrum short, straight, tapering and slightly compressed, with developed dorsal carina bearing four conspicuous teeth, without ventral teeth and ventral carina (Fig. 2a, b); lateral lamina feebly developed, continuous with orbital margin posteriorly (Fig. 2c, d). Orbit feebly developed, inferior orbital angle rounded, slightly projecting. Pterygostomial margin bluntly angular.

Abdominal somites smooth; pleura of first to fifth abdominal somites rounded, postero-lateral angle of sixth abdominal somite is broad and pointed, postero-ventral angle projecting and rounded (Fig. 6a, b). Telson is about three times as long as wide (Fig. 6b), converge gradually posteriorly, with two pairs of conspicuous dorsal submarginal spines situated at 0.4 and 0.7 of telson length; three pairs of posterior spines contain short lateral, long and slender intermediate and slender submediate spines which are about half of intermediate spine length (Fig. 6e).

Eyes large and well developed, with slightly projecting cornea. Central cornea with small papilla.

Antennules (Fig. 2e,f) well developed; basal segment is about two times longer than wide, with lateral border bearing an acute distolateral tooth, distal medial lobe with acute medial tooth, small setae is presented between teeth; distinct robust ventral tooth is situated on the middle of medial border of basal segment. The stylocerite is well developed. The intermediate segment is slender, about 1.5 times as long as wide, with disto-lateral inner border produced distally. The distal segment is about two times as long as wide. The upper flagellum with rami fused for the two proximal segments, the shorter ramus consists of four segments with five groups of aesthetascs, and the longer free ramus consists of more than twenty segments. The lower flagellum is filiform with more than twenty segments.

Antenna (Fig. 2h) well developed stylocerite, basicerite with small disto-ventral tooth; carpopocerite is slender, about four times as long as wide; flagellum is well developed, with the length equal to body length; scaphocerite is slender and exceeding the distal margin and intermediate antennular segment, about 3 times as long as maximum width, with well developed distolateral tooth.

Mouthparts without special features. Mandible (Fig. 3a) without palp; incisor process tapering to acute point with two terminal teeth; molar process well developed, robust, with five stout tooth distally.

Maxillula (Fig. 3b) is normal, with well developed bilobed palp; the upper lacinia is slightly curved, flaring distally, with strong setae distally; the lower lacinia is slender, tapering distally.

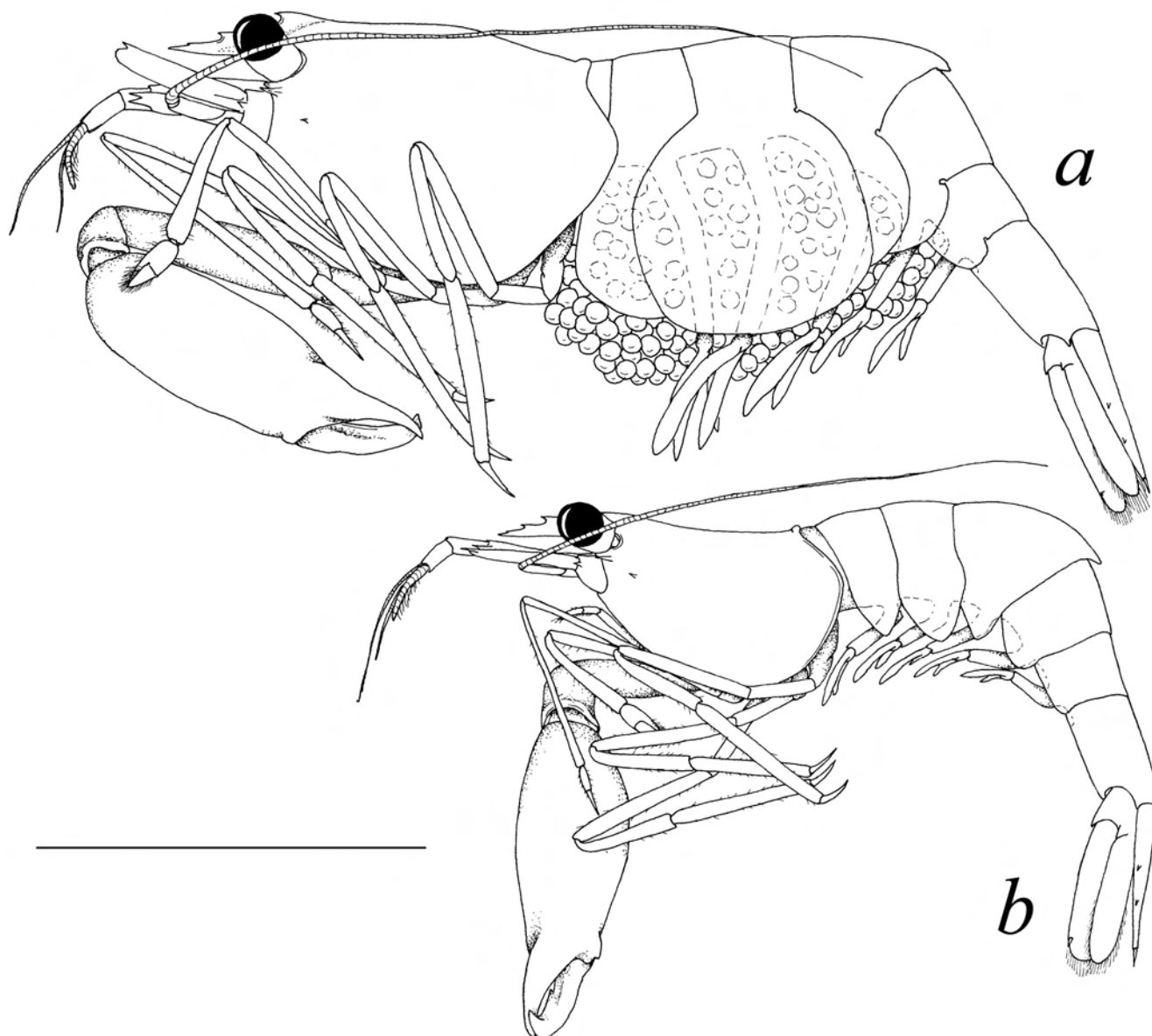


Fig. 1. *Crinotonia anastasiae*, new genus, new species: a, holotype female; b, allotype male. Scale bar = 5 mm.

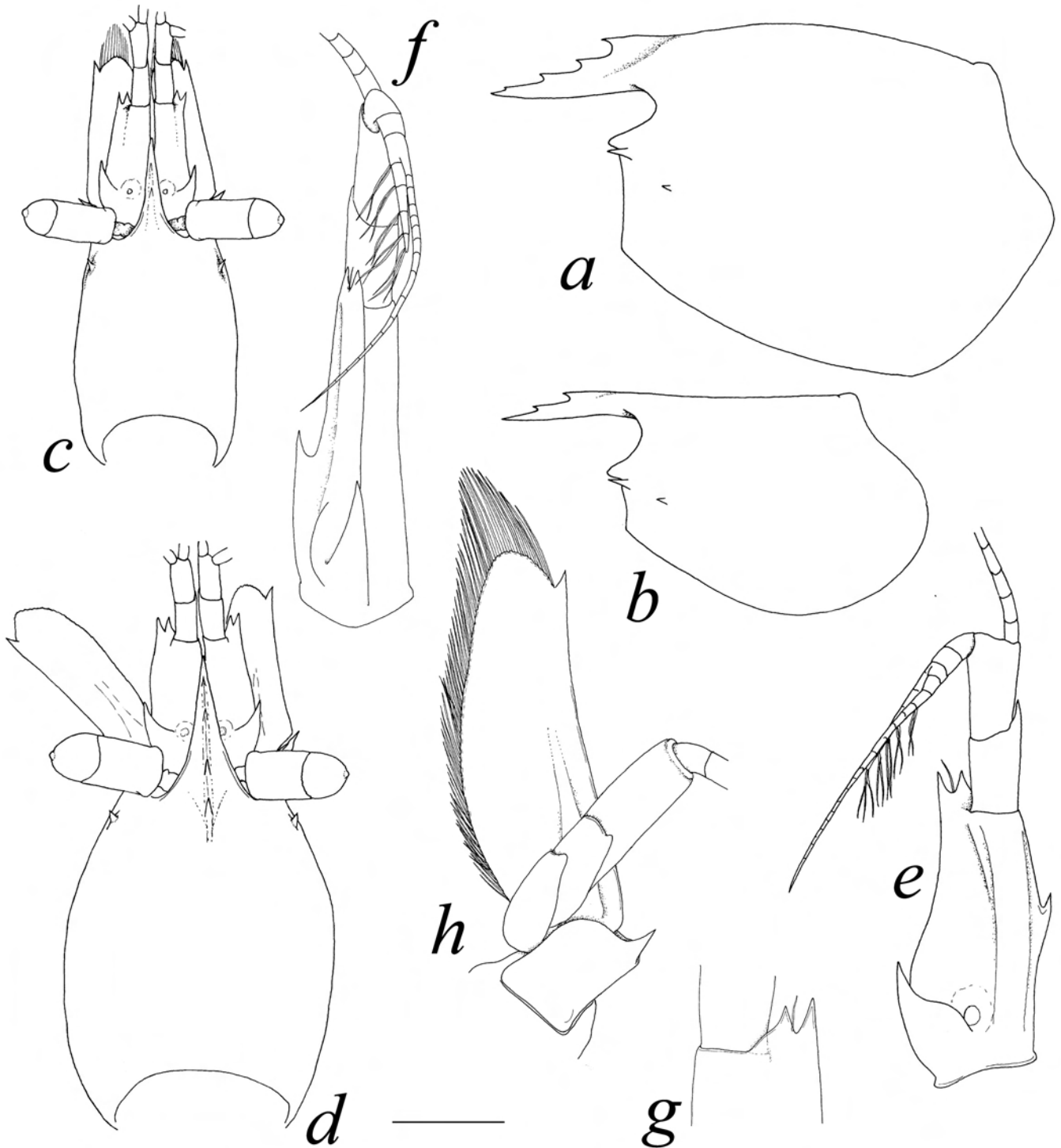


Fig. 2. *Crinotonia anastasiae*, new genus, new species, holotype (a, c) and allotype (b, d-h): a, b, carapace; c, d, front of carapace, dorsal; e, f, antennules; g, disto-lateral part of basal segment of antennules; h, antenna. Scale bar: a-d = 2 mm; e-h = 4.8 mm; g = no scale bar.

Maxilla (Fig. 3c) with well developed simple palp; endites are well developed, basal endite feebly bilobed, distal lobes subequal, furnished with stiff, elongated setae; scaphognathite well developed, with plumose setae.

First maxilliped (Fig. 3d) with distinct and well developed endites, basal endite is significantly larger, with setae along lateral margin; exopod well developed with large caridean lobe bearing plumose setae; epipod is triangular in shape, well developed.

Second maxilliped (Fig. 3e) with exopod well developed; distolateral margin of propodus broadly rounded, with slender setae; dactylus about three times longer than broad, with numerous spines along distal margin; epipod subrectangular; podobranch absent.

Third maxilliped (Fig. 3f) with slender segments and well developed exopod exceeding the length of ischiomerus; ischiomerus is about 3.5 times as long as maximum width, tapering significantly distally, the penultimate segment is slender, about five times as long as wide; the terminal segment is also slender, about seven times as long as wide, with sparse long setae along the border; epipod oval; arthrobranch absent.

First pereiopod (Fig. 4a) slender, with robust chela and broad, swollen fingers; carpus is slender, significantly flaring distally, palm is equal in width and length, slightly compressed laterally; fixed finger is robust with numerous terminal setae, with acute tip and feebly developed cutting edge; dactylus with acute tip and, subcylindrical, without conspicuous cutting edge (Fig. 4b,c).

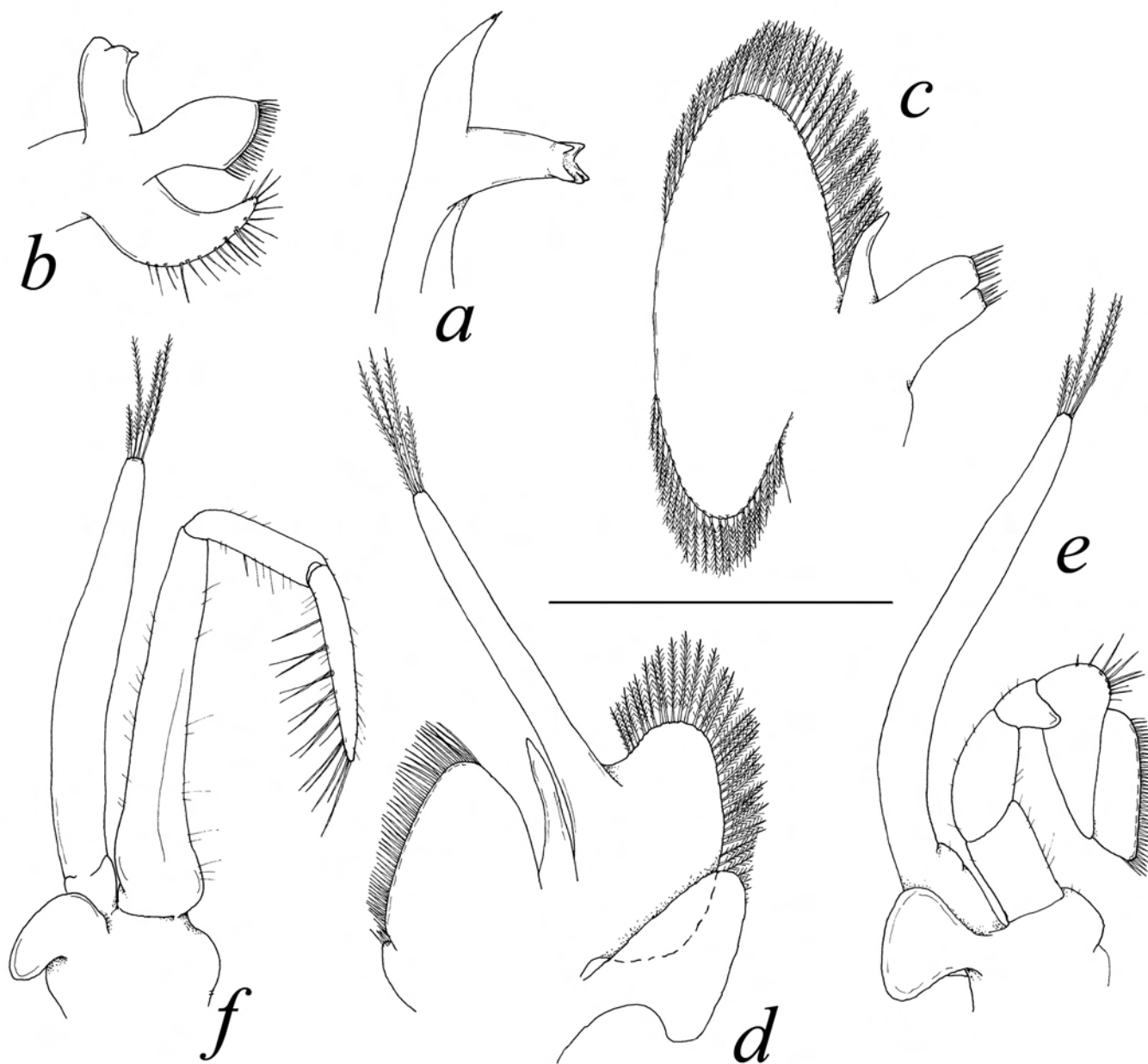


Fig. 3. Mouthparts of *Crinotonia anastasiae*, new genus, new species, allotype: a, mandibule; b, maxillula; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped. Scale bar = 1 mm.

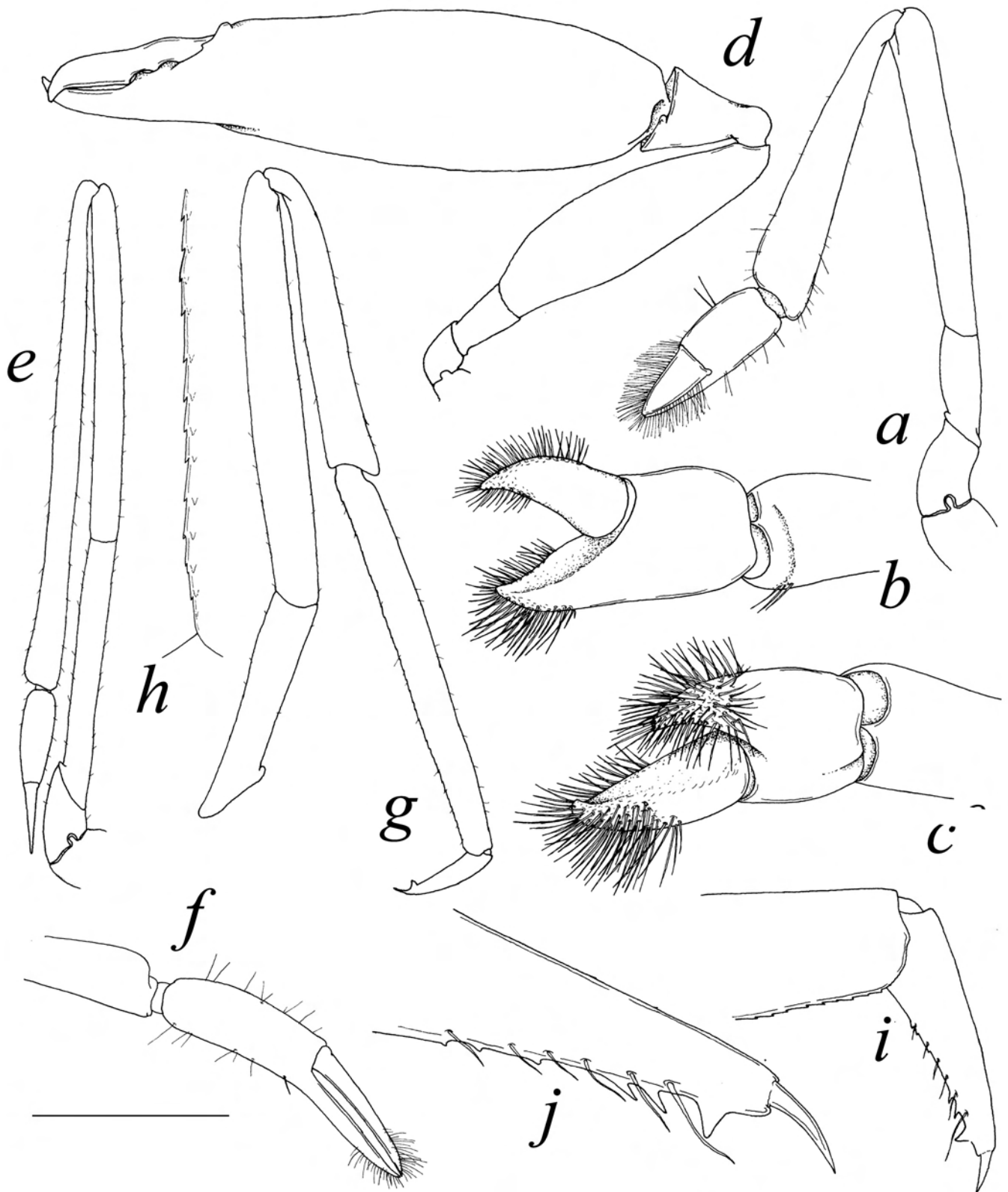


Fig. 4. *Crinotonia anastasiae*, new genus, new species, allotype: a, first pereiopod; b, c, chela of first pereiopod; d, major second pereiopod; e, minor second pereiopod; f, chela of minor second pereiopod; g, third pereiopod; h, same, ventral margin of propodus; i, dactylus of third pereiopod; j, same, distal part. Scale bar: a, e, g = 1 mm; b, c, f, i = 0.5 mm; d = 2 mm; j = no scale bar.

Second pereiopod highly differ in size and shape. Major pereiopod (Fig. 4d) with robust segments; ischium is about two times as long as wide; merus is about 3.4 times as long as maximal width, with medial part swollen centrally; carpus is flared distally, as long as maximal width, palm is subcylindrical, about 2.5 times as long as maximal width; fingers with acute, curved tips; fixed fingers robust, with two teeth opposing into deep pits on the dactylus, with distinct cutting edge on distal third of the length; dactylus is robust, about 4.5 times as long as wide, with distinct dorso-lateral flange along the proximal two-third of the length, ventral margin with distinct protruding cutting edge in distal third of the length, with two mesial deep pits and one tooth in proximal third of the length (Fig. 4a-d). Minor pereiopod (Fig. 4e) is extremely slender, ischium is about eight times as long as wide; merus is about thirteen times as long as width; carpus is flared distally, about fifteen times as long as maximal width, palm is subcylindrical, about five times as long as width, slightly tapering distally, fingers are slender, subcylindrical, equal to palm length, about 2.5 times as long as proximal width, with pointed, curved tips (Fig. 4f).

Third pereiopod (Fig. 4g) slender, with unarmed segments; ischium is about 3.5 times as long as wide; merus is about seven times as long as wide; carpus is about 3.5 times as long as maximum wide, tapering proximally; propodus is about 10.5 times as long as wide, with serrated ventral margin

(Fig. 4h); dactylus (Fig. 4i) slender, about 3 times as long as maximum width, significantly tapering distally, biunguiculate, with pointed slender curved unguis and preterminal triangular accessory tooth directed distally (Fig. 4j). Fourth and fifth pereiopods are similar.

Pleopods are normal, endopod of second pleopods in male with developed appendix masculina bearing numerous long terminal spines (Fig. 6f). Uropods (Fig. 6c) slender, exceeding telson; lateral border of uropodal endopod with small distal tooth and mobile spine.

Remarks. – An unique feature, presence of three well developed submediate posterior spines, was found in allotype specimen (Figs. 6f, g). The holotype specimen possesses two submediate posterior spines (Fig. 6h) that is ordinary normal in the Pontoniinae. This feature of the allotype is considered as an individual variation, but it needs confirmation on further material.

Colour in life. – Unknown.

Etymology. – This species named in honour of Anastasia Abramkina.

Distribution. – Known only from type locality, Nha Trang Bay, Vietnam.

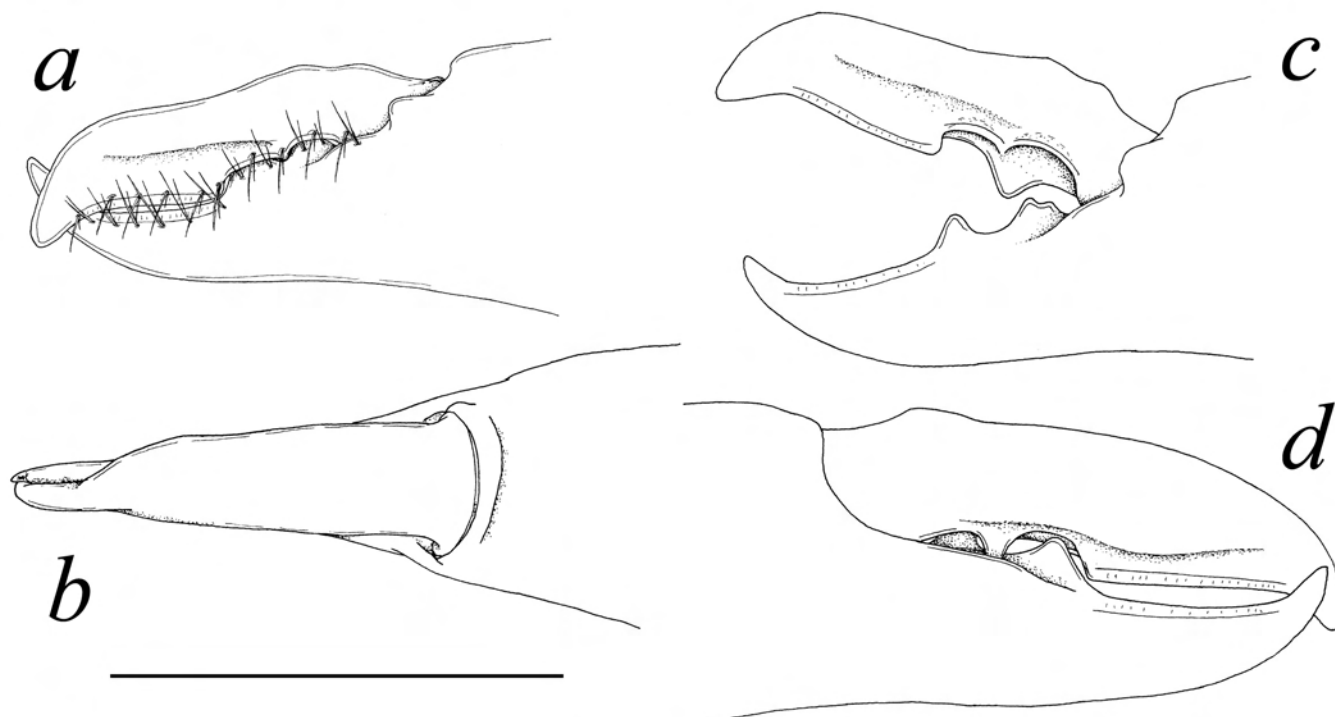


Fig. 5. *Crinotonia anastasiae*, new genus, new species, allotype: a-d, dactylus of major second pereiopod. Scale bar = 2 mm.

Differential diagnosis. – *Crinotonia anastasiae*, new species, is most similar to *P. attenuatus* but clearly differs in having a more robust body and appendages (segments of antennules and antenna (scaphocerite), second pereiopods, especially the palm of the major cheliped, and the walking legs), the more developed rostral carina, especially in the female, the form of distal part of dactylus of third pereiopod and the presence of several denticles along its ventral border.

Host and associated fauna. – Specimens were found on comatulid crinoid *Phanogenia gracilis* (Comasteridae: Crinoidea) also harbored with three juveniles of eumedonid crabs *Harrovia* sp.

***Crinotonia attenuatus* (Bruce, 1971), new combination**
(Figs. 7-10)

Periclimenes attenuatus Bruce, 1971: 533, Figs. 1-5 [type locality: Waterhouse Cove, Burukuk, Duke of York Group, Bismark Archipelago, associated with crinoids in 1-2 meters]; Bruce, 1983a: 879; 1983b: 206; Chace & Bruce, 1993: 103; Müller, 1993: 71; De Grave, 2000: 134; Li, 2000: 159, Fig. 196; 2004: 68, Figs. 1, 2.

Material examined. – 1 ovigerous female (PCL 4.2 mm)(ZMMU Ma 5461), 1 male (PCL 3.2 mm)(ZMMU Ma 5462), South China Sea, Vietnam, Nha Trang Bay, Mun Island, depth 10-15 m, from crinoid *Phanogenia gracilis*, coll. I. Marin, 6 Oct.2003; 1 ovigerous

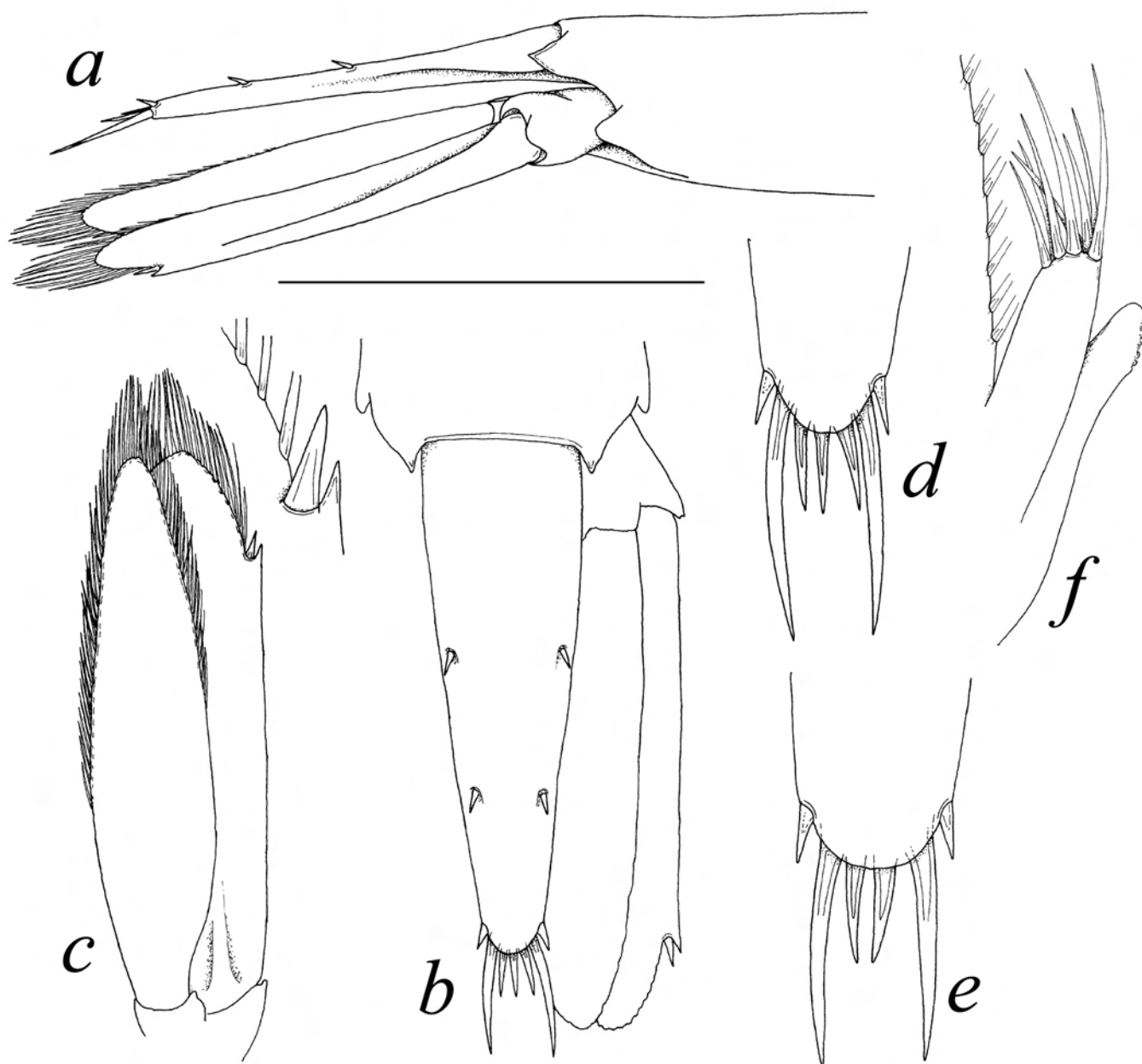


Fig. 6. *Crinotonia anastasiae*, new genus, new species, holotype (e), allotype (a-d, f): a, distal margin of sixth segment and telson, lateral view; b, telson, dorsal; c, uropods; d, e, distal part of telson; f, appendix interna of second male pleopods. Scale bar: a-c = 2 mm; d, e = 0.7 mm; f = 0.3 mm.

female (PCL 3.8 mm)(ZMMU Ma 5463), 1 male (PCL 2.3 mm)(ZMMU Ma 5464), from crinoid *Phanogenia gracilis*, same locality as previous; 1 male (PCL 3.2 mm)(ZMMU Ma 5465), from unidentified comatulid crinoid, same locality as previous.

Description. – Body is slender. Carapace smooth, swollen, with antennal and small hepatic spines. Rostrum (Fig. 8a-d) short, tapering, slightly upturned, with three-four dorsal teeth only, dorsal lamina is feebly developed, ventral teeth absent, lateral lamina feebly developed. Pterygostomial margin bluntly angular. Abdominal somites smooth; pleura of first to fifth abdominal somites rounded, postero-lateral angle of sixth abdominal somite pointed and postero-ventral angle projecting and rounded (Fig. 9i). Telson about three times as long as wide, with two pairs of dorsal and three pairs of posterior spines (Fig. 9j). Eyes slightly projecting distally, with corneal papillae. Antennules with large disto-lateral tooth and small teeth on distal medial lobe on proximal segment, robust ventral tooth in middle of medial border of basal segment (Fig. 8h,g). Antenna (Fig. 8k) with slender, about 4.5 times as long as maximum width. Second maxilliped without podobranch. First pereiopod (Fig. 9a) slender, with robust chela and broad, swollen fingers bearing numerous setae. Major second pereiopod (Fig. 9b) with slender, subcylindrical palm about 4 times as long as wide; minor pereiopod (Fig. 9d) is extremely slender, with simple slender fingers. Third pereiopod (Fig. 9f) with unarmed segments; ischium is about 5.5 times as long as wide; merus is about thirteen times as long as wide; carpus is about seven times as long as maximum wide, tapering proximally; propodus is about 11.5 times as long as wide, with serrated ventral margin; dactylus (Fig. 9g) is slender, about three times as long as maximal width, significantly tapering distally, preterminal accessory tooth is triangular and situated perpendicularly to ventral margin (Fig. 9h).

Remarks. – The observed specimens are identical to Bruce's (1971) original description. However, Li (2004) showed podobranch in material from Indonesia. The rostral formula in Vietnamese material is 3-4/0 and similar to Bruce's material. Li (2004) reported the presence of tiny sub-apical ventral tooth on rostrum and a "podobranch" on the second maxilliped and absence of epipod on the first maxilliped. During the material dissection I also received the same situation when epipod of first maxilliped was dissected together with second maxilliped attaching to it anteriorly. It looks like "podobranch" of second maxilliped while first maxilliped missing its epipod.

One of specimens studied (male, PCL 2.3 mm) (Fig. 10) shows the presence of a large disto-lateral tooth and three (large and two small) mesial teeth on the disto-medial border of basal segment of the antennules (Fig. 8i) that is slightly differ from type material. Minimal PCL of observed ovigerous females is 2.5 mm, for males – 2.0 mm and reaches to 4.2 mm and 3.2 mm respectively that significantly increase the known size of the species.

Colour in life. – Unknown.

Hosts. – In Nha Trang Bay, this species was found exclusively on the crinoid *Phanogenia gracilis*.

Distribution. – Known from Indonesia, Vietnam, Papua New Guinea and Palau.

Taxonomy. – The diagnosis of the genus *Periclimenes* with the type species *P. amethysteus* (Risso, 1827) from the Mediterranean Sea includes a well developed rostrum bearing robust dorsal and ventral teeth, second maxilliped with podobranch, small arthrobranch on third maxilliped, slender

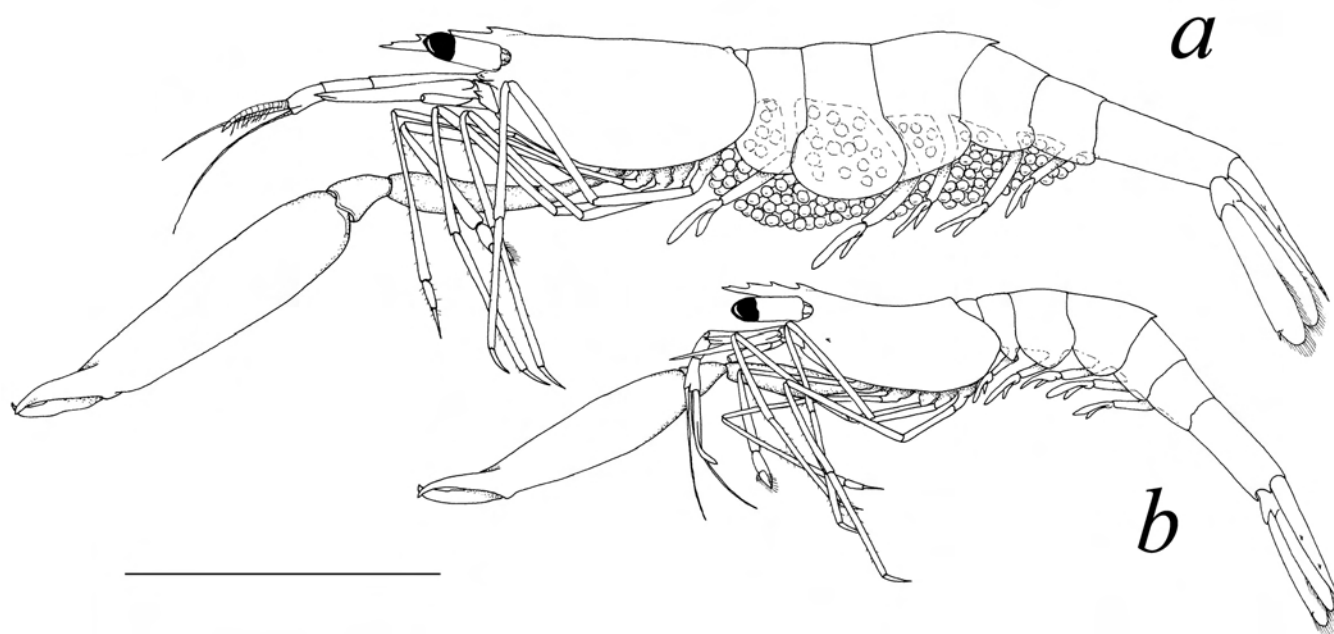


Fig. 7. *Crinotonia attenuatus* (Bruce), new combination: a, ovigerous female (PCL 3.8 mm); b, male (PCL 2.3 mm). Scale bar = 5 mm.

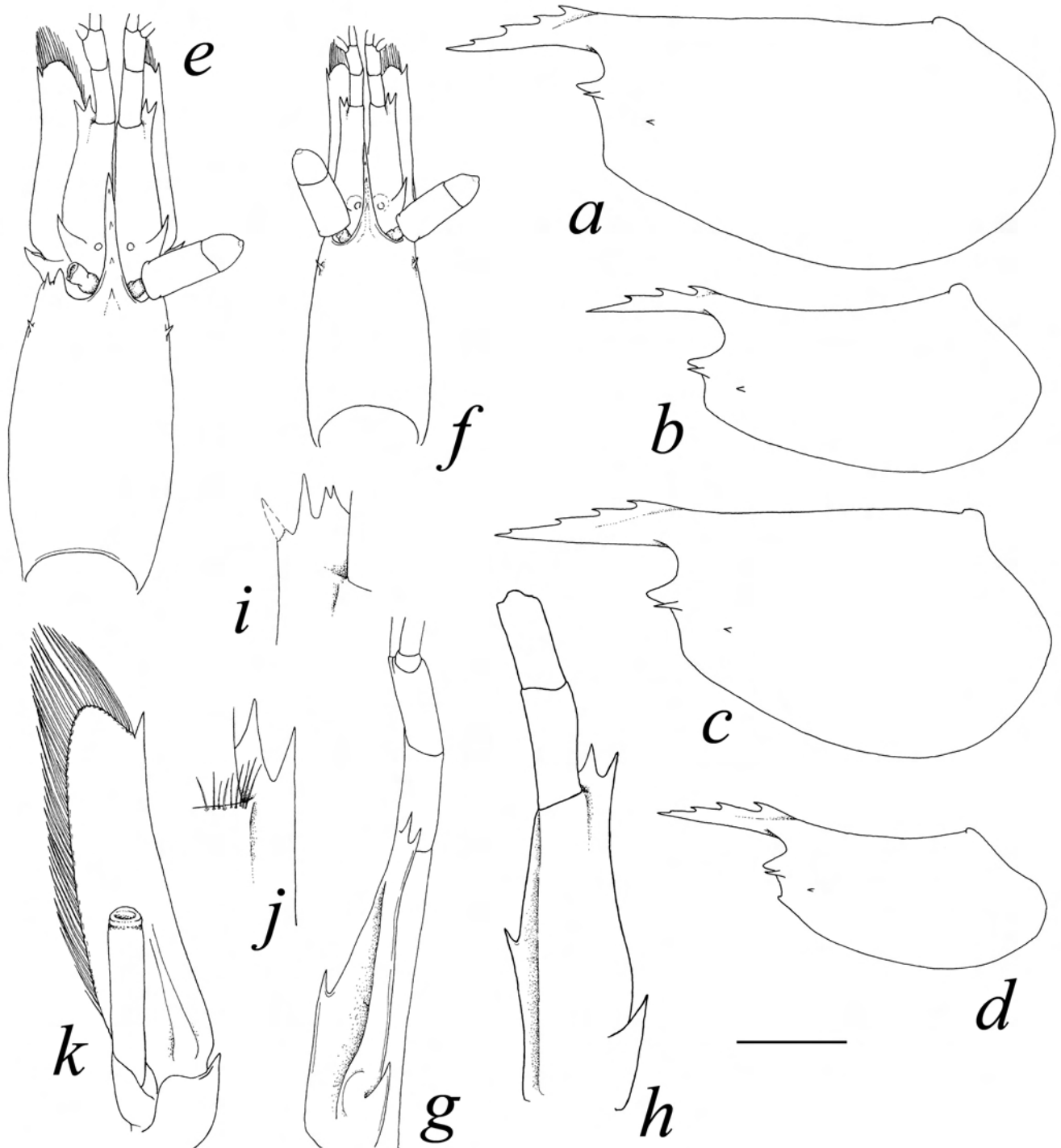


Fig. 8. *Crinotonia attenuatus* (Bruce), new combination: a-d, carapace; e, f, front of carapace, dorsal; g, h, antennule; i, j, disto-lateral part of basal segment of antennule (left and right); k, antenna. a, male (PCL 3.2 mm); b, g, k, female (PCL 3.8 mm); c, e, male (PCL 3.2 mm); d, f, i, female (PCL 4.2 mm). Scale bar: a-f = 2 mm; g, h = 4.3 mm; k = 2.4 mm; i, j = no scale bar.

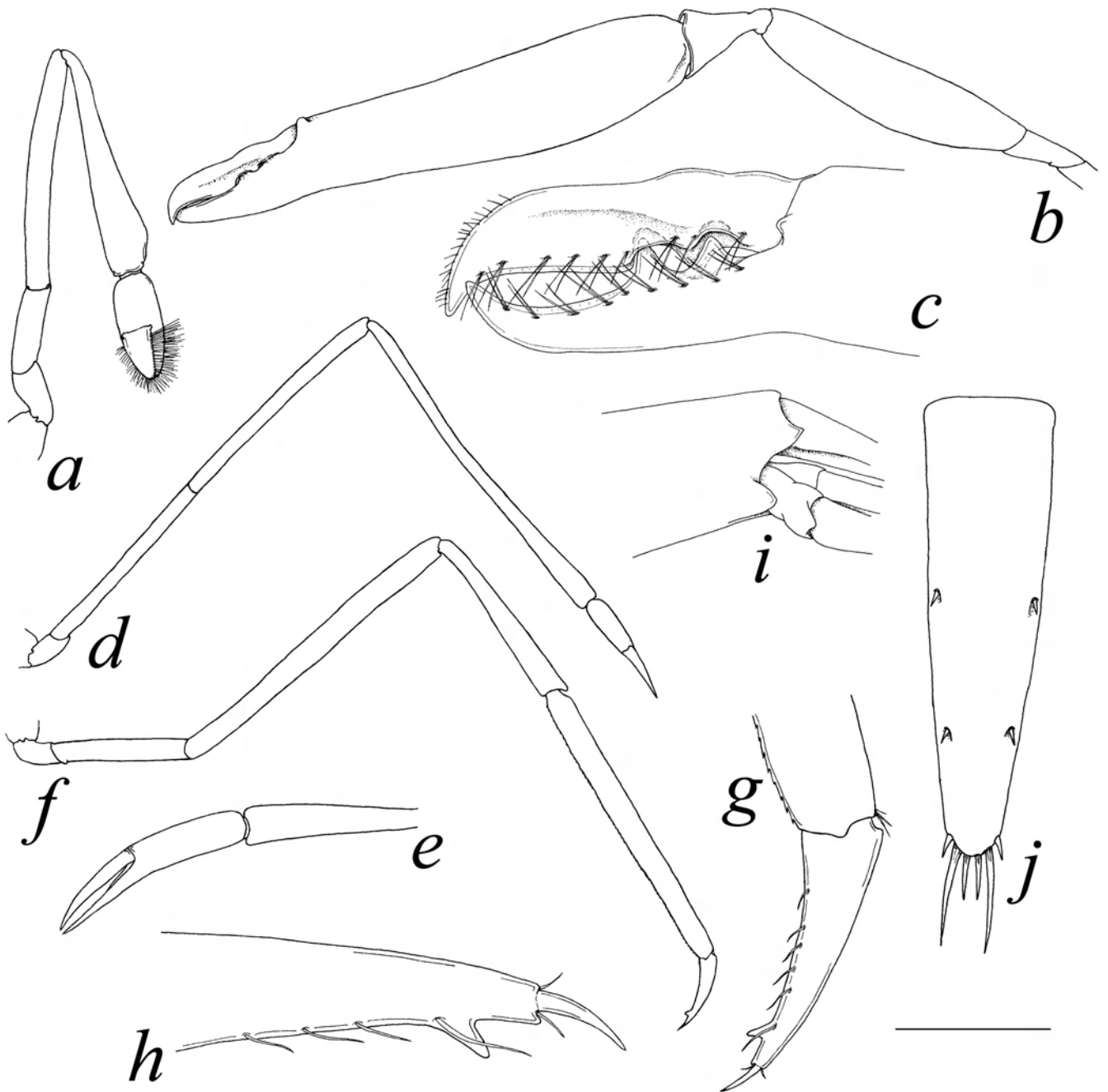


Fig. 9. *Crinotonia attenuatus* (Bruce), new combination, male (PCL 3.2 mm): a, first pereopod; b, major second pereopod; c, fingers of major second pereopod; d, minor second pereopod; e, chela of minor second pereopod; f, third pereopod; g, dactylus of third pereopod; h, same, distal part; i, distal part of sixth abdominal segment; j, telson. Scale bar: a, b = 1.1 mm; d, f = 1 mm; e = 0.7 mm; c, i, j = 0.7 mm; g = 0.4 mm; h = 0.2 mm.

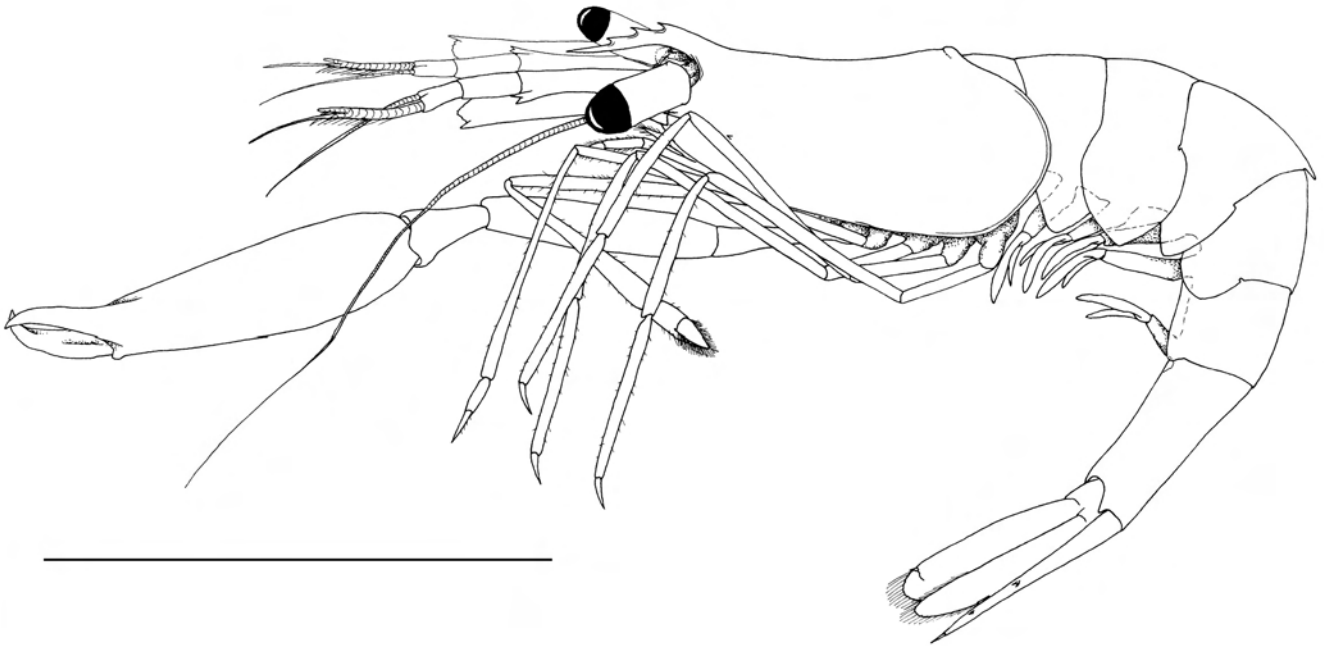


Fig. 10. *Crinotonia attenuatus* (Bruce), new combination, male (PCL 3.2 mm). Scale bar = 5 mm.

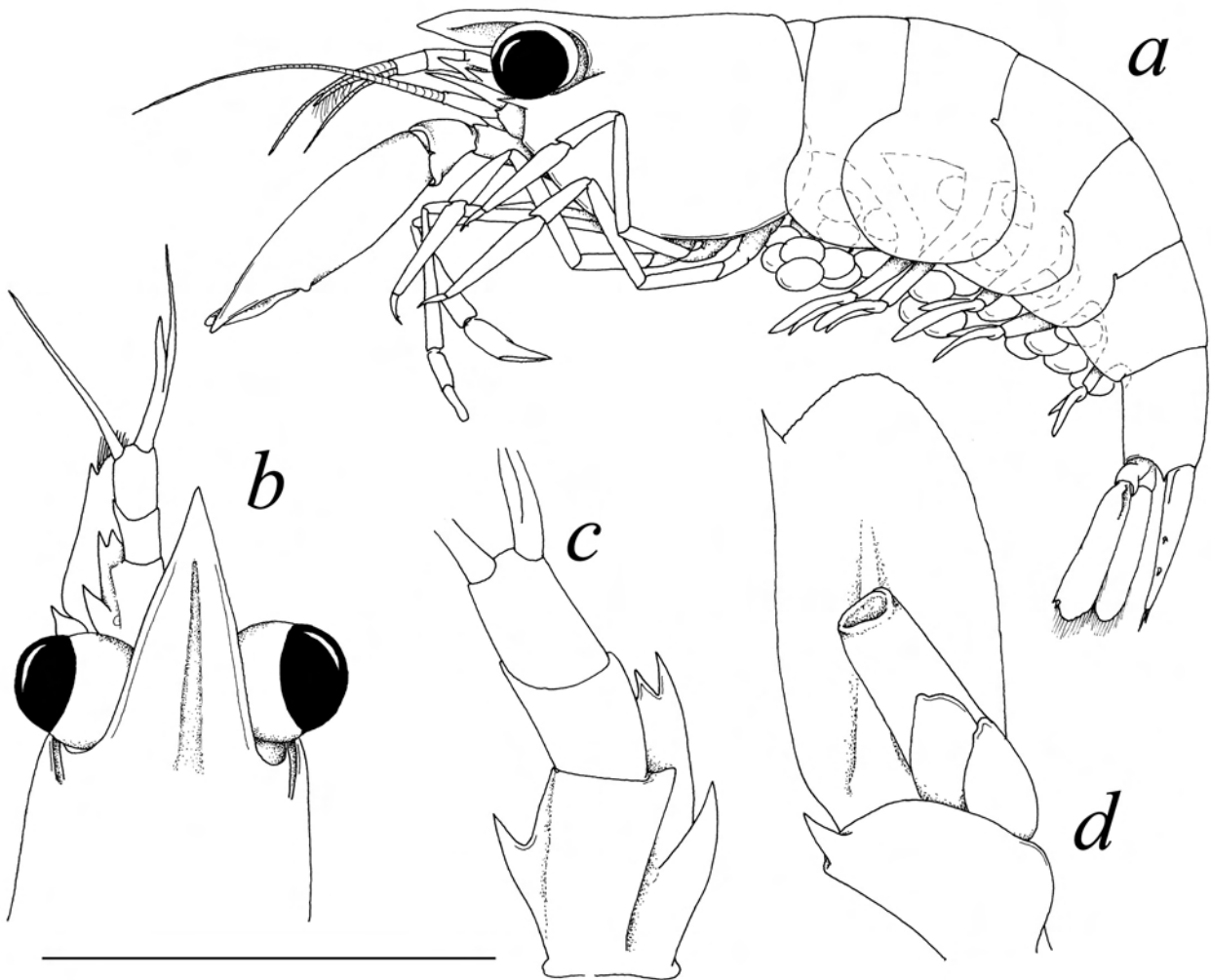


Fig. 11. *Pontoniopsis comanthi* Borradaile, ovigerous female (PCL 1.5 mm), Mun Island, Nha Trang Bay: a, general view; b, front of carapace, dorsal view; c, antennule; d, antenna. Scale bar: a = 2 mm; b = 3 mm; c, d = 4 mm.

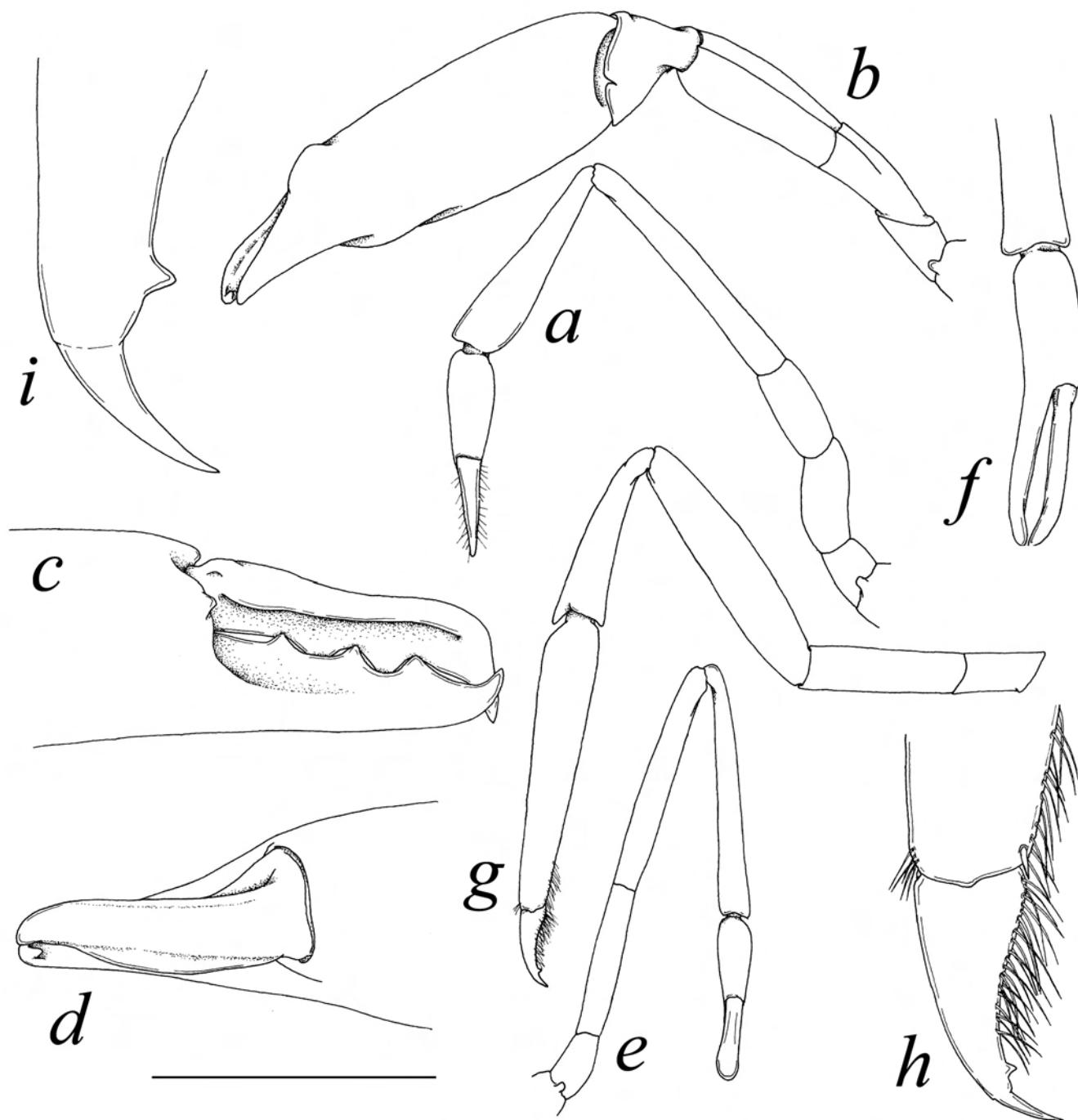


Fig. 12. *Pontoniopsis comanthi* Borradaile, ovigerous female (PCL 1,5 mm), Mun Island, Nha Trang Bay: a, first pereiopod; b, major second pereiopod; c, d, fingers of major second pereiopod; e, minor second pereiopod; f, chela of minor second pereiopod; g, third pereiopod; h, dactylus of third pereiopod; i, same, distal part. Scale bar: a, c, e = 1 mm; c, d = 0.6 mm; g = 0.8 mm; f = 0.5 mm; h = 0.25 mm; i = no scale bar.

first pereopod with simple fingers; similar second pereopods with chelae not borne in vertical plane, movable finger not ventral, finger without socket and plunger closure, third pereopod with ventral margin of propodus smooth, with disto-ventral spines, dactylus distinctly biunguiculate (Holthuis, 1952; Chace & Bruce, 1993). *Crinotonia attenuatus* (Bruce), new combination, shows many differences from the genus *Periclimenes* Costa, and its inclusion into a new genus is justified. The species is more similar to *Crinotonia anastasiae*, new species, than to any species of genus *Periclimenes* with regards to the features reported in diagnosis of *Crinotonia*, new genus.

Key to crinoid-associated pontoniine genera

1. Antennal spine absent *Araiopontonia* Fujino & Miyake
- Antennal spine present 2
2. Mandible with palp *Palaemonella* Dana
- Mandible without palp 3
3. Supraocular spines well developed 4
- Supraocular spines absent 5
4. Rostrum toothless *Parapontonia* Bruce
- Rostrum with dorsal and ventral teeth *Periclimenes* Costa (part)
5. Rostrum small, toothless, with well developed lateral carinae *Pontoniopsis* Borradaile
- Rostrum well developed, with dorsal or ventral teeth, without lateral carinae 6
6. Rostrum with 3 dorsal teeth only. Second pereopods highly unequal *Crinotonia*, new genus
- Rostrum with ventral or more than 3 dorsal teeth. Second pereopods equal *Periclimenes* Costa (part)

DISCUSSION

According to last reviews (Holthuis, 1993; Li, 2000) of diversity of pontoniine shrimps it includes 78 genera and 450 species worldwide. Since these publications, a lot of new genera and species were established. Bruce (1995) transferred *Periclimenes franklini* Bruce and *Periclimenes gorgonicola* Bruce to new genus *Paraclimenes* Bruce, 1995, but it was not referred in Li's catalog (Li, 2000). Fransen (2002) revised genus *Pontonia* Latreille sensu lato and established five new genera, *Ascidonia* Fransen, 2002 [*A. californiensis* (Rathbun), *A. flavomaculata* (Heller), *A. miserabilis* (Holthuis), *A. pusilla* (Holthuis), *A. quadsipusilla* (Chace)], *Bruceonia* Fransen, 2002 [*B. ardeae* (Bruce)], *Dactylonia* Fransen, 2002 [*D. anachoreta* (Kemp), *D. ascidicola* (Borradaile), *D. medipacifica* (Edmonson), *D. monniti* (Bruce), *D. okai* (Kemp)], *Odontonia* Fransen, 2002 [*O. compacta* (Bruce), *O. katoi* (Kubo), *O. sibogae* (Bruce), *O. simplicies* (Bruce)] and *Rostronia* Fransen, 2002 [*R. stylirostris* (Holthuis)]. Bruce (2004a, 2005b, d) proposed a new genus *Kemponia* Bruce, 2004 for number of species of *Periclimenes* Costa sensu lato, genus *Pontoniopsides* Bruce, 2005 for *Pontoniopsis paulae* Gore, and genus *Cainonia* Bruce, 2005 for *Dactylonia medipacifica* (Edmonson). Bruce et al. (2005) suggested new genus *Manipontonia* Bruce, Okuno & Li, 2005 for *Periclimenes psamathe* (De Man). An attempt to give a generalized review of recently described (since Li, 2000) pontoniine taxa is given (see Table 1). Including *Crinotonia*

anastasiae, new genus, new species, recent list of pontoniine shrimps is increased up to 93 genera with 510 species.

The fauna of caridean crinoid associates including the majority of caridean species is poorly studied and several new pontoniine, alpheid and stenopodidean species are still in process of description (e.g. Anker & Marin, in prep). Active investigations on communities associated with crinoids (e.g. Potts, 1915; Fishelson, 1974; Morton & Mladenov, 1992; Jangoux, 1990) gave separate data on community structure, symbionts coloration, their feeding and relationships between different symbionts but these investigations are still far from being completed and generalized. The main obstacles are the absence of exact data on symbiotic fauna and phylogeny of crinoid associates.

Concentrating on the morphology of symbiotic shrimps associated with crinoids it is possible to note some resemblance, especially the species from crinoid, ophiuroid and asteroid hosts. Some of the crinoid-associated species possess chelae with spatulate dactylus allowing them to collect food from host's ambulacral grooves (e.g. *P. comanthi*) (e.g. Bruce, 1982; Marin & Anker, in prep) or slender appendages with slender fingers allowing them to collect food from places difficult to access (e.g. *Periclimenes tenuis* Bruce, 1969, *C. anastasiae*, new species, and *C. attenuatus*, new combination). Nevertheless, it is also possible to observe different functions of homologous structures in related genera. Different morphology of the fingers of the minor second pereopod in *P. comanthi* and in representatives of genus *Crinotonia*, new genus, suggested different functions as adaptation to different ecological niches occupied on their hosts.

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Table 1. Taxa of pontonine shrimps not included in catalog of Li (2000) and described since its publication. Scientific names in **bold** indicates new genera described.

Taxon	Type locality, depth and host information	Reference
<i>Periclimenes patae</i> Heard et Spotte, 1991	Atlantic: British West Indies, Pine Cay, Turks and Caicos Islands; at depths less than 12 m; associated with shallow-water gorgonian	Heard & Spotte, 1991
<i>Neopericlimenes thornei</i> Heard, Spotte & Bubucis, 1993	Atlantic: British West Indies, Pine Cay, Turks and Caicos Islands; 40 m; collected from black coral colonies, <i>Stichopathes</i> sp. (Antipatharia)	Heard et al., 1993
<i>Periclimenes nomadophila</i> Berggren, 1994	Indian: Moçambique, Inhâca Island; no depth specified, presumably near surface; collected from <i>Rhopilema nomadica</i> (Scyphozoa, Rhizostomeae),	Berggren, 1994
<i>Tuleariocaris sarec</i> Berggren, 1994	Indian: Moçambique, Inhâca Island; no depth specified; on <i>Echinometra mathaei</i> (Echinodermata, Echinoidea)	Berggren, 1994
<i>Periclimenes anthipathophilus</i> Spotte, Heard & Bubucis, 1994	Atlantic: British West Indies, Turks and Caicos Islands; 17-45 m; collected with black coral colonies <i>Antipathes gracilis</i> (Antipatharia)	Spotte et al., 1994
<i>Periclimenes aegylios</i> Grippa & d'Udekem d'Acoz, 1996	Atlantic: Mediterranean, Gigiglio Island (Western Italy); 1.5 to 20 m; associated with the sea anemones <i>Anemonia viridis</i> , <i>Condylactis aurantica</i> and <i>Cribrinopsis crassa</i> (Actiniaria)	Grippa & Udekem d'Acoz, C. d', 1996
<i>Periclimenes wirtzi</i> d'Udekem d'Acoz, 1996	Atlantic: Azores, Madeira, Cape Verde Islands; 29 to 54 m; associated with antipatharian host	Udekem d'Acoz, C. d', 1996
<i>Periclimenes mcllelandi</i> Heard & Spotte, 1997	Atlantic: British West Indies, Turks and Caicos Islands; 14-43 m; associated with <i>Pseudopterogorgia americana</i> (Octocorallia)	Heard & Spotte, 1997
<i>Periclimenes albolineatus</i> Bruce & Coombes, 1997	Pacific: Northern Australia, Darwin Harbour, Lee Point, 12°19.0'S 130°52.5'E, ELWST; no depth specified; collected from unidentified sea anemone (Actinaria)	Bruce & Coombes, 1997
<i>Periclimenes canalinsulae</i> Bruce & Coombes, 1997	Pacific: Australia, Northern Territory, Channel Island, 12°33.4'S 130°52.3'E, ELWS reef flat pool; no host indicated, collected by rotenone poisoning	Bruce & Coombes, 1997
<i>Periclimenes novaffinis</i> Bruce & Coombes, 1997	Pacific: Australia, Northern Territory Darwin Harbour, off East Point, 12°25.92'S 130°48.72'E, 68 m; collected from <i>Zygotetra</i> spp. (Echinodermata, Crinoidea)	Bruce & Coombes, 1997
<i>Nippopontonia minirostris</i> Bruce & Bauer, 1997	Pacific: Japan, Ryukyu Island; 15 m; collected from unidentified black sponge (Porifera)	Bruce & Bauer, 1997
<i>Ballsia noeli</i> Bruce, 1998	Atlantic: Western Mediterranean, Banyuls; no depth indicated; associated with gorgonian genera <i>Eunicella</i> , <i>Paramuricella</i> , zooantharian <i>Gerardia</i> and antipatharian <i>Corallium rubrum</i> (Octocorallia)	Bruce, 1998a
<i>Periclimenes terangeri</i> Bruce, 1998	Pacific: Northern Australia, Queensland, North Stradbroke Islands; 0.5 m; collected in sea grass, possibly, free-living	Bruce, 1998b
<i>Onycocaris stradbrokei</i> Bruce, 1998	Pacific: Northern Australia, Queensland, North Stradbroke Islands; 9 m; host is unknown, presumably a sponge (Porifera)	Bruce, 1998b

Marin: *Crinotonia anastasiae*, new genus, new species, from Vietnam

Table 1. To be Cont'd

Taxon	Type locality, depth and host information	Reference
<i>Periclimenaeus myora</i> Bruce, 1998	Pacific: Northern Australia, Queensland, North Stradbroke Islands, Myora reef; 9 m; host is unknown, presumably a tunicate (Ascidia)	Bruce, 1998b
<i>Izucaris masudai</i> Okuno, 1999	Pacific: Japan, Honshu, Izu Peninsula; 20 m; associated with <i>Nemanthus nutidus</i> (Actiniaria: Nemanthidae)	Okuno, 1999a
<i>Palaemonella hachijo</i> Okuno, 1999	Pacific: Japan, Honshu, Izu Peninsula; 20 m; possibly free-living	Okuno, 1999b
<i>Typton manningi</i> Bruce, 2000	Pacific: Queensland, Abbot Point; 5-8 m; from <i>Ircinia</i> sp. (Porifera)	Bruce, 2000
<i>Typton capricorniae</i> Bruce, 2000	Pacific: Queensland, Heron Island; 5-8 m; from unidentifiable small sponge (Porifera), encrusting base of <i>Pocillopora</i> colony	Bruce, 2000
<i>Periclimenes murcielagensis</i> Vargas, 2000	Atlantic: Costa Rica, Guanacastle, Archipiélago de las Islas Murciélago, Isla San Pedrito; 25 m; associated with <i>Anthipathes panamensis</i> (Anthipatharia)	Vargas, 2000
<i>Pontonia manningi</i> Fransen, 2000	Atlantic: Carribean Sea; 25 miles N of Margarita Island; 36.5 m; associated with <i>Spondylus</i> sp. (Bivalve: Spondylidae)	Fransen, 2000
<i>Periclimenes thermohydrophilus</i> Hayashi & Ohtomi, 2001	Pacific: Japan, Kagoshima Bay; 90-105 m; collected on hydrothermal vent fields among colonies of hard tubes vestimentiferan tube-worm <i>Lamellibrachia satsuma</i> (Pogonophora, Lamellibrachidae) and soft tubes of identified polychaete tube worm	Hayashi & Ohtomi, 2001
<i>Coralliocaris tridens</i> Mitsuhashi, Fujino, & Takeda, 2001	Pacific: Japan, Ryukyu Islands, Ishigaki Island; no depth indicated; associated with <i>Acropora</i> sp. (Scleractinia: Acroporidae)	Mitsuhashi et al, 2001
<i>Pseudocoutierea wirtzi</i> d'Udekem d'Acoz, 2001	Atlantic: Azores, Madeira, Cape Verde Islands; 29 to 54 m; associated with antipatharian host	Udekem d'Acoz, C. d', 2001
<i>Periclimenes kobayashii</i> Okuno & Nomura, 2002	Pacific: Japan, Honshu, Izu Peninsula; 32 m; associated with <i>Dofleinia armata</i> (Actiniaria: Actiniidae)	Okuno & Nomura, 2002
<i>Palaemonella foresti</i> Bruce, 2002	Pacific: Western Australia, Cockburn Sound, 32°13.9'S 115°45.14'E; possibly free-living, collected from harbour piles, with mixed sessile invertebrates	Bruce, 2002a
<i>Palaemonella maziwi</i> Bruce, 2002	Indian: East Africa, Tanganyika, Maziwi Island; 0.5-2 m; free-living	Bruce, 2002b
<i>Pontonia pilosa</i> Fransen, 2002	Atlantic: Azores, Madeira, Cape Verde Island, Tarrafal; no depth specified; associated with <i>Pseudochama radians</i> (Bivalve: Chamidae)	Fransen, 2002
<i>Dactylonia holthuisi</i> Fransen, 2002	Pacific: Indonesia, Ambon; 25 m; associated with colony of <i>Plurella</i> sp. (Ascidia: Styelidae)	Fransen, 2002
<i>Odontonia rufopunctata</i> Fransen, 2002	Pacific: Indonesia, Sulawesi; 20 m; in unidentified solitary ascidian host	Fransen, 2002
<i>Odontonia seychellensis</i> Fransen, 2002	Indian: Seychelles, Bir Island; 20 m; in unidentified solitary ascidian host	Fransen, 2002
<i>Periclimenes sarasvati</i> Okuno, 2002	Pacific: Japan, Kume-jima Island; 21 m; associated with <i>Euphyllia ancora</i> (Scleractinia: Caryophyllidae)	Okuno, 2002
<i>Periclimenes dolichosternum</i> Okuno & Mitsuhashi, 2003	Pacific: Japan, Ryukyu Islands, Kume Island; 1.5 m; beneath the pieces of coral rubbles	Okuno & Mitsuhashi, 2003

Table 1. To be Cont'd

Taxon	Type locality, depth and host information	Reference
<i>Kemponia adularans</i> (Bruce, 2003) as <i>Periclimenes adularans</i> Bruce, 2003	Pacific: Queensland, Cape Flattery; 2 m; collected on silty muddy substrate, free-living	Bruce, 2003a
<i>Kemponia paulsoni</i> (Bruce, 2003) as <i>Periclimenes paulsoni</i> Bruce, 2003	Pacific: Queensland, Cape Flattery; 7 m; collected on silty muddy substrate, free-living	Bruce, 2003a
<i>Dactylonia franseni</i> Bruce, 2003	Indian: Kenya, Mombasa, Old Port, Nyali; 2 m, associated with <i>Ascidia</i> sp. (Ascidacea: Ascidiidae)	Bruce, 2003b
<i>Vir colemani</i> Bruce, 2003	Pacific: Papua New Guinea, Loloata; 15 m; associated with bubble coral <i>Plerogyra sinouosa</i> (Scleractinia: Caryophyllidae)	Bruce, 2003c
<i>Poripontonia dux</i> Fransen, 2003	Pacific: Indonesia, Loloan Bena, Tanjung Bena, 08°45'46"S 115°41'01"E; about 20-25 m; in <i>Neopetrosia</i> sp. (Porifera)	Fransen, 2003
<i>Balssia antipodarum</i> Bruce, 2004	Pacific: Tasman Sea, north of Norfolk Island, North Norfolk Ridge; 111-115 m; without host data	Bruce, 2004b
<i>Epipontonia tahitiensis</i> Bruce, 2004	Pacific: French Polynesia, Tahiti; depth and host unknown	Bruce, 2004c
<i>Periclimenes speciosus</i> Okuno, 2004	Pacific: Japan, Honshu, Boso Peninsula; 18 m; collected from <i>Entacmaea quadricolor</i> (Actiniaria: Actiniidae)	Okuno, 2004
<i>Paranchistus liui</i> Li, Bruce & Manning, 2004	Pacific: north of South China Sea [21°N 108°E]; 30 m; no host data	Li et al., 2004
<i>Periclimenes chacei</i> Li, Bruce & Manning, 2004	Pacific: South China Sea, Hainan Island, Xincun; 1-3 m; from living unidentified scleractinian coral (Scleractinia)	Li et al., 2004
<i>Onycocharis temiri</i> Marin, 2005	Pacific: South China Sea, Vietnam, Nha Trang Bay; 16 m; inside boring sponge <i>Kallipilidion</i> sp. (Porifera)	Marin, 2005
<i>Periclimenes fenneri</i> Bruce, 2005	Pacific: Tasman Sea, West Norfolk Ridge, 34°37.20'S, 158°59.03'E; 521-539 m; without host data	Bruce, 2005a
<i>Periclimenes tangeroa</i> Bruce, 2005	Pacific: Tasman Sea, South Norfolk Ridge, 34°09.14'S 171°27.95'E; 242-254 m; without host data	Bruce, 2005a
<i>Periclimenaeus kottae</i> Bruce, 2005	Pacific: Western Australia, Ashmore Reef; 6-16 m, associated with <i>Didemnum membranaceum</i> Sluiter (Ascidia)	Bruce, 2005c
<i>Periclimenaeus matherae</i> Bruce, 2005	Pacific: Western Australia, Ashmore Reef; 4-7 m, associated with <i>Hypodistoma deerata</i> (Sluiter) (Ascidia)	Bruce, 2005c
<i>Vir euphyllius</i> Marin & Anker, 2005	Pacific: South China Sea, Vietnam Nha Trang Bay; 15 m; associated with <i>Euphyllia divisa</i> (Scleractinia: Caryophyllidae)	Marin & Anker, 2005
<i>Vir pareuphyllius</i> Marin & Anker, 2005	Pacific: South China Sea, Vietnam, Nha Trang Bay; 7 m; associated with <i>Euphyllia</i> cf. <i>paraancora</i> (Scleractinia: Caryophyllidae)	Marin & Anker, 2005
<i>Colemania litodactyla</i> Bruce, 2005	Pacific: Papua New Guinea, Milne Bay; 12 m, inside unidentified encrusting ascidia (Ascidia)	Bruce, 2005d
<i>Periclimenes grandidens</i> Bruce, 2005	Pacific: Papua New Guinea, Loloata Island; 16 m, <i>Euphyllia paradivisa</i> (Scleractinia: Caryophyllidae); paratypes were collected from <i>Plerogyra sinouosa</i> (Scleractinia: Caryophyllidae) and <i>Stichodactyla mertensii</i> (Actinaria)	Bruce, 2005d

Table 1. To be Cont'd

Taxon	Type locality, depth and host information	Reference
<i>Pontonides asperulatus</i> Bruce, 2005	Pacific: Papua New Guinea, Loloata Island; 16 m, from <i>Cirripathes</i> sp. (Antipatharia)	Bruce, 2005d
<i>Pontonides loloata</i> Bruce, 2005	Pacific: Papua New Guinea, Loloata Island; 5 m, from <i>Cirripathes</i> sp. (Antipatharia)	Bruce, 2005d
<i>Dactylonia borradailei</i> Bruce, 2005	Pacific: New Caledonia, Neokumbi Reef; 20-40 m, inside <i>Ascidea sydneyensis</i> Stimpson (Ascidia)	Bruce, 2005d
<i>Pontonides sibogae</i> Bruce, 2005	Pacific: Indonesia, 23°30'S 119°4.6'E, Sape Strait; 70 m, host unknown	Bruce, 2005d
<i>Dactylonia carinacula</i> Bruce, 2006	Indian: Yemen, Socorta Is.; 7-9 m, collected from "dead <i>Acropora</i> "	Bruce, 2006
<i>Periclimenoides socorta</i> Bruce, 2006	Indian: Yemen, Socorta Is.; 5-7 m, host unknown	Bruce, 2006

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