

DEEP-SEA PONTONIINES (DECAPODA: PALAEMONIDAE) FROM THE PHILIPPINE
“PANGLAO 2005” EXPEDITION, WITH DESCRIPTIONS OF FOUR NEW SPECIES

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A B S T R A C T

Ten species belonging to three genera of the subfamily Pontoniinae were collected by the deep-sea expedition “PANGLAO 2005” in the Philippines, including four new species of the genus *Periclimenes*, i.e., *P. boucheti* n. sp., *P. leptunguis* n. sp., *P. ngi* n. sp., and *P. panglaonis* sp. nov., and one newly recorded species from the Philippines, *Periclimenes laccadivensis*. They are reported with color photographs except one species, *Plesiopontonia monodi*. The possible synonymy of *Periclimenes foresti* and *P. granuloides* is discussed.

KEY WORDS: Caridea, Decapoda, deep sea, palaemonids, Pontoniinae, taxonomy

INTRODUCTION

At present, 78 species in 16 genera of the subfamily Pontoniinae (Caridea: Palaemonidae) have been reported from depths of more than 100 m (Bruce, 1991a, 2005, 2006, Chace and Bruce, 1993; Hayashi and Ohtomi, 2001; Li, 2000; Li and Bruce, 2006; Mitsuhashi and Chan, 2006). Of these, 14 species in three genera are from the Philippines (Bruce, 1981, 1985; Chace and Bruce, 1993). During the deep-sea faunal expedition to the Philippines, “PANGLAO 2005”, many interesting pontoniine shrimp specimens were collected from the Bohol Sea and eastern part of the Sulu Sea at depths of 123–740 m. These were identified as ten species belonging to three genera including four new species of the genus *Periclimenes* and one species newly recorded from the Philippines (*Periclimenes laccadivensis* Alcock and Anderson, 1894). The four new species are described in detail and the fresh colors are recorded, with photographs, for all species except one, *Plesiopontonia monodi* Bruce, 1985. As the result, the number of deep-sea species of Pontoniinae known from the Philippines is now increased to 19.

The genera and species are arranged alphabetically in the text. The descriptions of the fresh colors are based on photographs taken by the third author (TYC). The synonymies provided for each species are restricted to nomenclatural and local reports; complete synonymies of the species can be found in Li (2000) and Li and Bruce (2006). In the following account, carapace length (cl) refers to the postorbital carapace length; the rostral formula (R.) is presented as “a + b/c” (a = the number of dorsal series rostral teeth on carapace posterior to the postorbital margin, including the epigastric tooth, if present; b = the number of dorsal rostral teeth anterior to the postorbital margin; c = the number of the ventral rostral teeth). The station “stn.” designation includes the gear type, with CA, CP and DW referring to trap (CA), beam trawl (CP), and dredge (DW),

respectively. The specimens are deposited in the Muséum national d’Histoire naturelle, Paris (MNHN), the National Taiwan Ocean University, Keelung (NTOU), the Philippines National Museum, Manila (NMCR) and the Raffles Museum of Biodiversity Research, National Museum of Singapore, Singapore (ZRC).

Species List

Palaemonella sp.
***Periclimenes boucheti* n. sp.**
Periclimenes dentidactylus Bruce, 1984
Periclimenes hertwigi Balss, 1913
Periclimenes laccadivensis (Alcock and Anderson, 1894)
***Periclimenes leptunguis* n. sp.**
***Periclimenes ngi* n. sp.**
***Periclimenes panglaonis* n. sp.**
Periclimenes sp.
Plesiopontonia monodi Bruce, 1985

SYSTEMATICS

Palaemonella sp.
Figs. 1A, B, 16A

Material Examined.—stn. DW 2376, 8°40.9’N, 123°16.0’E, 189 m, sandy/muddy, 28 May 2005, 1 ♂ (cl 2.8 mm) (NTOU).

Color.—Body generally translucent, somewhat whitish. Tail-fan and appendages translucent; pleon and posterior part of carapace whitish semitranslucent; ventral part of pleura each with light yellow stripe; anterior part of carapace, antennular peduncle and eye-stalk light red to light orange. Eggs pale blue.

Remarks.—The only specimen collected is damaged, lacking the rostrum, distal 0.75 of the telson, left antennular peduncle, distal 0.5 of the left scaphocerite and flagellum, and right second to fourth pereopods. The left second pereopod is regenerating and the left fifth pereopod is

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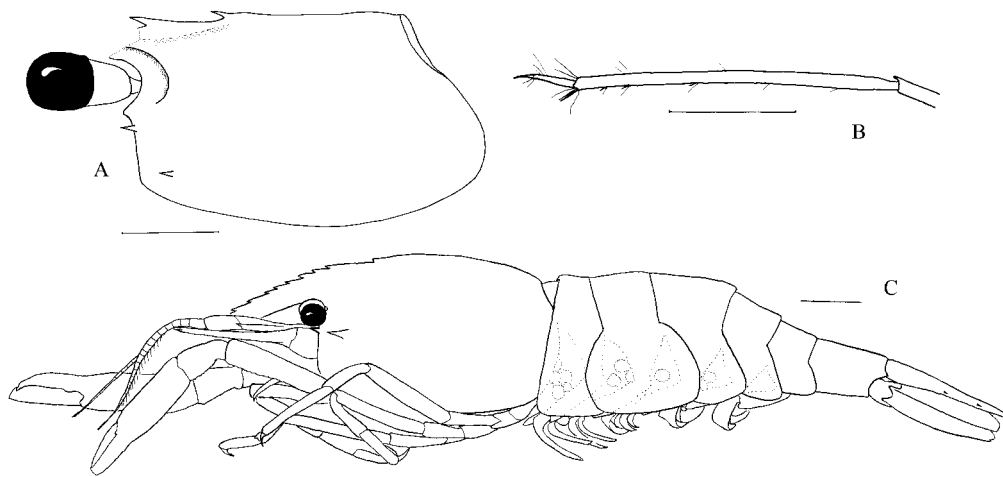


Fig. 1. A, B, *Palaemonella* sp., ♂ (cl 2.8 mm), stn. DW 2376: A, carapace and eye, lateral; B, left third pereiopod, dactylus and propodus, lateral. C, *Periclimenes boucheti* sp. nov., holotype ovig. ♀ (cl 6.8 mm), stn. CA2373, body, lateral. Scales A and B = 1 mm; C = 2 mm.

detached. Because of the presence of the mandibular palp, hepatic spine, and slender median process on the fourth thoracic sternite, this specimen is referred to the genus *Palaemonella*. Fourteen species are known in the genus and four species are recorded from Philippines, i.e., *P. biunguiculata* Nobili, 1904, *P. pottsi* Borradaile, 1915, *P. rotumana* (Borradaile, 1898), and *P. spinulata* Yokoya, 1936. The absence of a supraorbital spine, markedly long, slender pereiopods, with the propodus of the third pereiopod about 27 times longer than its width, the dactylus being about 8.0 times longer than its proximal depth indicate that the specimen belongs to “*Palaemonella dolichodactylus* species group” sensu Li and Bruce (2006) that has not been reported from Philippines. The species group includes three species, *P. dolichodactylus* Bruce, 1991b, *P. hachijo* Okuno, 1999, and *P. komaii* Li and Bruce, 2006. Table 1 summarizes the differences between the present specimen and the three species of the “*Palaemonella dolichodactylus* species group”. This specimen is most similar to *P. hachijo* in having the ambulatory pereiopods not sub-segmented and the third pereiopods robust, but different in the much lower

position of the hepatic spine (see Table 1). Further identification of present specimen is difficult because of the damaged condition.

***Periclimenes boucheti* n. sp.**

Figs. 1C, 2-4, 5A, B, 16B-D

Material Examined.—stn. CA 2373, 8°42.4'N, 123°13.4'E, 123 m, sandy/muddy, 27 May 2005, holotype ovig. ♀ (parasitized by rhizocephalan with two egg sacks) (cl 6.8 mm) (NMCR), paratype: ♂ (parasitized by rhizocephalan with four egg sacks) (cl 7.2 mm), (MNHN).

Additional Material.—stn. CA 2381, 8°43.3'N, 123°19.0'E, 275-280 m, sandy, 28 May 2005, 1 ovig. ♀ (cl 10.2 mm) (MNHN).

Description.—Medium size subcylindrical body form of *Periclimenes foresti* species group.

Rostrum well developed, moderately deep, straight, directed anteroventrad, slightly longer than 0.5 of carapace length, reaching distal end of antennular peduncle in

Table 1. The differences among the present species and other three species of the *Palaemonella dolichodactylus* species complex.

cl	<i>Palaemonella</i> sp. 2.8 mm	<i>P. dolichodactylus</i> Bruce, 1991b* 3.5-4.0 mm	<i>P. hachijo</i> Okuno, 1999** 2.8-3.3 mm	<i>P. komaii</i> Li and Bruce, 2006 3.4-3.6 mm
Position of hepatic spine	closer to ventrolateral margin of carapace rather than antennal spine	closer to antennal spine rather than ventrolateral margin of carapace	closer to antennal spine rather than ventrolateral margin of carapace	closer to ventrolateral margin of carapace rather than antennal spine
Length ratio of third propodus to cl	0.94	>1.00	0.97	1.22
Ratio of third propodal length to width	26.6	26.0	28.9	41.4
Ratio of third dactylar length to depth	8.1	12.0	8.0	10.6
Length ratio of third dactylus to propodus	0.20	0.33	0.21	0.17
Ratio of length of distoventral spine of third propodus to length of dactylus	0.31	0.08	0.26	0.10
Sub-segmented of third propodus	no	feebly	no	yes
Depth	189 m	16-250 m	0-45 m	327-360 m

*According to the descriptions of Bruce (1991a, 1991b).

**According to the descriptions and illustrations of Okuno (1999, 2000).

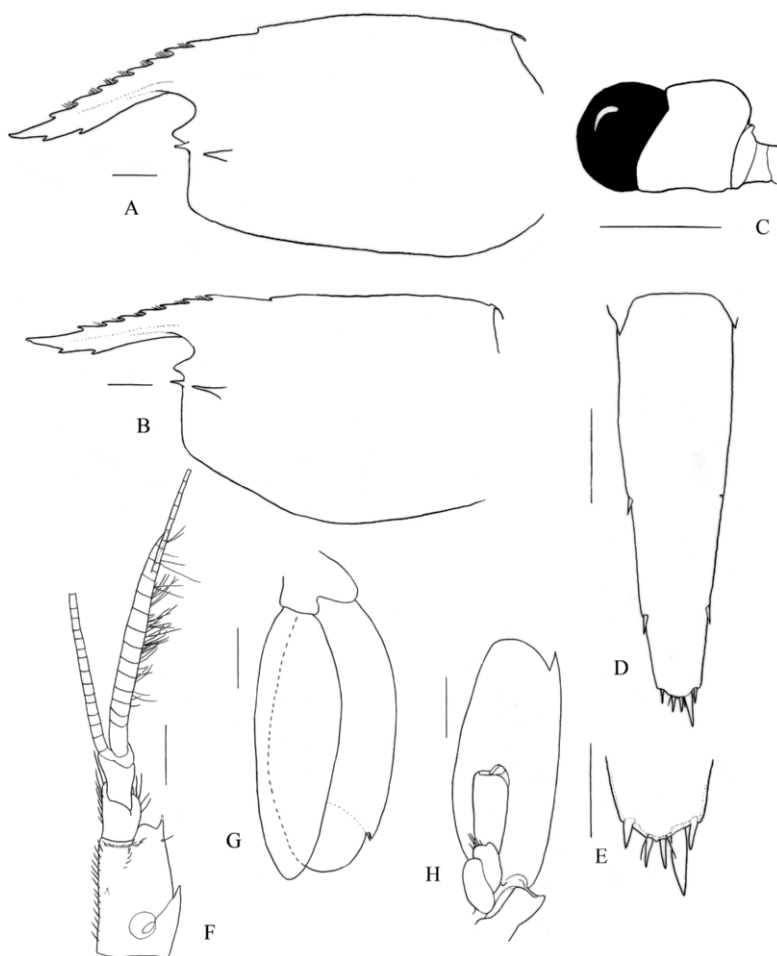


Fig. 2. *Periclimenes bouchetti* n. sp., A, F, H, holotype ovig. ♀ (cl 6.8 mm), stn. CA2373; B-E, G, paratype ♂ (cl 7.2mm), same station. A, B, anterior part of carapace, lateral, posterior part omitted; C, left eye, dorsal; D, telson, dorsal; E, same, distal part; F, right antennule, dorsal; G, right uropods, dorsal; H, left antenna, ventral. Scales = 1 mm.

holotype, almost reaching distal end of antennular peduncle in paratype, dorsal carina well developed, deepest posteriorly, dorsal margin straight, ventral margin with proximal 0.5 nearly straight, subparallel to dorsal margin, distal 0.5 convex; rostral formula $2 + 7/2$ in holotype, $2 + 6/3$ in paratype, dorsal rostral teeth low, acute, subequally spaced, interspaces setose, posterior second tooth slightly posterior to level of posterior orbital margin; ventral two teeth acute, on distal 0.33 of rostrum, holotype with indistinct small tooth close to tip of rostrum, lateral carinae distinct, horizontal, moderately expanded posteriorly.

Carapace smooth, glabrous; orbit feebly developed, inferior orbital angle produced, tip rounded; anterolateral margin of branchiostegite obtuse, bluntly rounded; epigastric tooth low, distinct, at anterior 0.24 of carapace in holotype, 0.26 in paratype; supraorbital spine absent; antennal spine very small, acute, marginal, distinct, situated below inferior orbital angle; hepatic spine larger than antennal spine, long, acute, slightly lower than horizontal level of antennal spine, at about anterior 0.1 of carapace length.

Pleon smooth, glabrous; third pleomere not produced posterodorsally, non-carinate; pleura of first three pleomeres

broadly rounded, fourth and fifth posteriorly produced, rounded; fifth pleomere about 0.6 length of sixth, sixth pleomere cylindrical, about 0.33 of carapace length, 1.6 times longer than deep, slightly tapered posteriorly, posteroventral angle small, blunt, posterolateral angle larger, subacute. Telson damaged in holotype, with following measurements in paratype: telson about 0.7 of carapace length, 1.7 length of sixth pleomere, 3.3 times longer than maximum width, lateral margins subparallel anteriorly, posteriorly convergent, with two pairs of small marginal dorsolateral spines, at about 0.5, 0.8 length of telson, spines about 0.05 of telsonal length, posterior margin with small median point; lateral spines about 0.03 of telsonal length, intermediate spines robust, about 0.09 of telsonal length, submedian spines slender, short, about 0.5 length of intermediate spine.

Eye with well-developed globular cornea, slightly oblique, without accessory pigment spot, corneal diameter about 0.13 of carapace length, stalk subcylindrical, subequal to corneal diameter, about 1.2 times wider than posterior marginal length.

Antennular peduncle far short of anterior margin of scaphocerite; proximal segment with medial marginal length

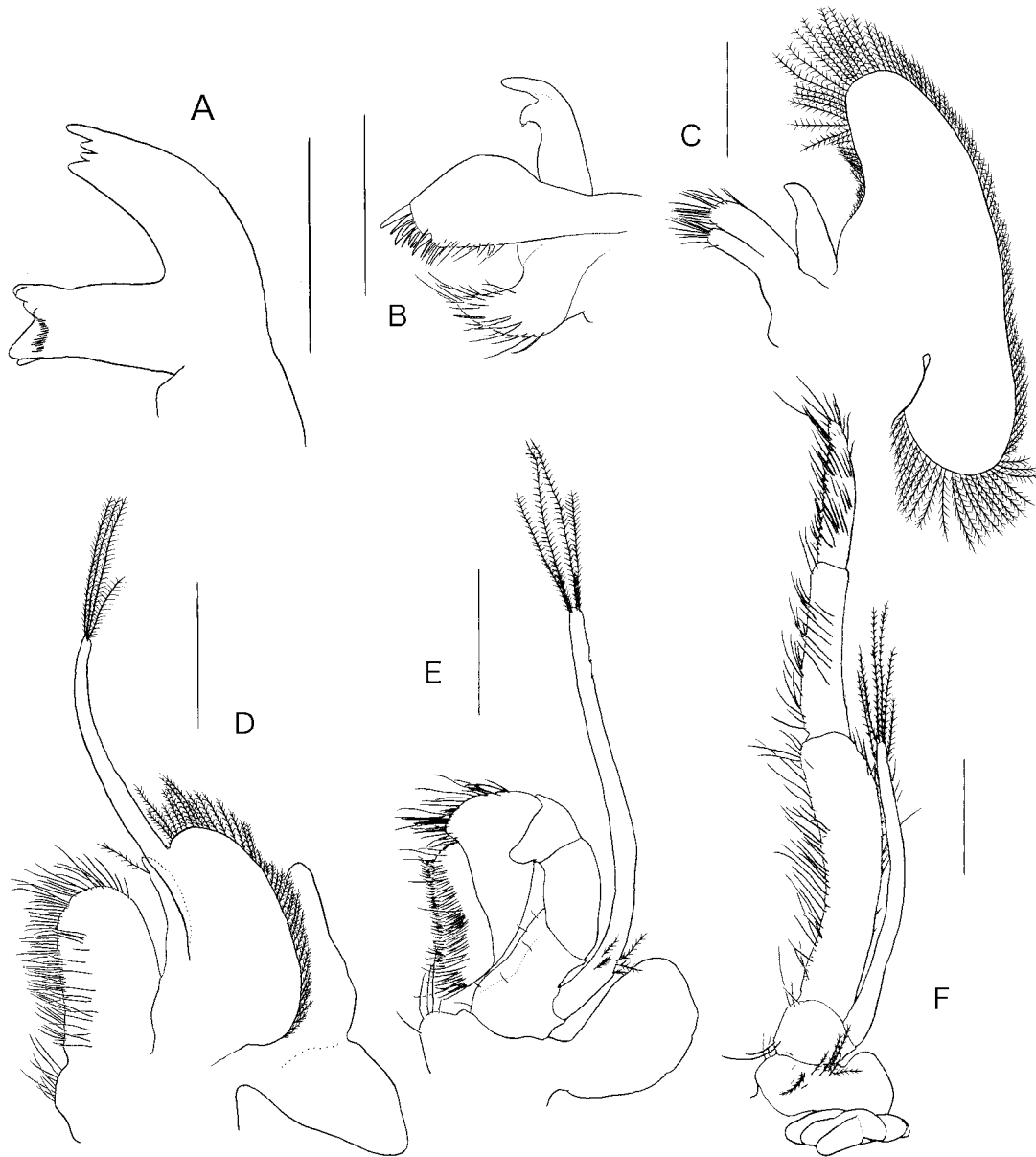


Fig. 3. *Periclimenes boucheti* n. sp., paratype ♂ (cl 7.2 mm), stn. CA2373. A, left mandible; B, left maxillule; C, left maxilla; D, left first maxilliped; E, left second maxilliped; F, left third maxilliped. Scales = 1 mm.

about 0.3 of carapace length, about 1.5 times longer than broad, medial margin straight, sparsely setose, with small acute ventral tooth at 0.5 of segmental length, lateral margin slightly convex, with large acute distolateral tooth, tip overreaching middle of intermediate segment, distolateral margin roundly produced; stylocerite robust, in holotype left stylocerite short, rounded, probably from regeneration, reaching to about 0.5 length of medial margin of proximal segment, statocyst normal, with granular statolith; intermediate segment short, obliquely articulated with distal segment, dorsal length about 0.4 length of medial margin of proximal segment, as long as maximum width, lateral margin expanded, with long plumose setae; distal segment about 0.5 length of medial margin of proximal segment, about 1.4 times longer than distal width, upper flagellum

biramous, proximal 13 segments fused in holotype, 11 segments fused in paratype, depressed, shorter free ramus with four segments, lower flagellum slender.

Antenna with basis robust, with short blunt lateral tooth, carpus subcylindrical, about 2.1 times longer than wide in dorsal view, reaching to about 0.4 length of scaphocerite; left flagella only remaining in paratype, long, almost as long as length of body; scaphocerite well developed, about 0.6 of carapace length, very broad, about 2.4 times longer than maximum width, medial and lateral margins convex, lateral margin with robust distal tooth, exceeded by rounded distal margin of lamella.

Epistome unarmed. Fourth and fifth thoracic sternites each with posterior transverse ridge divided by deep median notch, posterior sternites broad.

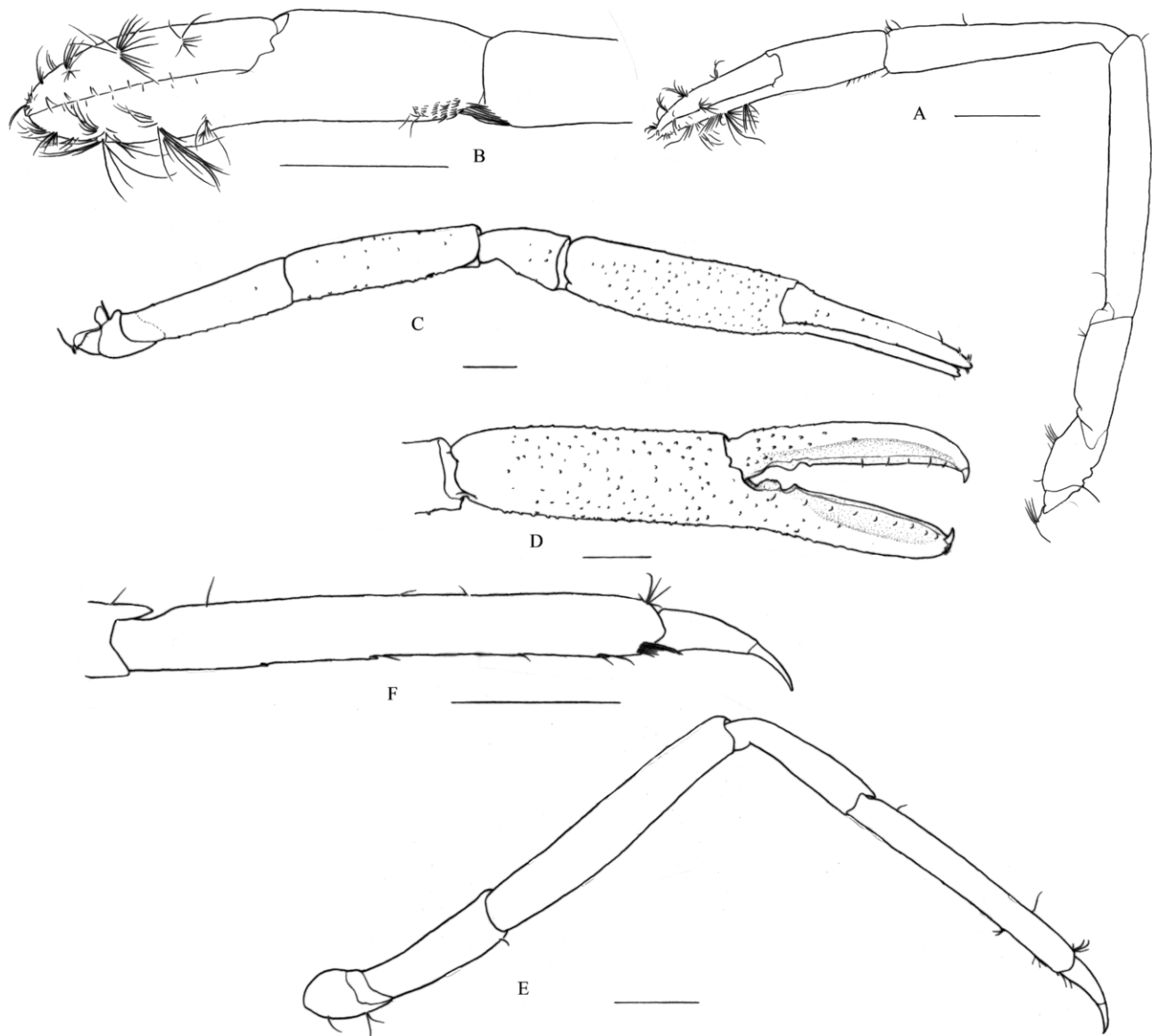


Fig. 4. *Periclimenes boucheti* n. sp., holotype ovig. ♀ (cl 6.8 mm), stn. CA 2373. A, left first pereiopod, dorsal; B, same, chela and distal part of carpus, mesial; C, right second pereiopod, ventral; D, same, chela and distal part of carpus, mesial; E, right third pereiopod, lateral; F, same, dactylus, propodus and distal part of carpus. Scales = 1 mm.

Mouthparts described based on left side of paratype. Mandible normal, without palp; molar process distally with seven blunt teeth and two groups of dense setae; incisor process obliquely truncate distally with four triangular teeth, lateral teeth somewhat larger than medial tooth. Maxillule with bilobed palp, upper lobe well developed, overreaching lower lobe, lower lobe with short apical seta; upper lacinia with 12 stout spines and several setae; lower lacinia slender, tapering, with spiniform dense setae distally. Maxilla with palp simple, bent medially; distal 0.5 of basal endite bilobed, width of distal lobe about 1.5 of width of proximal lobe, each with distal setae; coxal endite obsolete, medial margin feebly convex; scaphognathite large, broad, anterior lobe with medial margin concave, posterior lobe broadly rounded. First maxillipedal palp elongated, with one subapical seta; basal endite rounded, distal and medial

margins and ventromedial surface setose; coxal endite medially convex, medial margin setose; exopod with long flagellum with long apical plumose setae, caridean lobe large, broad, fringed with plumose setae; epipod large, bilobed. Second maxilliped with normal endopod, dactylar segment narrow, with multiple rows of serrulate spines medially, propodal segment large, distomedial margin with several spinulate setae, upper margin and distomedial surface with long setae; carpus, ischiomerus and basis normal, coxa produced medially, with several setae; exopod well developed; with plumose setae on distal margin and proximal part; epipod large, subrectangular; podobranch absent. Third maxilliped with slender endopod, extending distally to middle of carpus; ischiomerus and basis incompletely fused, combined segment compressed, ischiomerus about 0.4 of carapace length, 5.0 times longer than

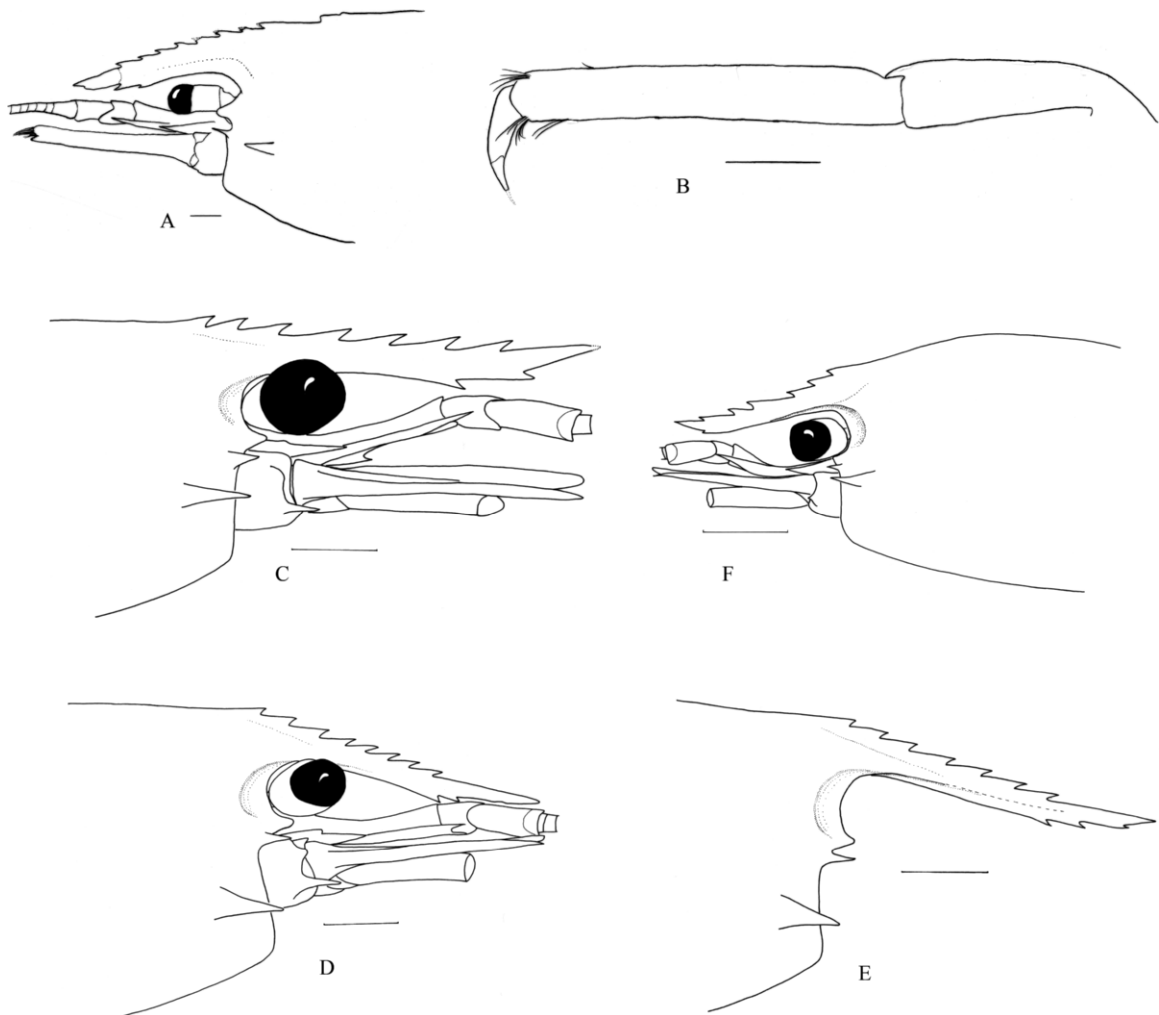


Fig. 5. A, B, *Periclimenes boucheti* n. sp., ovig. ♀ (cl 10.2 mm), stn. CA 2381. C, *Periclimenes dentidactylus* Bruce, 1984, ♂ (cl 6.0 mm), stn. CP 2362. D-F, *Periclimenes hertwigi* Balss, 1913: D, ♂ (cl 6.7 mm), stn. CA 2337; E, ♂ (cl 7.1 mm), stn. CP 2343; F, ovig. ♀ (cl 4.1 mm), Suruga Bay, Japan, 45 m depth. A, C, D, F, distal part of carapace and appendages, lateral; B, left third pereiopod, dactylus, propodus and distal part of carpus, lateral; E, anterior part of carapace, lateral. Scales = 1 mm.

maximum width, with lateral margin slightly convex, with setae on distal 0.5, medial margin sinuous, with long simple setae along entire length; intermediate segment about 0.5 length of ischiomerall segment, about 4.0 times longer than proximal width, with long finely serrulate spiniform setae medially; terminal segment about 0.4 length of ischiomerall segment, tapering distally, 4.7 times longer than proximal width, with several transverse groups of spiniform setae ventromedially and long spiniform setae distally; exopod with slender flagellum almost reaching end of ischiomerus with distal and subdistal plumose setae; coxa with large lateral rounded plate, medial margin slightly produced, with long simple setae ventrally; arthrobranch well developed, with about eight lobes.

First pereiopod well developed, robust, reaching beyond scaphocerite by length of chela; chela about 0.4 of carapace length, with palm slightly compressed, about 2.0 times longer than wide, with five or six rows of short serrulate setae proximoventrally; fingers slightly longer than length of palm, simple, not subspatulate, with five transverse groups

of long setae, cutting edges entire; carpus as long as chela, distal part subcylindrical, gradually compressed proximally, about 5.0 times longer than distal width, with transverse row of long serrulate setae distoventrally; merus about 1.1 length of chela, distal part subcylindrical, compressed proximally, about 8.0 times longer than distal width; ischium about 0.5 of length of chela, distal 0.67 expanded, proximal 0.33 contracted, strongly obliquely articulated with basis; coxa normal with small distoventral setose process.

Second pereiopods well developed, similar, covered with small tubercles. Ovigerous female holotype with chelipeds subequal in size, exceeding scaphocerite by length of chela; chela almost as long as carapace, palm subcylindrical, compressed, about 3.0 times longer than central width; fingers almost as long as palm, tips hooked, curved, articulated; dactylus with distal 0.6 of cutting edge entire, two low triangular teeth at proximal 0.23, 0.32 of dactylar length, proximal tooth blunt; fixed finger with entire cutting edge, distal 0.65 with two triangular teeth at 0.19, 0.28 length of fixed finger, lateral low projection at near tip fitting

movable finger when fingers closed; carpus cup-like distally, about 0.44 length of palm, tapering proximally, 1.7 times longer than distal width; merus subcylindrical, about 0.9 length of palm, 4.0 times longer than proximal depth; ischium 0.8 length of palm, compressed, 3.6 times longer than distal depth; basis and coxa without special features.

Paratype male with similar second pereopods to holotype, left (minor) distinctly smaller than right, without distinct tubercles, possibly due to regeneration. Major (right) second pereopod tuberculate, exceeding scaphocerite by length of chela, chela about 1.2 of carapace length, with two triangular teeth on cutting edge of dactylus at proximal 0.25 and 0.38, two teeth on cutting edge of fixed finger at 0.20 and 0.33; carpus about 0.4 length of palm, 1.9 times longer than distal width. Minor second pereopod exceeding scaphocerite by length of fingers, chela about 0.8 of carapace length, with indistinct teeth on dactylus, two teeth at proximal 0.23 and 0.32 on fixed finger; carpus about 0.5 length of palm, 1.6 times longer than distal width.

Ambulatory pereopods slender, third pereopod reaching distal margin of scaphocerite when extended, exceeding carpus by dactylar length and 0.33 of propodus; third pereopodal dactylus simple, unguis feebly demarcated from corpus, long, slender, corpus about 4.0 times longer than proximal depth, about 0.4 of dactylar length, flexor margin sinuous, without accessory tooth; propodus about 0.5 of carapace length, 8.8 times longer than central depth, with transverse row of setae, with or without one or two small spines on distoventral margin, three or four very small spines situated along flexor margin, distal spine with several long setae, dorsal margin with few setae and distal group of setae; carpus about 0.5 of propodal length, slightly tapering proximally, 3.9 times longer than distal depth, with distinct distodorsal lobe; merus slightly longer than propodus, 7.2 times longer than proximal depth, distoventral angle unarmed; ischium subequal to carpus, slightly compressed, slightly tapering proximally, about 3.3 times longer than distal depth, obliquely articulated with basis; basis and coxa normal. Fourth and fifth pereopods similar to third, with propodus subequal to that of third, propodus with or without one or two distal spines and one to three small spines along flexor margin.

Uropods distinctly exceeding telson, protopod with distolateral angle rounded; exopod about 0.6 of carapace length, broad, twice longer than greatest width, lateral margin feebly convex, with distolateral angle obsolete, with minute mobile spinule medially, diaeresis feeble; endopod 0.97 of exopodal length, distal margin slightly overreaching that of exopod, about 3.0 times longer than greatest width.

Ova less than 100 in holotype, early stage, maximum length about 0.43 mm.

Color.—Types generally semitranslucent, densely covered with fine reddish orange spots, distal parts of appendages lighter; eggs light olive green. Specimen from stn. CA2381 more whitish (see remarks and the color photos).

Etymology.—Named after Dr. Philippe Bouchet, the principal investigator of the “PANGLAO 2005” expedition.

Remarks.—The new species is quite similar to *Periclimenes foresti* Bruce, 1981, the type locality being also in the

Philippines, to *P. granuloides* Hayashi, 1986 from the Tosa Bay, Honshu, Japan, and to *P. crosnieri* Li and Bruce, 2006 from Indonesia. In having granulated second pereopods, simple dactyli on the ambulatory pereopods, and an epigastric tooth (or projection) separated from the dorsal rostral teeth, these species are so similar to each other that we can call them the “*Periclimenes foresti* species complex”. *Periclimenes boucheti* sp. nov. is readily distinguished from *P. crosnieri* by the number of dorsolateral spines on the telson (two vs four pairs). *Periclimenes foresti* and *P. granuloides* are very similar; the significant difference between them according to the available descriptions is the presence [*P. foresti* (see Bruce, 1981; 1985)] or absence [*P. granuloides* (see Hayashi, 1986)] of spinules on the propodus of the ambulatory pereopods. We examined the type specimens of *P. granuloides* Hayashi, 1986 [Tosa Bay, Shikoku, depth 120 m, 8 November 1984, coll. by Toriyama, M., holotype male (cl 11.0 mm), paratype ovigerous female (cl 13.6 mm) (NFU 530-2-1130) deposited in the National Fisheries University]. That re-examination revealed that the propodi of the ambulatory pereopods have very small spines on the flexor margins as in *P. foresti*. It is very likely that *P. granuloides* is a junior synonym of *P. foresti*. *Periclimenes boucheti* sp. nov. also has some minute spines on the flexor margins of the propodi of the ambulatory pereopods, however, it can be distinguished from *P. granuloides* and *P. foresti* by the well-developed corneas of the eyes, the diameters of which are as wide as the eye-stalks. *P. granuloides* and *P. foresti* have reduced corneas with diameters only 0.6 times the maximum width of the eye-stalks.

The species of the “*Periclimenes foresti* species complex” may be distinguished by the following key:

1. Telson with two pairs of dorsolateral spines *P. crosnieri* Li and Bruce, 2006
- Telson with four pairs of dorsolateral spines 2
2. Cornea well developed, as wide as eye-stalk *P. boucheti* n. sp.
- Cornea reduced, diameter 0.6 of greatest width of eye-stalk *P. granuloides* Hayashi, 1986/*P. foresti* Bruce, 1981

The single male specimen from CA 2381 is somewhat different from the type specimens in the following aspects: the epigastric teeth appear as two blunt projections (one in the types); the postorbital teeth (excluding epigastric teeth) are two (one in the types); the rostrum is rather deep and straight (much shallower and depressed in the types). The coloration of generally cream white of the specimen is also distinct from the types, which are generally semi-translucent orange. Those characters may represent a range of variation in the species that is not clear from the limited number of specimens.

Periclimenes dentidactylus Bruce, 1984
Figs. 5C, 16E

Periclimenes dentidactylus Bruce, 1984: 7, figs. 1-6.—Chace and Bruce, 1993: 108, fig. 22.

Material Examined.—stn. CP 2362, 8°54.6'N, 123°33.7'E, 679-740 m, sandy, 26 May 2005, 1 ♂ (cl 6.0 mm) (NTOU).

Color.—Body and appendages generally semi-translucent whitish, somewhat pinkish with small red spots. Third maxilliped and proximal part of merus of first pereopod reddish; second pereopod pinkish at proximal part of fingers and distal part of carpus; third to fifth pereopods pinkish.

Distribution.—Type locality: Makassar Strait, southwest to Tandjung Mangkalihat, Borneo, Indonesia, 592-595 m. Also known from Philippines; 592-1280 m depth (Chace and Bruce, 1993).

Remarks.—The specimen examined keys out to this species using the key to Philippine-Indonesian species of *Periclimenes* (Chace and Bruce, 1993) and also agrees closely with the descriptions and illustrations of Bruce (1984) and Chace and Bruce (1993) in its general morphology. It has the rostral dentition of 2 + 5/2; the second pereopod is covered with fine tubercles on the chela and the flexor margin of the carpus and merus; its palm is 4.0 times longer than the width; the corpus of the ambulatory dactylus is 3.2 times longer than the depth; the distolateral tooth of the scaphocerite slightly overreaches the distal margin of the blade; and the uropods distinctly overreach the distal margin of the telson. This species is most closely allied to *Periclimenes hertwigi* Balss, 1913 and *P. calcaratus* Chace and Bruce, 1993 and they may form a species complex, the “*Periclimenes hertwigi* species group”, which is characterised by a slender and shallow rostrum, very large and long hepatic spine arising closely to the anterior margin of the carapace and distinctly overreaching the anterior margin of the carapace, well developed major chela having relatively short fingers compared to the palm, and the ambulatory dactylus armed with characteristic small teeth at the distoventral angle. All the three species have been recorded from the Philippines. *Periclimenes dentidactylus* can be distinguished from *P. hertwigi* by the slightly upturned rostrum with high teeth and a dentition of 1 + 6/3 (1 + 5/1-2 in *P. hertwigi*); the distolateral tooth of the scaphocerite that distinctly overreaches the distal margin of the blade (overreaching the margin little if at all in *P. hertwigi*); the second pereopods that are more slender and elongate, with the chelae finely tuberculate; the palm about 4.0 (2.7-3.0 in *P. hertwigi*) times longer than wide; the corpus of the ambulatory dactylus about 4.0 (3.0 in *P. hertwigi*) times longer than the depth (Bruce, 1984); the shorter uropods, reaching to about level of the end of the extended telson (overreaching in *P. hertwigi*) (Chace and Bruce, 1993). *Periclimenes dentidactylus* also differs from *P. calcaratus* by the number of teeth on the ventral margin of the rostrum (2-3 vs 1) and the position of the anterior pair of the dorsolateral telsonal spines (anterior 0.5 of the telson in *P. dentidactylus* but posterior 0.5 in *P. calcaratus*). The generally whitish color of *P. dentidactylus* that is reported for the first time in this study also can be a distinctive feature of the species (*P. hertwigi* shows generally reddish color, see remarks of *P. hertwigi*).

Periclimenes hertwigi Balss, 1913
Figs. 5D-F, 16F-H

Periclimenes hertwigi Balss, 1913: 235.—Bruce, 1972: 352, figs. 1, 2; 1983: 208; 1990: 151, figs. 1, 2, 39c.—Chace and Bruce, 1993: 113.—Debelius, 1999: 186 (unnumbered color photo).—Minemizu,

2000: 59 (unnumbered color photo).—Kobayashi, 2000: 172 (unnumbered color photo).

Periclimenes hertwigi.—Balss, 1914: 49, figs. 28-30.

Periclimenes (Periclimenes) hertwigi.—Holthuis, 1952: 43, figs. 11, 12.

Material Examined.—stn. CA 2337, 9°31.5'N, 123°41.7'E, 336 m, sandy/muddy, 22 May 2005, 1 ♂ (cl 6.7 mm) (NTOU); stn. CP 2343, 9°27.4'N, 123°49.4'E, 273-302 m, sandy/muddy, 23 May 2005, 1 ♂ (cl 7.1 mm) (ZRC).

Color.—Body and appendages generally semi-translucent reddish, densely covered with fine red spots, uropods and rostrum appearing very red. Color patterns of appendages differed in the two specimens. The specimen from CA2337 had uniformly reddish ambulatory pereopods, while in the specimen from CP 2343 distal parts of meri of the ambulatory pereopods were white.

Distribution.—Type locality is Sagami Bay, Japan. Also reported from Kumano-nada, Honshu, Japan, East China Sea, Kei Islands, Indonesia, Queensland, Australia (Bruce, 1972, 1991a).

Remarks.—As mentioned in the remarks of *Periclimenes dentidactylus*, *P. hertwigi* is closely allied to *P. dentidactylus* and *P. calcaratus* but can be easily recognized by the uropods that overreach the distal margin of the telson. The two specimens examined were identified as *P. hertwigi* with the key to species by Chace and Bruce (1993) and also agree with the general morphology as reported by Balss (1913), Bruce (1983, 1990) and Chace and Bruce (1993). The Philippines specimens have the following characters: the rostral dentition is 1 + 6/3 in specimen from CA2337 and 1 + 7/2 in specimen from CP2343; the hepatic spine is situated lower than the level of the antennal spine and close to the ventral margin of the carapace; the distolateral tooth of the basis is very slender, long and acute, as long as or slightly longer than the antennal spine; the second pereopods of the specimen from CA2337 (lacking in the specimen from CP 2343) are unequal in size, covered with fine tubercles on the chela and the flexor margins of the carpus and merus; the corpus of the ambulatory dactylus of the specimen from CA2337 is 4.0 times longer than the depth. The second pereopods of the specimen from CA2337 have palms 3.1 (major) or 3.3 (minor) times longer than wide, the corpus of the ambulatory dactylus of the specimen CP 2343 is 3.1 times longer than the depth, the rostrum is depressed, and the uropods distinctly reach beyond the telson. The cornea of the eye is somewhat reduced, not distinctly stouter than the stalk and without an accessory pigment spot.

Bruce (1991a) reported two specimens from New Caledonia that had distinctly different dactyli of the ambulatory pereopods and suggested the possibility of a complex of related species. The dactyli of the ambulatory pereopods in the specimens examined here agree with *P. hertwigi* s. str. and not the material reported by Bruce (1991a). We also compared our material with a specimen of *P. hertwigi* collected near the type locality [specimen data: Sakushita, Ohse-zaki, Suruga Bay, 45m, associated with a sea urchin, SCUBA diving, 11 April 1996, 1 ovigerous female (cl 4.1 mm) (CBM-ZC-3692) deposited in Natural History Museum and Institute, Chiba]. The Philippines specimens exhibit some differences from that specimen. The

ovigerous female (CBM-ZC-3692) is distinctly smaller than the specimens collected from the Philippines (cl 4.1 mm in contrast to cl 6.7 and 7.1 mm). The hepatic spine is more closely situated to the antennal spine and the distolateral tooth of the scaphocerite is short and rounded in the specimen from Japan. The differences might support the concept of a species complex, however it might be variation dependent on the body size. Further study on the morphological variation utilizing many specimens of this species is needed.

The color pattern of the present specimens shows some differences from the color pattern photographed in some guide books. The underwater photographs of this species appearing in guide books (Debelius, 1999; Minemizu, 2000; Kobayashi, 2000) show that the shrimp is generally reddish and with a white longitudinal stripe on eye-stalk; distally white meri of the second pereopods, dorsally white carpi and dorsally white palms and fingers; white ambulatory pereopods extending from distal part of meri, and a large white patch on the dorsal parts of fifth and sixth pleomeres to the telson. The color pattern of the specimen from CP2343 agrees well in the ambulatory pereopods; however the specimen lacks a large white patch on the posterior pleon and telson. The specimen from CA2337 shows a uniformly reddish color and lacks any white patch. The difference in color patterns in this species may reflect variations based on the host sea urchin as reported in another sea urchin associated pontonine shrimp, *Tuleariocaris zanzibarica* Bruce, 1967, which shows some color variations depending on the color of host sea urchin (Maihara and Suzuki, 1993).

No information is available on the host(s) of the specimens examined here.

Periclimenes laccadivensis (Alcock and Anderson, 1894)
Fig. 17A

Palaemonella laccadivensis Alcock and Anderson, 1894: 157.

Periclimenes laccadivensis.—Kemp, 1922: 152, fig. 19.—Bruce, 1991a: 301, fig. 1; 1992: 69, fig. 20.—Li and Bruce, 2006: 697.

Material Examined.—stn. CP 2359, 8°49.9'N, 123°34.9'E, 437-443 m, sandy, 26 May 2005, 1 ovig. ♀ (cl 4.2 mm) (NTOU), 1 ovig. ♀ (cl 4.0 mm) (ZRC).

Color.—Body semi-translucent whitish, proximal antennule, antenna, third maxilliped, first pereopod, and proximal parts of ambulatory pereopods reddish; rostrum and appendages semi-translucent; body and appendages covered with small red spots. Eggs light green.

Distribution.—Type locality: Laccadive Sea, 770-1353 m. Known also from western Indian Ocean, South China Sea, New Caledonia, Australia (Tasmania), 274-1353 m (Bruce, 1991a). This is the first record from the Philippines.

Remarks.—The two specimens are damaged and part of the rostrum is missing in both specimens, the smaller specimen has lost most pereopods and bears only left first and right fifth pereopods. However it agrees well with the definition of *P. laccadivensis* in having the well developed eyes, presence of three evenly spaced acute teeth on the carapace with the first two teeth being semi-articulated, and the biunguiculate dactyli of the ambulatory pereopods.

Periclimenes leptunguis n. sp.

Figs. 6-8, 17B

Material Examined.—stn. CP 2359, 8°49.9'N, 123°34.9'E, 437-443 m, sandy, 26 May 2005, holotype ovig. ♀ (cl 8.1 mm) (NMCR).

Description.—Large size subcylindrical body form of *Periclimenes*.

Rostrum well developed, moderately deep, straight, directed anteroventrad except anteriorly directed tip, about 0.5 of carapace length, reaching nearly to end of antennular peduncle, dorsal carina well developed, deepest posteriorly, dorsal margin straight; rostral formula 1 + 6/2; dorsal teeth small, low, subacute, subequally spaced, interspaces non-setulose, posterior tooth slightly posterior to level of posterior orbital margin; lateral carinae distinct, horizontal, moderately expanded posteriorly; ventral margin with proximal 0.5 nearly straight, subparallel to dorsal margin, distal 0.5 convex; ventral teeth very small, subacute, anterior to and posterior to level of seventh dorsal tooth respectively.

Carapace smooth, glabrous, with deep, long longitudinal groove below hepatic spine, extending posteriorly to about middle of carapace, shallow, short groove above hepatic spine behind inferior orbital angle, short, shallow oblique groove at about posterior 0.25 of carapace; orbit feebly developed, inferior orbital angle produced, tip rounded; anterolateral margin of branchiostegite obtuse, bluntly rounded; ventrolateral margin with soft longitudinal lobe extending anteriorly from almost posteriormost margin of carapace to about anterior 0.20 of carapace; supraorbital spine and epigastric tooth absent; antennal spine very small, acute, marginal, distinct, situated below inferior orbital angle; hepatic spine larger than antennal spine, at approximately same horizontal level, at about anterior 0.1 of carapace length, distinctly posterior to posteriormost dorsal rostral tooth.

Pleon smooth, glabrous; third pleomere not posterodorsally produced, non-carinate; pleura of first three pleomeres broadly rounded, fourth and fifth posteriorly produced, rounded; fifth pleomere about 0.6 length of sixth pleomere, sixth pleomere cylindrical, about 0.4 of carapace length, 1.4 times longer than deep, slightly tapered posteriorly, posteroventral angle small, blunt, posterolateral angle larger, subacute. Telson about 0.8 of carapace length, about 1.9 length of sixth pleomere, 3.3 times longer than anterior width, lateral margins subparallel anteriorly, posteriorly convergent, with four (right), five (left) small marginal dorsolateral spines at 0.4, 0.6, 0.7, 0.9 and 0.4, 0.5, 0.6, 0.8, 0.9 of telsonal length, respectively, about 0.026 of telsonal length; posterior margin rounded, without median point, about 0.4 of anterior width, with five posterior spines, left lateral spine anterior to dorsolateral spine (see above), right lateral spine small, similar to dorsal spines, intermediate spines robust, about 0.06 of telsonal length, submedian spines slender, short, about 0.4 length of intermediate spine, non-setulose.

Eye with well developed globular cornea, slightly oblique, without accessory pigment spot, corneal diameter about 0.13 of carapace length, stalk subcylindrical, broad, subequal to corneal diameter, about 1.25 times wider than posterior marginal length.

Antennular peduncle reaching far behind anterior margin of scaphocerite; proximal segment with length of medial

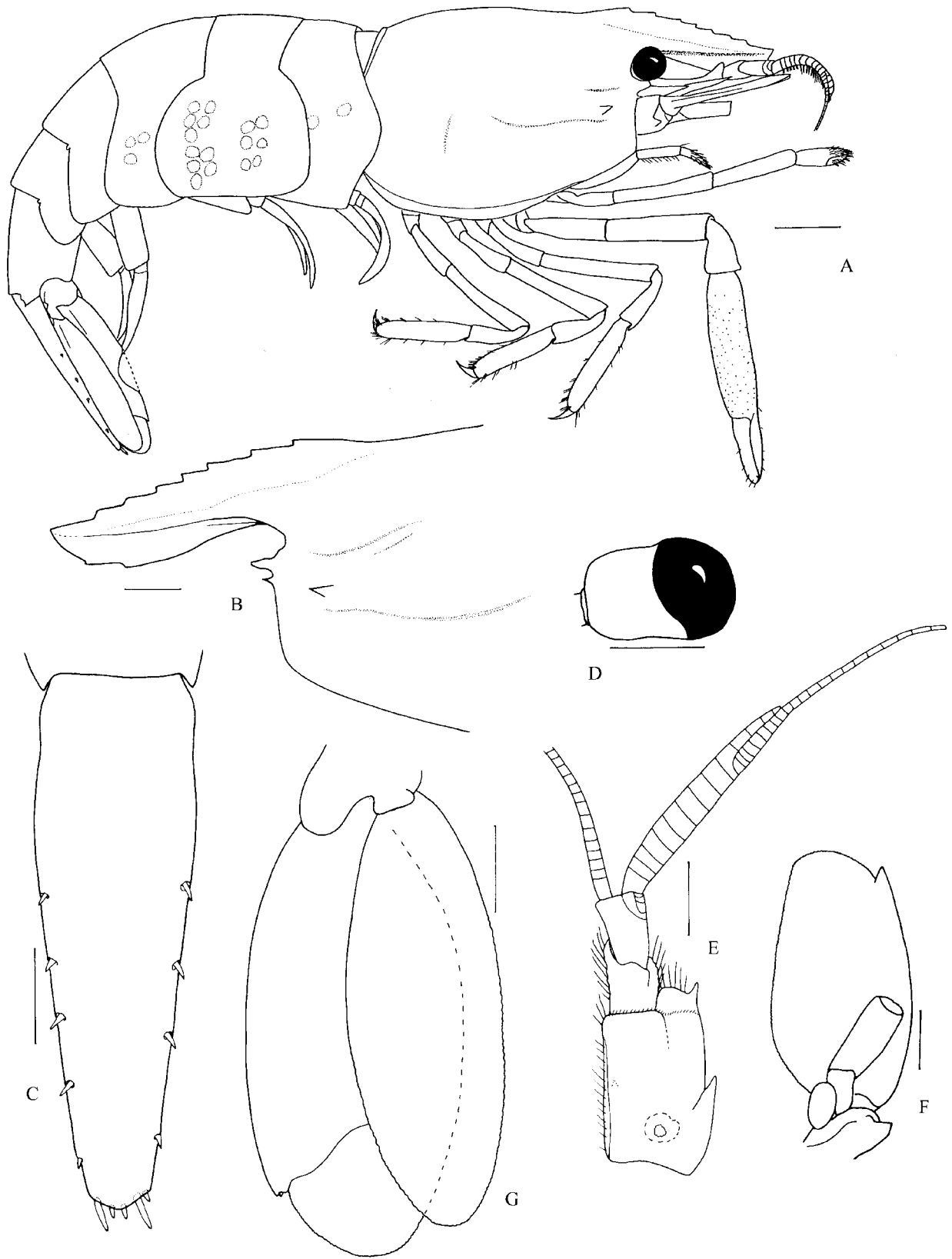


Fig. 6. *Periclimenes leptunguis* n. sp., holotype ovig. ♀ (cl 8.1 mm), stn. CP 2359. A, body, lateral; B, anterior part of carapace, lateral; C, telson, dorsal; D, right eye, dorsal; E, right antennule, dorsal; F, left antenna, ventral; G, left uropods, dorsal. Scales A = 2 mm, B-G = 1 mm.



Fig. 7. *Periclimenes leptunguis* n. sp., holotype ovig. ♀ (cl 8.1 mm), stn. CP 2359. A, right mandible; B, right maxillule; C, right maxilla; D, right first maxilliped; E, right second maxilliped; F, right third maxilliped. Scales = 1 mm.

margin about 0.3 of carapace length, about 1.5 times longer than broad, medial margin straight, sparsely setose, with small acute ventral tooth at 0.5 of segmental length, lateral margin slightly convex, with large acute distolateral tooth exceeding distolateral margin, distolateral margin strongly produced, rounded, with six long plumose setae, stylocerite robust, reaching to about 0.6 length of medial margin of proximal segment, statocyst normal, with granular statolith; intermediate segment short, obliquely articulated with distal segment, dorsal length about 0.33 length of medial margin of proximal segment, about 0.9 of maximum width, lateral margin expanded, with long plumose setae; distal segment about 0.5 length of medial margin of proximal segment, about 1.4 times longer than distal width, upper flagellum biramous, proximal ten segments fused, about 1.2 length of medial margin of proximal segment, stout, compressed, shorter free ramus with four segments, about 0.3 of fused portion, with about 25 groups of aesthetascs, longer free ramus slender, filiform, lower free flagellum slender, incomplete.

Antenna with basis robust, with small acute lateral tooth, carpus subcylindrical, about 2.4 times longer than wide,

reaching to about 0.4 length of scaphocerite; flagella lacking; scaphocerite well developed, about 0.5 of carapace length, very broad, about 1.9 times longer than maximum width at proximal 0.25 of length, medial and lateral margins convex, lateral margin with robust distal tooth, exceeded by rounded distal margin of lamella.

Epistome normal, unarmed. Fourth and fifth thoracic sternites each with posterior transverse ridge with median notch, posterior sternites broad, unarmed.

Mouthparts described based on right side. Mandible normal, without palp; molar process distally with five blunt teeth, two groups of dense setae; incisor process obliquely truncate distally with three triangular teeth, lateral teeth somewhat larger than medial tooth. Maxillule with bilobed palp, upper lobe well developed, overreaching lower lobe, lower lobe with short hooked apical seta; upper lacinia with nine stout spines and several setae; lower lacinia slender, tapering, with dense spiniform setae. Maxilla with palp simple, bent medially; basal endite bilobed about distal 0.33, width of distal lobe about 1.5 of width of basal lobe, each with distal setae; coxal endite obsolete, medial margin feebly

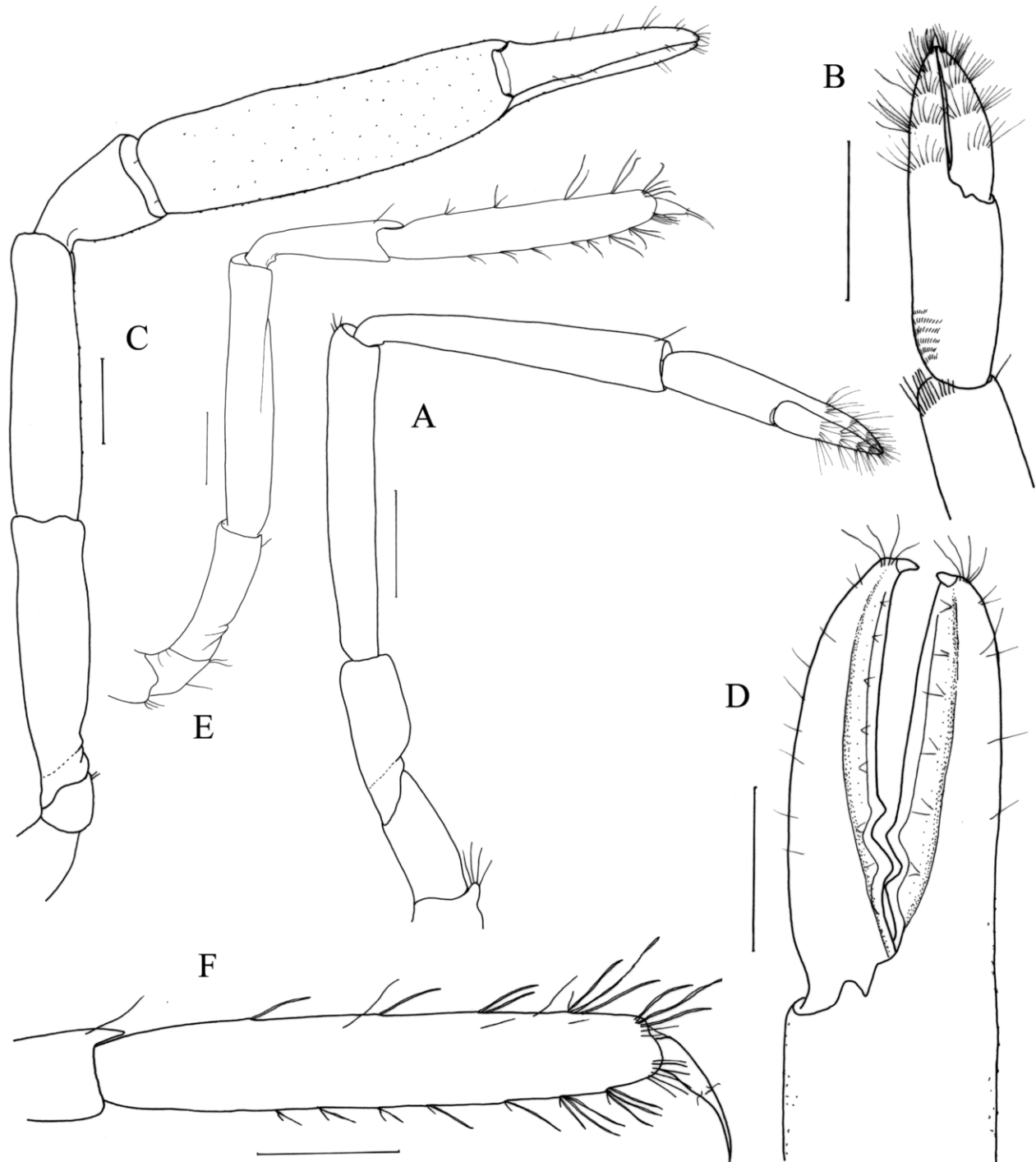


Fig. 8. *Periclimenes leptunguis* n. sp., holotype ovig. ♀ (cl 8.1 mm), stn. CP 2359. A, right first pereopod, ventral; B, left and distal part of carpus, mesial; C, right second pereopod, ventral; D, same, distal part of chela, mesial; E, right third pereopod, lateral; F, right fifth pereopod, dactylus, propodus and distal part of carpus. Scales = 1 mm.

convex; scaphognathite large, broad, anterior lobe with medial margin concave, posterior lobe broadly rounded. First maxilliped with palp elongated, with simple apical seta and plumose subapical seta; basal endite rounded, distal and medial margins and ventral surface setulose; coxal endite medially convex, medial margin setose; exopod with long flagellum, flagellum with several long plumose setae on apex and distolateral margin, caridean lobe large, broadly fringed

with plumose setae; epipod large, bilobed. Second maxilliped with normal endopod, dactylar segment narrow, with multiple rows of serrulate spines medially, propodal segment large, distomedial margin with several spinulate setae, upper margin and distomedial surface with some long setae; carpus, ischiomerus and basis normal, coxa produced medially, with several setae; exopod well developed, with plumose setae on distal margin and proximal part; epipod

large, subrectangular; podobranch absent. Third maxilliped with slender endopod, extending distally to middle length of carpus; ischiomerus and basis incompletely fused, combined segment compressed, ischiomerus portion curved medially about 0.3 of carapace length, 3.2 times longer than maximum width, with lateral margin slightly convex, medial margin sinuous, with numerous long simple setae along entire length, basal portion slightly expanded medially, with several long simple setae; intermediate segment about 0.6 length of ischiomerus segment, about 3.1 times longer than proximal width, with five groups of long finely serrulate spiniform setae medially; terminal segment about 0.5 length of ischiomerus segment, tapering distally, 3.6 times longer than proximal width, with several transverse groups of spiniform setae ventromedially and long distal spiniform setae; exopod with slender flagellum extending distinctly beyond end of combined segment, with ten distal and subdistal plumose setae; coxa with large lateral rounded plate, medial margin slightly produced, with two long simple setae; arthrobranch well developed with about ten lobes.

First pereopod well developed, robust, reaching beyond scaphocerite by length of fingers and distal 0.5 of palm, exceeding carpus by length of chela and distal 0.5 of carpus; chela about 0.3 of carapace length, with palm slightly compressed, about 2.0 times longer than wide, with six rows of short serrulate setae proximally; fingers about 0.8 length of palm, simple, not subspatulate, with five transverse groups of long setae, cutting edges entire; carpus about 1.3 length of chela, distal part subcylindrical, gradually depressed proximally, 5.6 times longer than distal width, with transverse row of long serrulate setae distoventrally; merus about 1.4 length of chela, distal part subcylindrical, compressed proximally, 6.4 times longer than distal width; ischium about 0.7 of length of chela, distal 0.67 expanded, proximal 0.33 tapering, strongly obliquely articulated with basis; coxa normal with small distoventral setose process.

Minor (right) second pereopod exceeding scaphocerite by length of fingers and distal 0.75 of palm, exceeding carpus by length of chela and carpus; chela about 0.9 of carapace length, palm subcylindrical, about 4.0 times longer than central width, covered with small tubercles, fingers about 0.5 length of palm, with sparse simple setae, tips hooked, curved, with feeble lateral flanges, dactylus with distal 0.5 of cutting edge entire, sharp, two teeth at proximal 0.3, 0.5 of length, respectively, proximal tooth rounded, distal subacute, low, fixed finger with distal 0.55 of cutting edge entire, sharp, two teeth at proximal 0.3, 0.4 of length, respectively, subacute; carpus distally cup-like, about 0.3 length of palm, tapering proximally, 1.4 times longer than distal wide, with occasional fine tubercles on flexor surface; merus about 0.7 length of palm, distal subcylindrical, gradually compressed proximally, distoventral margin smooth, about 3.6 times longer than proximal depth; ischium 0.6 length of palm, compressed, 3.4 times longer than distal depth; basis and coxa without special features.

Ambulatory pereopods robust, third pereopod reaching beyond end of scaphocerite by dactylar length, exceeding carpus by dactylar length and distal 0.75 of propodus; third pereopod with dactylus long, slender, with unguis feebly demarcated from corpus, very long, slender, distal part

broken and lost, corpus about 2.0 times longer than proximal depth, flexor margin sinuous, without accessory tooth, with distal pairs of short sensory setae medially and laterally; propodus about 0.5 of carapace length, compressed, 6.1 times longer than central depth, with distoventral transverse row of setae and seven groups of long setae along flexor margin, distal groups with more, longer setae than proximal groups, without spinules, dorsal margin with five groups of long setae, including distodorsal transverse group; carpus about 0.5 of propodal length, slightly tapering proximally, 3.3 times longer than distal depth, with distinct distodorsal lobe; merus subequal to propodal length, distal part depressed, compressed proximally, 5.5 times longer than proximal depth, distoventral angle unarmed; ischium subequal to carpus, slightly compressed, slightly dorsally curved distally, slightly tapering proximally, about 2.9 times longer than distal depth, obliquely articulated with basis; basis and coxa normal. Fourth and fifth pereopods similar, with propodus subequal to third; fifth with dactylus about 0.25 of propodal length, unguis 1.1 times longer than dorsal corpal length, 6.5 times longer than basal depth.

Uropods distinctly exceeding telson, protopodite with distolateral angle rounded; exopod about 0.6 of carapace length, broad, 2.0 times longer than wide, lateral margin feebly convex, non-setulose, with distolateral angle obsolete, with minute mobile spinule medially, diaeresis distinct; endopod 0.95 of exopodal length, 2.7 times longer than wide.

Ova numerous, ovum length about 0.55 mm.

Color.—Body and appendages generally semi-translucent whitish, covered with small red spots. Distal 0.5 of telson and uropods somewhat reddish. Eggs in early stage light blue.

Etymology.—The Greece “*leptos*”, means thin, delicate, the specific name is in reference to the very slender and elongate unguis of the ambulatory pereopodal dactylus.

Remarks.—The combination of having the simple ambulatory dactylus with very long and slender unguis, the rostrum with all the dorsal teeth situated anterior to the level of the hepatic spine, and four pairs of lateral spines on the telson, is unique in the genus *Periclimenes*. The soft longitudinal lobe at the ventrolateral margin of carapace is also rare in the genus. In the deep-water species of *Periclimenes*, the new species is close to *P. leptodactylus* Bruce, 1991a that was described on a single specimen lacking second pereopods. *Periclimenes leptunguis* sp. nov. can be readily distinguished from the latter by the first pereopod with the fingers not subspatulate (subspatulate in *P. leptodactylus*); the dactyli of the ambulatory pereopods are simple (the corpus with a pair of minute distoventral accessory teeth in *P. leptodactylus*); and without spines on the distal and flexor margins of the propodus of ambulatory pereopods (armed with spines in *P. leptodactylus*).

Periclimenes ngi n. sp.

Figs. 9-11, 17C, D

Material Examined.—stn. CP 2343, 9°27.4'N, 123°49.4'E, 273-302 m, sandy/muddy, 23 May 2005, holotype ♀

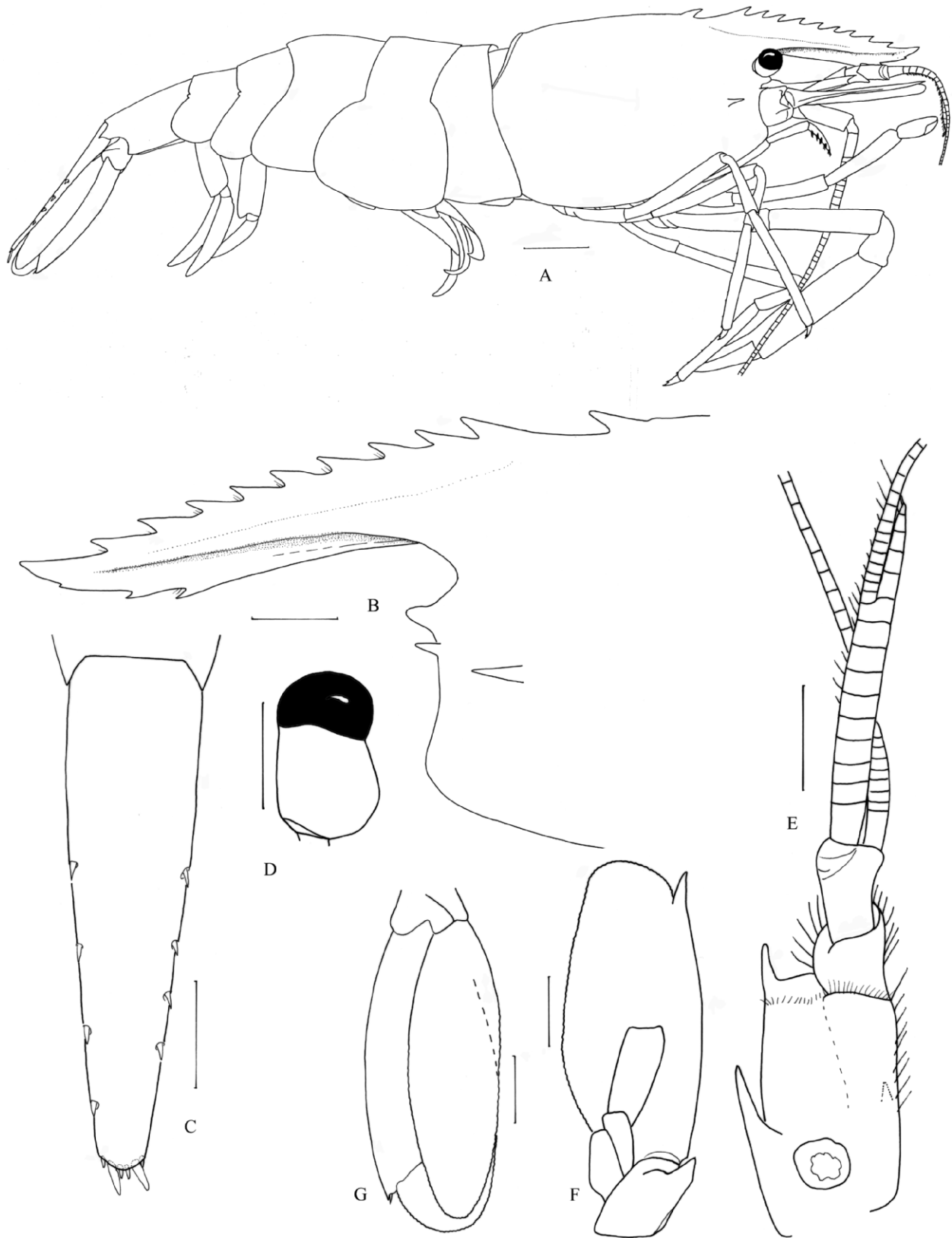


Fig. 9. *Periclimenes ngi* n. sp., holotype ♀ (cl 7.3 mm), stn. CP 2343. A, body, lateral; B, anterior part of carapace, lateral; C, telson, dorsal; D, left eye, dorsal; E, left antennule dorsal; F, left antenna, ventral; G, left uropods, dorsal. Scales A = 2 mm, B-G = 1 mm.

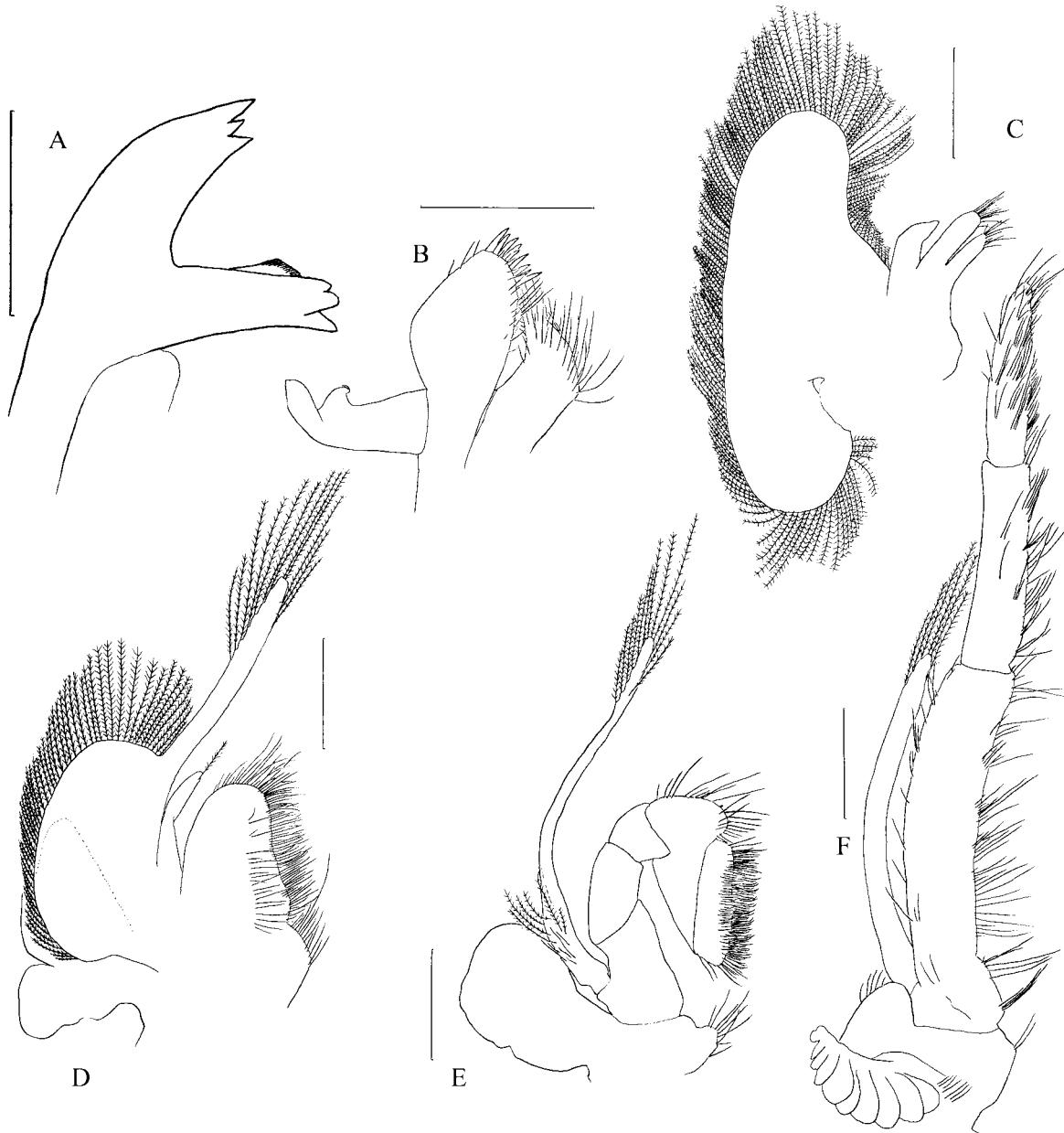


Fig. 10. *Periclimenes ngi* n. sp., holotype ♀ (cl 7.3 mm), stn. CP 2343. A, left mandible; B, left maxillule; C, left maxilla; D, left first maxilliped; E, left second maxilliped; F, left third maxilliped. Scales = 1 mm.

(cl 7.3 mm) (NMCR), paratype ♀ (cl 9.2 mm) (ZRC); stn. CP 2381, 8°43.3'N, 123°19.0'E, 275-280 m, sandy, 28 May 2005, paratype ♀ (cl 7.3 mm) (MNHN).

Description.—Large species of “*Periclimenes alcocki* species group” so far including twelve species (Li and Bruce, 2006; Bruce, 2006), with robust subcylindrical body form, similar to *P. alcocki* Kemp, 1922 and *P. tangeroa* Bruce, 2005. Holotype lacking major (left) second pereiopod; paratype from CP2343 lacking right second pereiopod, left ambulatory pereiopods and chela of left second pereiopod; paratype from CP2381 with regenerated right first to third pereiopods, telson broken, with distal part from third dorsolateral spines missing.

Rostrum well developed, deep, extending distinctly beyond antennular peduncle, about 0.7 of carapace length, directed slightly anteroventrally, feebly up-turned distally, dorsal carina well developed; rostral formula 2 + 8/3 in holotype, 2 + 7/3 in paratypes; dorsal teeth evenly distributed along entire length, with interdental setae, tip acute, second posterior tooth at or slightly posterior to level of orbital margin; ventral carina well developed distally, three small acute ventral teeth on distal 2/5 of rostral length, subdistal tooth sometimes minute, obsolescent.

Carapace smooth, glabrous; orbit feebly developed, inferior angle produced, tip rounded; anterolateral angle slightly produced, rounded; supraorbital spines absent; epigastric tooth stout, at anterior 0.3 of carapace length;

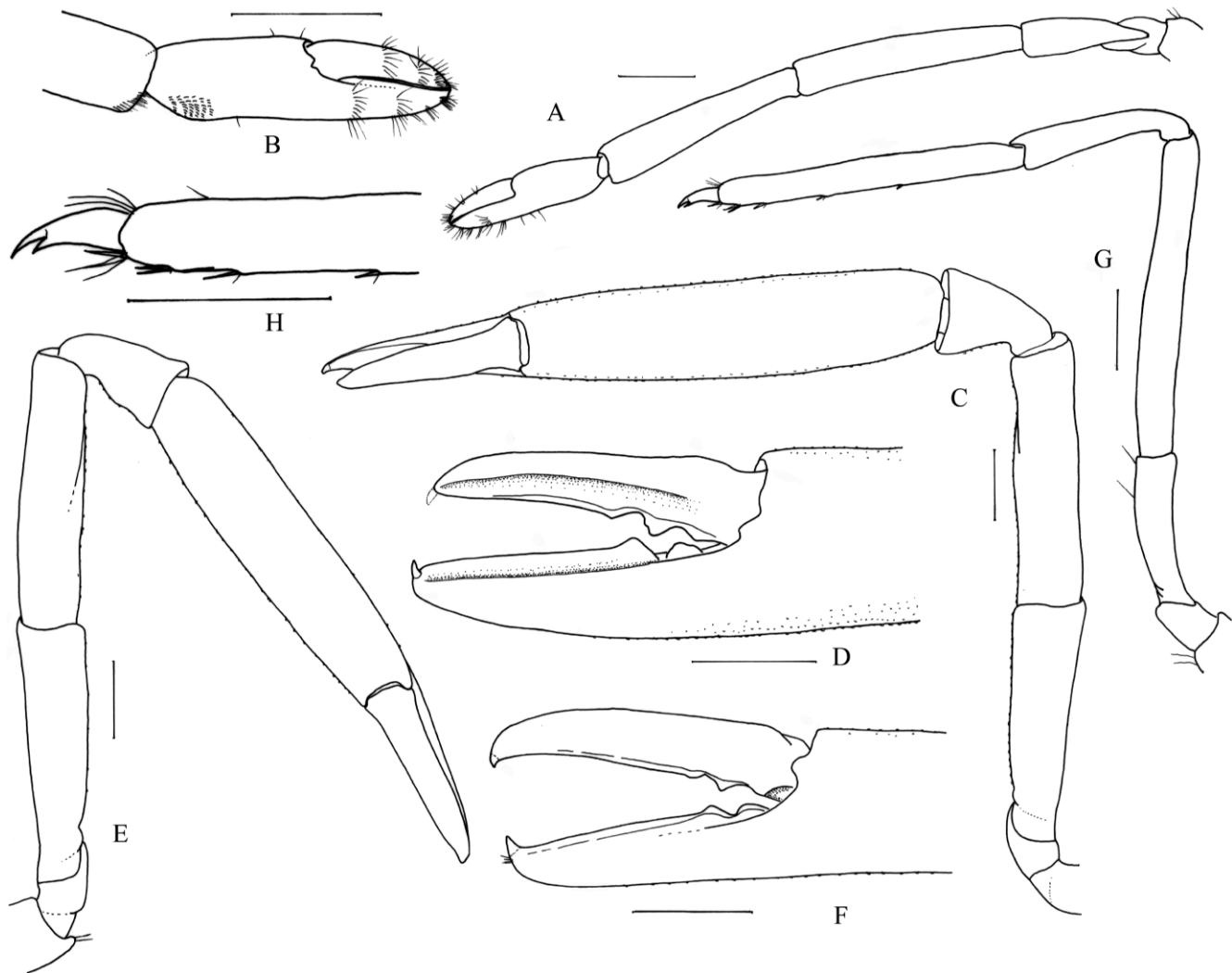


Fig. 11. *Periclimenes ngi* n. sp., A, paratype ♀ (cl 9.2 mm), stn. CP 2343; B, C, F-H, holotype ♀ (cl 7.2 mm), stn. CP 2343; D, E, paratype ♀ (cl 7.3 mm), stn. CP 2381. A, left first pereiopod, lateral; B, same, chela and distal carpus, mesial; C, left second pereiopod, ventral; D, same, fingers, mesial; E, right second pereiopod, ventral; F, same, fingers, lateral; G, left third pereiopod, lateral; H, same, dactylus and distal part of propodus. Scales = 1 mm.

antennal spine small, marginal, not exceeding inferior orbital angle; hepatic spine well developed, in advance of level of epigastric tooth, slightly posterior to level of posteriormost dorsal rostral tooth, larger than antennal spine, at more ventral level, tip distant from anterior margin of carapace.

Pleon smooth, glabrous, third tergite not posterodorsally produced, posterior margin entire, pleura of first to fifth pleomeres broadly rounded, sixth pleomere about 0.4 of carapace length, 1.6-2.0 of fifth length, 1.6-1.7 times longer than deep, posterolateral angle well developed, tip acute, posteroventral angle truncate. Telson 0.7 of carapace length, about 4.0 times longer than anterior width, lateral margins sinuous, posteriorly convergent, with four pairs of small marginal dorsolateral spines at about 0.4, 0.6, 0.7, 0.8 of telsonal length (holotype with right side third and fourth spines abnormally anterior), spines about 0.03 of telsonal length, posterior margin rounded, without median point, 0.3 of anterior width, posterior spines reduced, intermediate spines robust, 0.07 of telsonal length, lateral spines smaller

than dorsal spines, 0.4 length of intermediate spine, submedian spines short, non-setulose, slender, 0.5 length of intermediate spine.

Antennule with medial length of proximal segment of peduncle about 0.3 of carapace length, about 1.6 times longer than wide, medial and lateral margins subparallel, medial margin with well developed ventral tooth at about 0.5 of length, distolateral angle strongly produced, convex, with slender acute distolateral tooth reaching to level of proximal margin of distal peduncular segment, stylocerite slender, acute, reaching to 0.7 of medial segmental length, statocyst normal, statolith granular; intermediate segment very obliquely articulated with distal segment, distomedial and distolateral margins swollen, with numerous plumose setae, dorsal minimum length about 0.3 length of proximal segment; dorsal maximum length of distal segment about 0.5 medial length of proximal segment; upper flagellum biramous, proximal 10-12 segments fused, shorter free ramus with five segments, with about 33 groups of aesthetascs, lower flagellum slender, with numerous segments.

Antennal basis with stout distolateral tooth; carpus short, robust, about 2.2 times longer than wide, reaching to about 0.5 length of scaphocerite, flagellum well developed; scaphocerite well developed, reaching tip of rostrum, about 0.6 of carapace length, broad, about 2.2 times longer than central width, lateral margin stout, feebly convex, with strong acute distolateral tooth, about 0.1 of lateral marginal length, slightly exceeded by broadly rounded distal margin of lamella.

Eye with cornea well developed, small, globular, well pigmented, without accessory pigment spot, diameter about 0.11 of carapace length, slightly oblique; stalk subcylindrical, about 1.2 corneal diameter, proximal-medial angle swollen, maximum width about 0.9 of length.

Epistome unarmed. Fourth thoracic sternite without median process, posterior margins of fourth and fifth with well developed transverse ridges each with median notch, sixth to eighth sternites broad, unarmed.

Mouthparts described based on paratype (ZRC) right side. Mandible normal, without palp; molar process distally with five blunt teeth and two groups of dense setae; incisor process obliquely truncate distally with five teeth, lateral teeth somewhat larger than medial teeth. Maxillule with bilobed palp, upper lobe well developed, lower lobe with small apical hooked seta; upper lacinia with about ten stout spines and several setae; lower lacinia slender, tapering, with spiniform dense setae. Maxilla with palp simple, bent medially; basal endite bilobed about distal 1/5, width of distal lobe about 1.5 of width of basal lobe, each with distal setae; coxal endite obsolete, medial margin feebly convex; scaphognathite large, broad, anterior lobe with medial margin concave, posterior lobe broadly rounded. First maxilliped with palp elongated, with subapical plumose seta; basal endite rounded, with distal and medial margins and ventral surface setose; coxal endite medially convex, medial margin setose; exopod with long flagellum with several long plumose setae on distal margins; caridean lobe large, broadly fringed with plumose setae; epipod large, bilobed. Second maxilliped with normal endopod, dactylar segment narrow, with multiple rows of serrulate spines medially, propodal segment large, distomedial margin with several spinulate setae, upper margin and distomedial surface with some long setae; carpus, ischiomerus and basis normal, coxa produced medially, with several setae; exopod well developed, with plumose setae on distal margin and proximal part; epipod large, subrectangular; podobranch absent. Third maxilliped slender, extending to near or beyond distal end of carpus, ischiomerus and basis incompletely fused, ischiomerus portion compressed, twisted, about 0.33 of carapace length, about 7.1 times longer than proximal width, setose medially and laterally; intermediate segment about 0.7 length of ischiomerus portion, slightly tapering proximally, about 5.2 times longer than distal width, setose medially; terminal segment about 0.5 length of ischiomerus portion, tapering distally, about 5.0 times longer than proximal width, with several transverse groups of spiniform setae ventromedially and distally; exopod with slender flagellum extending to distal end or 0.9 length of ischiomerus segment, with several plumose setae; arthrobranch well developed with about ten lobes.

First pereopod slender, exceeding carpus by length of chela and half to entire carpus, exceeding scaphocerite by

length of fingers or entire chela; chela about 0.3 of carapace length, palm oval in section, about 2.1 times longer than deep, with about six transverse rows of short cleaning setae proximoventrally; fingers about 0.8 length of palm, with several groups of long setae laterally, dactylus about 3.7 times longer than basal depth, tapering to small simple acute hooked tip, cutting edge laminar, entire; fixed finger similar to dactylus; carpus about 1.3 length of chela, 4.7 times longer than distal width, slightly tapering proximally, with few distoventral cleaning setae; merus about 1.4 length of chela, 6.1 times longer than distal width, slightly compressed proximally, somewhat prismatic; ischium obliquely articulated with basis, stout, maximum length about 0.8 length of chela, about 3.6 times longer than distal width; basis and coxa without special features.

Major? (left) second pereopod (paratype from CP2381) exceeding rostrum by almost entire chela, with chela densely minutely tuberculate, about 1.2 of carapace length, palm oval in section, subcylindrical, about 4.4 times longer than wide; fingers about 0.5 length of palm, dactylus with well developed lateral longitudinal flange, tip damaged, hooked tip lost, about 5.0 times longer than proximal depth, tapering distally, distal 0.67 of cutting edge sharp, entire, proximal 0.33 with three teeth, middle tooth largest, distal smallest, proximal tooth rounded, shallow; fixed finger similar to dactylus, lateral flange well developed, two proximal teeth of cutting edge large, arising at level opposite with dactylar teeth; carpus distally excavated, about 0.3 length of palm, strongly tapered proximally, 1.3 times longer than distal width, with minute tubercles ventrally; merus about 0.6 length of palm, subcylindrical, distal 0.25 of flexor margin smooth, about 4.1 times longer than deep, unarmed distally, flexor margin with tubercles; ischium about 0.6 length of palm, obliquely articulated with basis, somewhat compressed, tapering slightly proximally, about 3.4 times longer than distal width, flexor margin with tubercles; basis and coxa without special features.

Minor (right) second pereopod (holotype) with chela sparsely minutely tuberculate, subequal to carapace length, palm oval in section, subcylindrical, about 4.5 times longer than wide; fingers about 0.5 length of palm, dactylus about 4.7 times longer than proximal depth, tapering distally to acute hooked tip, distal 0.67 of cutting edge sharp, entire, proximal 0.33 with small acute distal tooth and larger proximal tooth; fixed finger similar to dactylus, two proximal teeth rounded, arising at level opposite to dactylar teeth; carpus about 0.3 length of palm, slightly excavated distally, strongly tapered proximally, 1.5 times longer than distal width, with minute tubercles ventrally; merus about 0.7 length of palm, subcylindrical, about 4.4 times longer than deep, unarmed, flexor margin with sparse minute tubercles; ischium subequal to meral length, obliquely articulated with basis, somewhat compressed, slightly tapering proximally, about 3.9 times longer than distal width, flexor margin with several tubercles along entire length; basis robust, without special features; coxa with distoventral lobe.

Third pereopod with dactylus slender, curved, biunguiculate, about 0.2 of propodal length; unguis feebly demarcated from corpus, curved, about 0.5 length of dorsal

corpus, about 4.5 times longer than basal width, corpus about 2.1 times longer than basal width, dorsal margin convex, flexor margin concave with well developed acute distal accessory tooth extending to about 0.5 length of unguis, with medial and lateral distal sensory setae; propodus about 0.5 of carapace length, 10.0 times longer than central depth, with well developed single distoventral spine extending to about 0.5 length of dactylar corpus, pair of similar subdistoventral spines, and three shorter ventral spines at about 0.4, 0.7, 0.9 of propodal length, and small groups of simple distal setae; carpus about 0.5 of propodal length, with well developed distodorsal lobe, unarmed, slightly tapering proximally, about 4.5 times longer than distal width; merus subequal to propodus in length, about 8.5 times longer than distal width; ischium about 0.5 of propodal length; basis and coxa without special features. Fourth and fifth pereopods similar to third, fourth and fifth propodi 1.1 length of third propodus.

Uropod with protopod unarmed, distolaterally rounded, rami reaching slightly beyond level of distal end of telson; exopod about 0.6 of carapace length, 2.3 times longer than wide, lateral margin entire, feebly convex, with small acute distolateral tooth and slender mobile medial spine; endopod slightly shorter than exopod, about 3.2 times longer than wide.

Color.—Body and appendages whitish, covered with minute reddish spots; rostrum, scaphocerite, antennular peduncle, ventral part of first to fourth pleonal pleura and tail-fan light reddish-orange.

Etymology.—The specific name is given in honor of Dr. Peter K. L. Ng, the co-investigator of the “PANGLAO 2005” expedition.

Remarks.—*Periclimenes ngi* n. sp. belongs to the “*Periclimenes alcocki* species group” sensu Bruce (2005; 2006) and Li and Bruce (2006) that is characterized by the telson having more than two pairs of dorsolateral spines; the cornea of the eye being usually reduced; the dactylus of the major second chela being generally flanged and sometimes covered with small tubercles; and the ambulatory pereopods with the dactyli being biunguiculate. The armature of the ambulatory pereopodal propodus of the new species, which has single distoventral spine and a pair of subdistoventral spines, is unique in the “*P. alcocki* species group”. This new species is very close to *P. alcocki* Kemp, 1922 and *P. tangeroa* Bruce, 2005, sharing the following characters: rostrum not overreaching the scaphocerite; presence of spines on the distoventral and ventral margins of the propodi of the ambulatory pereopods; and telson with four pairs of dorsolateral spines. Nevertheless, it can be further distinguished from *P. alcocki* by the longer accessory tooth of the dactylus of the third pereopod that extends about 0.45 the length of the unguis (0.2 in *P. alcocki*, see Bruce, 1991a), and the hepatic spine situated distinctly anterior to the level of the epigastric tooth (at about same level of epigastric tooth in *P. alcocki*). The new species distinctly differs from *P. tangeroa* in having the longer accessory tooth of the dactylus of the third pereopod extending about 0.45 the length (0.08 in *P. tangeroa*) of unguis; longer rostrum extending almost to the same level of the tip of the

scaphocerite with more rostral teeth on ventral margin (in *P. tangeroa*, the rostrum does not reach the tip of the scaphocerite and there is only one ventral tooth on rostrum); more posteriorly situated epigastric tooth, which arises at anterior 0.33 (0.25 in *P. tangeroa*) of the carapace length; and longer uropod with the rami reaching slightly beyond (not exceeding in *P. tangeroa*) the level of the distal end of the telson.

***Periclimenes panglaonis* n. sp.**

Figs. 12, 13, 14A-D, 17E

Material Examined.—stn. CP 2332, 9°38.8'N, 123°45.9'E, 418-477 m, muddy, 22 May 2005, holotype ♀ (cl 5.5 mm) (NMCR).

Description.—Medium size subcylindrical body form of “*Periclimenes alcocki* species group”.

Rostrum well developed, shallow, compressed, horizontal, reaching distal scaphocerite, extending distinctly beyond antennular peduncle, about 0.8 of carapace length; dorsal margin very slightly concave; rostral formula 2 + 7/3, first seven dorsal teeth subequal, nearly evenly distributed, distal tooth very small, subapical, second posterior tooth situated just posterior to orbital margin; lateral carina feebly developed, continued with orbital margin posteriorly; ventral margin very slightly convex, three ventral teeth acute on distal 0.5; interdental spaces and proximal ventral carina feebly setose.

Carapace smooth, glabrous, with shallow short longitudinal grooves dorsally, posteriorly and ventrally to hepatic spine, respectively; orbit developed, inferior orbital angle strongly produced, distally rounded; anterolateral angle of carapace bluntly rounded; supraorbital spine absent; epigastric tooth with indistinct basal suture, situated at anterior 0.30 of carapace; antennal spine slender, marginal, acute, distinctly below inferior orbital angle, not exceeding inferior orbital angle; hepatic spine acute, stout at base, semi-erect, very slightly lower than, or almost at same level as antennal spine, slightly anterior to level of first dorsal rostral tooth.

Pleon smooth, glabrous; third pleomere not produced, non-carinate; pleura of first three pleomeres broadly rounded, fourth and fifth posteriorly produced, rounded, sixth pleomere subcylindrical, 0.4 of carapace length, 1.55 length of fifth pleomere, 1.7 times longer than deep, posterolateral angle acute, posteroventral angle blunt. Telson 0.6 of carapace length, 1.46 length of sixth pleomere, 4.1 times longer than anterior width, lateral margins with posterior 0.75 straight, convergent, posterior width 0.4 of anterior width; dorsal surface with four dorsolateral spines on right at 0.4, 0.6, 0.7, 0.9 of telsonal length and five dorsolateral spines on left at 0.4, 0.6, 0.7, 0.8, 0.9, spines about 0.04-0.05 of telsonal length; posterior margin of telson rounded, without median point, with three pairs of spines, lateral spines short, similar to dorsolateral spines, intermediate spines long, robust, 0.10 of telsonal length, submedian spines slender, 0.47 length of intermediate spine.

Eye small, with globular cornea, well pigmented, corneal diameter 0.14 of posterior orbital carapace length, without accessory pigment spot; stalk subcylindrical, 0.8 as long as

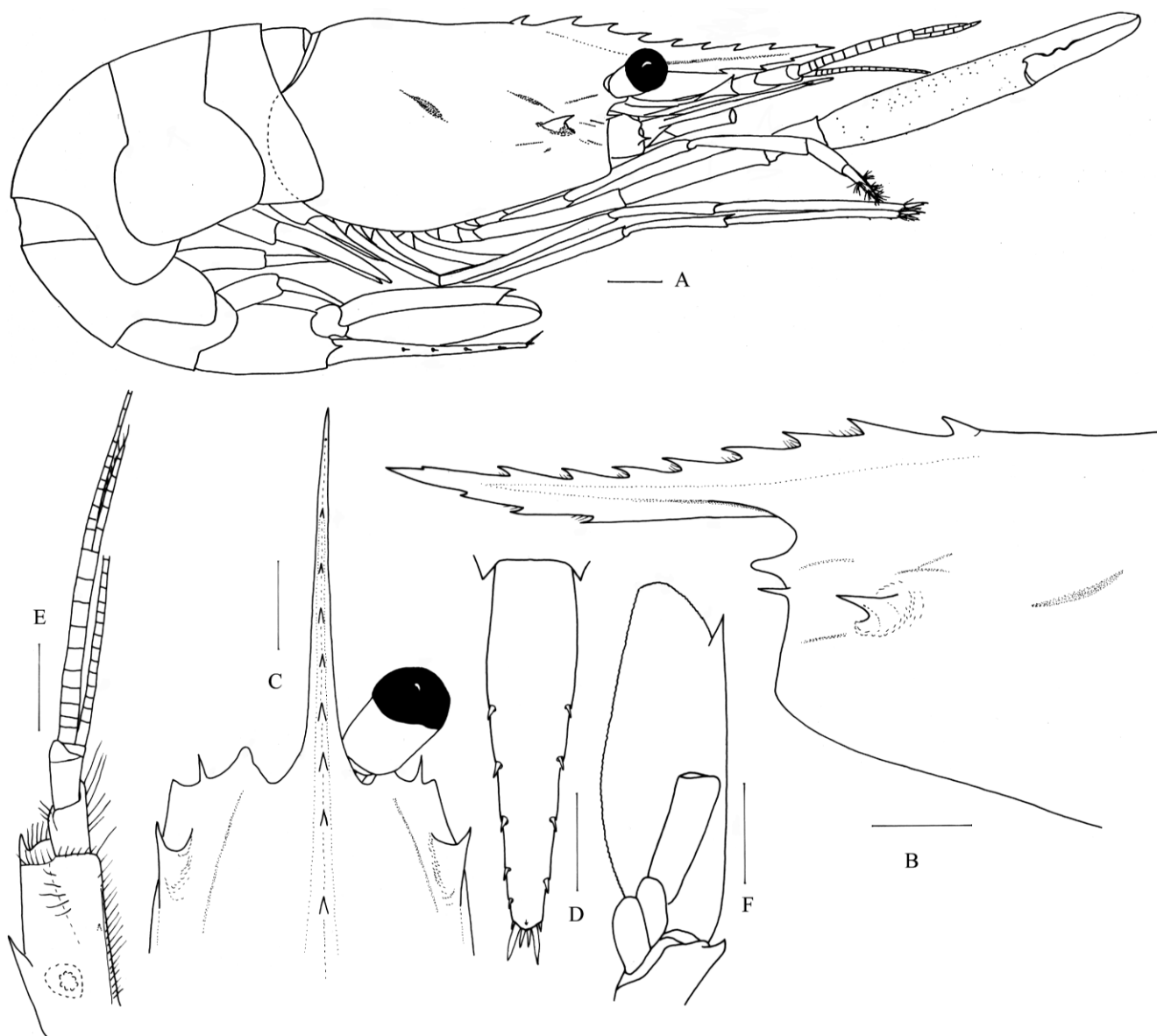


Fig. 12. *Periclimenes panglaonis* n. sp., holotype ♀ (cl 5.47 mm), stn. CP 2332. A, body, lateral; B, anterior part of carapace, lateral; C, same, with right eye, dorsal; D, telson, dorsal; E, left antennule, dorsal; F, left antenna, ventral. Scales = 1 mm.

corneal diameter, feebly compressed, width subequal to corneal diameter.

Antennular peduncle overreaching distal ventral rostral tooth. Proximal segment with intermediate length 0.3 of carapace length, 1.8 times longer than central width; stylocerite slender, acute, reaching to 0.5 of intermediate length; anterolateral margin produced, reaching to middle of dorsal length of intermediate segment, setose; distolateral tooth long, slender, acute, overreaching anterolateral margin; medial margin setose, ventromedial tooth at 0.5 of medial length. Intermediate segment with dorsal length 0.3 length of proximal segment, 1.2 of maximal width; lateral margin expanded, setose; medial margin setose. Distal segment about 0.4 length of proximal segment, 1.8 times longer than distal width. Upper flagellum biramous, with ten proximal segments of rami fused, fused portion 0.4 of carapace length; shorter free ramus with six segments, 0.6

length of fused portion, whole shorter free ramus and fused portion with about 25 groups of aesthetascs; longer ramus slender, filiform, more than 2.1 length of fused portion; lower flagellum slender, filiform.

Antennal basis robust, with acute distolateral tooth; carpus subcylindrical, compressed, extending to 0.5 length of scaphocerite, 3.2 times longer than distal width; flagellum lost; scaphocerite well developed, 0.6 of carapace length, broad, 2.9 times longer than maximum width, greatest width at about 0.4 of length, distal margin bluntly rounded, distinctly exceeding distolateral tooth, lateral margin nearly straight, with strong acute distolateral tooth.

Epistome unarmed. Fourth thoracic sternite without slender median process; posterior sternites unarmed.

Mouthparts described based on left side. Mandible normal, without palp; molar process distally with four blunt teeth, three groups of dense setae; incisor process obliquely

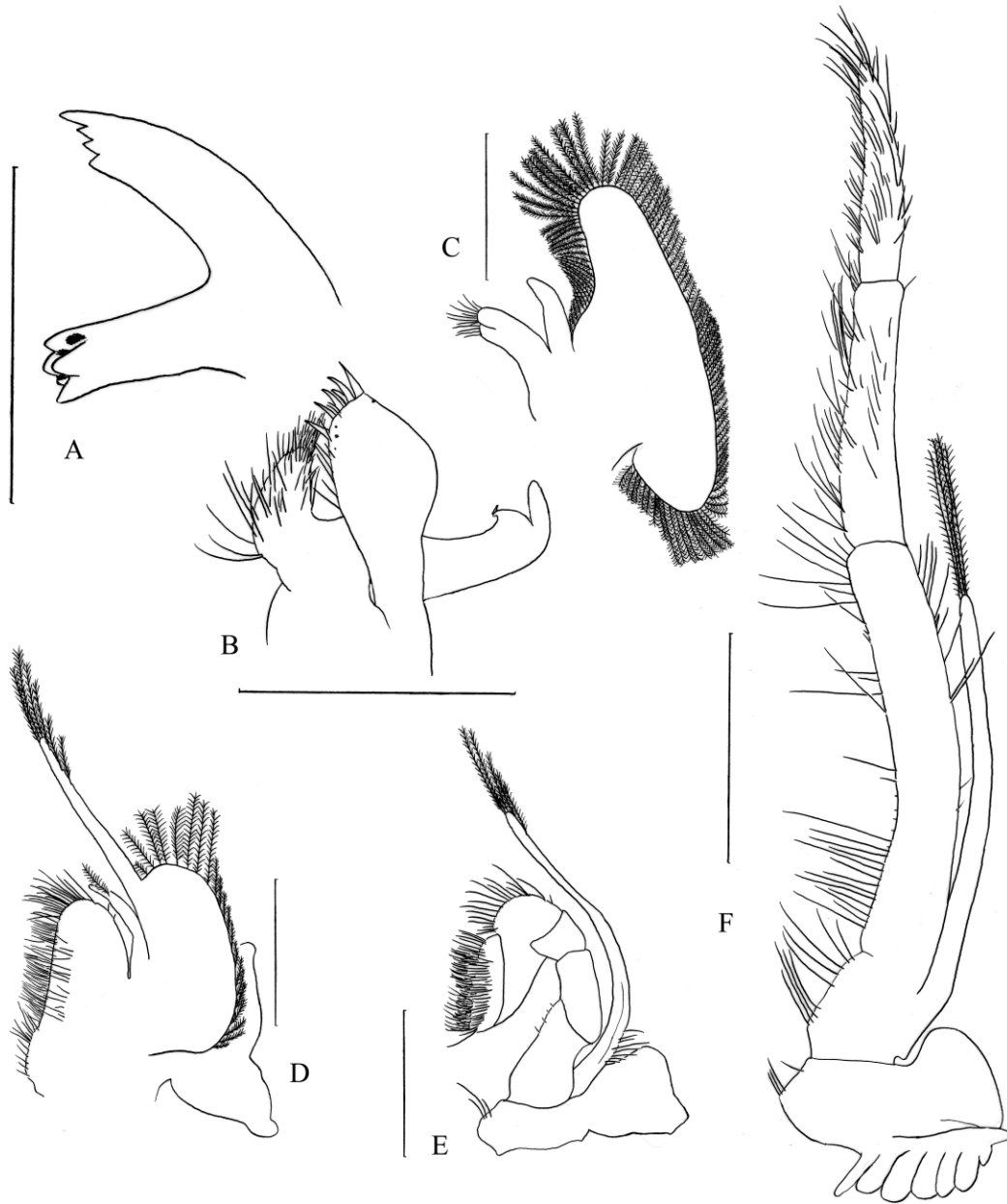


Fig. 13. *Periclimenes panglaonis* n. sp., holotype ♀ (cl 5.5 mm), stn. CP 2332. A, left mandible; B, left maxillule; C, left maxilla; D, left first maxilliped; E, left second maxilliped; F, left third maxilliped. Scales = 1 mm.

truncate distally with four triangular teeth, lateral teeth somewhat larger than medial teeth. Maxillule with bilobed palp, upper lobe well developed, overreaching lower lobe, lower lobe with short hooked apical seta; upper lacinia with nine stout spines and several setae; lower lacinia slender, tapering, with dense spiniform setae. Maxilla with palp simple, bent medially; basal endite with about distal 0.20 bilobed, width of distal lobe about 1.3 of basal lobe width, each with distal setae; coxal endite obsolete, medial margin somewhat convex; scaphognathite large, broad, anterior lobe with medial margin concave, posterior lobe broadly rounded. First maxilliped with palp elongated, with sub-apical plumose seta; basal endite rounded, with distal and medial margins setose; coxal endite medially convex, medial margin setose; long exopodal flagellum with long

plumose setae on apex and distolateral margin, caridean lobe large, broadly fringed with plumose setae; epipod large, bilobed. Second maxilliped with normal endopod, dactylar segment narrow, with multiple rows of serrulate spines medially, propodal segment large, distomedial margin with several spinulate setae, upper margin and distomedial surface with some long setae; carpus, ischiomerus and basis normal, coxa produced medially, with few setae; exopod well developed, with plumose setae on distal margin and proximal part; epipod large, subrectangular; podobranch absent. Third maxilliped with slender endopod, extending distally to 0.67 length of carpus, ischiomerus and basis incompletely fused, ischiomerus portion curved medially, basal portion slightly expanded medially, combined segment compressed, 0.4 of carapace length, 7.6 times longer

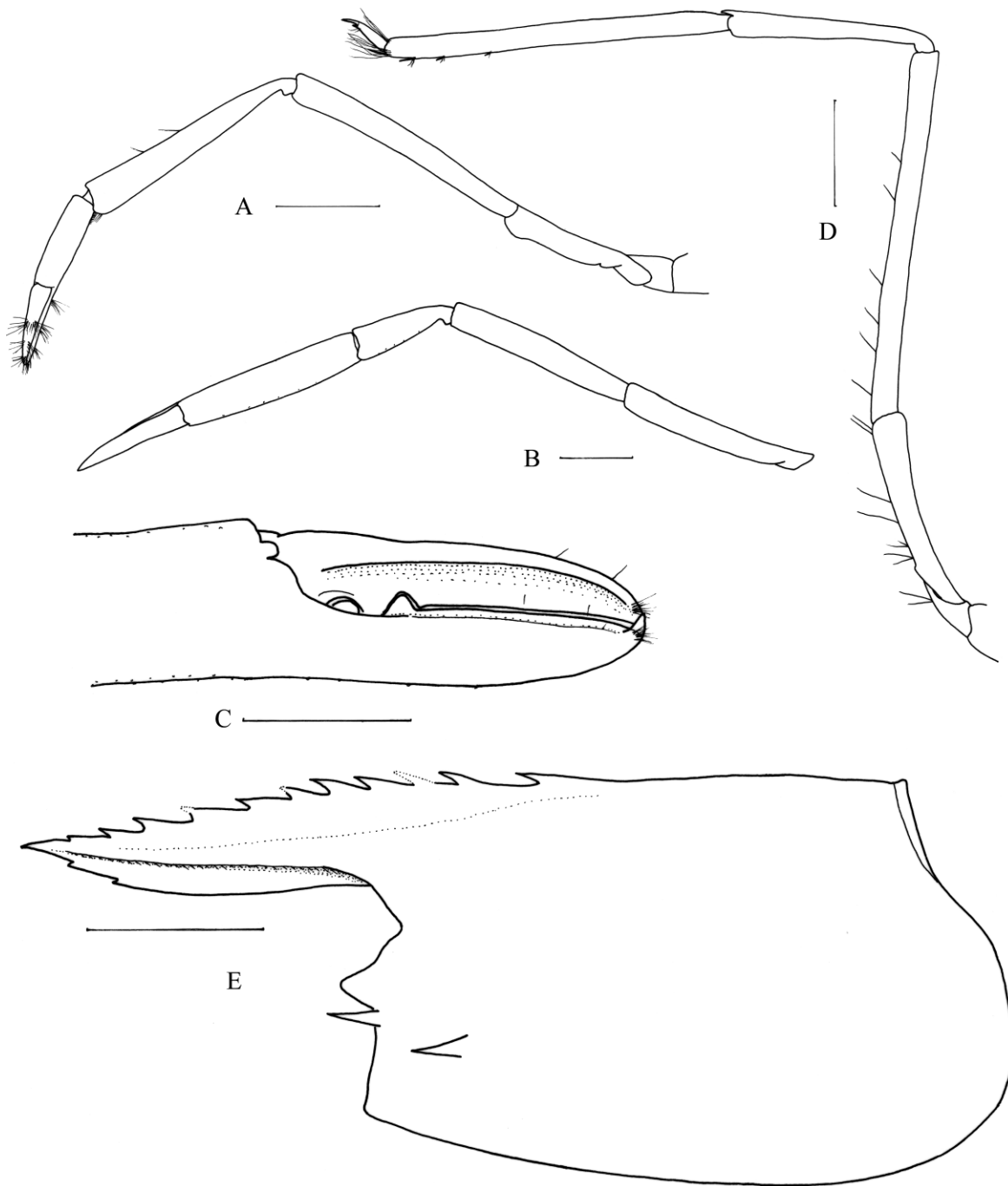


Fig. 14. A-D: *Periclimenes panglaonis* n. sp., holotype ♀ (cl 5.5 mm), stn. CP 2332: A, left first pereiopod, ventral; B, left minor second pereiopod, ventral; C, distal part of chela of right major second pereiopod, mesial; D, left third pereiopod, lateral. E: *Periclimenes* sp., ♀ (cl 2.9 mm), stn. CP 2359, carapace, lateral. Scales = 1 mm.

than central width, setose medially and laterally; intermediate segment 0.5 length of combined proximal segment, 5.1 times longer than proximal width, with several groups of long finely serrulate spiniform setae medially; terminal segment 0.4 length of combined proximal segment, tapering distally, 5.4 times longer than proximal width, with several transverse groups of ventromedial spiniform setae and long distal spiniform setae; exopod with slender flagellum extending to 0.9 length of combined segment, with four

distal and three subdistal plumose setae; arthrobranch well developed.

First pereiopods moderately slender, exceeding carpus by length of chela and distal 0.6-0.7 of carpus, exceeding scaphocerite by fingers and distal 0.5 of palm; chela with palm subcylindrical, slightly compressed, 0.2 of carapace length, 2.5 times longer than wide, at about proximal 0.3 of length of palm with seven transverse rows of short cleaning setae proximoventrally; fingers subequal to palm, tapering

distally, surrounded by palisade of long setae medially and laterally, cutting edges sharp, entire, tips hooked, dactylus 5.8 of proximal width, fixed finger slightly stouter than dactylus; carpus 2.4 length of palm, slightly tapering proximally, 6.7 times longer than distal width, with seven to nine obliquely ranged serrulate cleaning setae distoventrally; merus 2.7 length of palm, 9.3 times longer than distal width; ischium 1.3 length of chela, carinate distoventrally, 3.4 times longer than distal depth. Basis and coxa with medially grouped setae.

Second pereopods slender, major (right) exceeding scaphocerite by length of chela, exceeding carpus by lengths of chela, carpus and distal 0.18 of merus; chela with palm subcylindrical, 0.7 of carapace length, 4.5 times longer than wide, with sparse fine tubercles; fingers articulated laterally on palm, 0.6 length of palm, tips hooked, distal 0.6 of cutting edges entire, sharp, proximal 0.4 of cutting edge with two or three rounded teeth respectively on dactylus and fixed finger, teeth on dactylus and fixed finger intercrossed when fingers closed, dactylus with intermediate tooth largest, distal tooth low, fixed finger with distal tooth larger than proximal tooth; dactylus with distinct longitudinal lateral flange, fixed finger stouter than dactylus, lateral flange feeble; carpus short, cup-like, 0.2 length of palm, 1.5 of distal width, with scattered small tubercles on flexor surface; merus 0.7 length of palm, 5.9 times longer than deep, with scattered small tubercles on flexor surface; ischium subequal to merus, compressed, 5.6 times longer than deep; basis and coxa normal. Minor (left) second pereopod exceeding scaphocerite by length of fingers and distal 0.6 of palm, exceeding carpus by length of chela and distal 0.67 of carpus; chela with palm 0.6 of major palm, 4.4 times longer than distal width, with sparse tubercles, fingers 0.7 length of palm, tips hooked, curved, cutting edges entire, sharp, unarmed; carpus not cup-like, 0.6 length of palm, slightly tapering proximally, 3.3 times longer than distal width, with occasional fine tubercles on flexor surface; merus subequal to palm, distally subcylindrical, gradually compressed proximally, 6.6 times longer than distal width; ischium as long as palm, compressed, 6.8 times longer than distal depth.

Ambulatory pereopods moderately slender. Third pereopod exceeding carpus by lengths of dactylus, propodus, and distal 0.3 of carpus, exceeding scaphocerite by dactylus and distal 0.5 of propodus; dactylus compressed, curved, biunguiculate, 0.2 of propodal length, unguis distinct, 0.6 of dorsal length of corpus; corpus 2.8 times longer than proximal depth, dorsal margin feebly convex, non-setulose, flexor margin straight, acute distal accessory tooth extending to 0.3 length of unguis, with two distolateral sensory setae; propodus 0.6 of carapace length, slightly compressed, 16 times longer than deep, with long, slender simple distoventral spine, distal 0.33 of flexor margin with three single spines accompanied with transverse row of long, curved setae, number of setae of distoventral row more than posterior rows, setae of distoventral row extending to near tip of dactylus, propodus with subdistal lateral and medial rows of long, curved setae and distodorsal row of long setae; carpus 0.6 of propodal length, distally subcylindrical, gradually depressed proximally, 7.9 times longer than distal

width, distodorsal lobe distinct; merus 1.1 of propodal length, slightly depressed distally, gradually compressed proximally, 14 times longer than central depth, unarmed distoventrally; ischium 0.6 of propodal length, slightly compressed, slightly tapering proximally, 6.1 times longer than distal depth; basis and coxa without special features. Fourth and fifth pereopods similar to third, fourth propodus 1.0, fifth propodus 1.1 length of third propodus; fifth exceeding carpus by dactylus and distal 0.8 of propodus.

Uropods distinctly exceeding telson, reaching near tip of intermediate posterior telsonal spine; protopodite with posterolateral angle rounded; exopod broad, 0.7 of carapace length, 3.1 times longer than central width, lateral margin distinctly convex, right uropodal exopod with small acute distal tooth and very slender mobile medial spine, left uropodal exopod with strong tooth, without mobile spine; endopod narrow, 0.9 of exopodal length, 4.0 times longer than central width.

Color.—Body and appendages covered with fine red spots or small stripes on white background, rostrum, tail-fan and parts of pereopods translucent to semi-translucent.

Etymology.—The specific name is given based on the type locality of the Panglao, Philippines.

Remarks.—*Periclimenes panglaonis* sp. nov. is very close to *P. loyautensis* Li and Bruce, 2006 in the “*Periclimenes alcocki* species group” sharing the following features: rostrum extends distinctly beyond the antennular peduncle; hepatic spine is situated at the same level as the antennal spine; cornea is reduced but not markedly so, the diameter is 0.13–0.14 of the carapace length; dorsal telsonal spines are not minute, 0.04–0.05 times as long as the telsonal length. *Periclimenes panglaonis* sp. nov. can be easily distinguished from *P. loyautensis* by the hepatic spine, being somewhat erect and with a very stout base (in *P. loyautensis*, the base of hepatic spine is not erect and the base is normally thin); the long rostrum, which extends to the distal margin of the scaphocerite (the rostrum does not extend to the distal margin of the scaphocerite in *P. loyautensis*); the fingers of the first pereopod, which are subequal to the palm (distinctly shorter than the palm in *P. loyautensis*); and uropod reaching near to the tip of intermediate posterior telsonal spine (distinctly exceeding the distal end of intermediate posterior telsonal spine in *P. loyautensis*).

Recently, Li and Bruce (2006) presented a key to species of the “*Periclimenes alcocki* species group”. Bruce (2006) added one new species of the species group, *P. manihine* Bruce, 2006. With the discovery of two additional new species, the “*Periclimenes alcocki* species group” now contains at least 14 valid species. A key to distinguish the 14 described species of the species group is given as a modification of the key of Li and Bruce (2006).

Key to the species of *Periclimenes alcocki* species group

1. Telson with seven pairs of dorsolateral spines; rostrum overreaching scaphocerite; third pereopod with dactylus truncate subdistally,

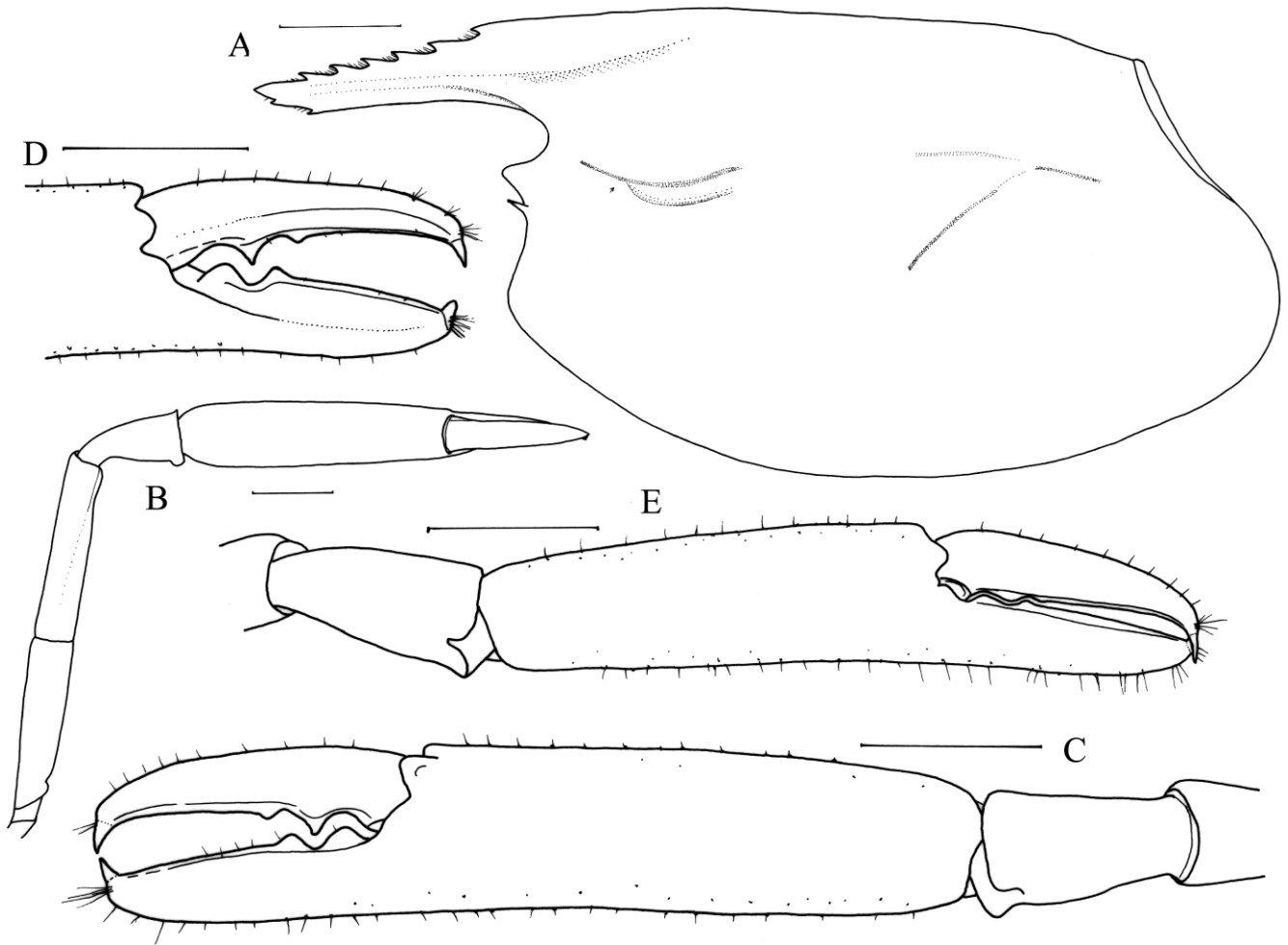


Fig. 15. *Plesiopontonia monodi* Bruce, 1985, ♀ (cl 5.3 mm), stn. CP 2392. A, carapace, lateral; B, right major second pereiopod, ventral; C, same, chela, carpus and distal part of merus, lateral; D, same, distal part of chela, mesial; E, left minor second pereiopod, chela, carpus and distal part of merus, lateral. Scales = 1 mm.

- | | | |
|--|--|--------------------------------|
| propodus without spinules on flexor margin; R. 2-3 + 7/4-5 | – Propodus of ambulatory pereiopod with distoventral and ventral spines | 6 |
| – Telson with three to five pairs of dorsolateral spines | 6. Accessory tooth of dactylus of third pereiopod about 0.45 length of unguis; R. 2 + 7-8/3 | <i>P. ngi</i> n. sp. |
| 2. Telson with three pairs of dorsolateral spines; rostrum not overreaching scaphocerite; corneal diameter about 0.12 of carapace length, eye-stalk not distinctly narrower than cornea; dorsal rostral margin concave; propodus of third pereiopod with spinules along flexor margin, rows of transverse setae distally and pairs of distoventral and sub-distoventral spines; R. 1 + 7/3 | – Accessory tooth of dactylus of third pereiopod 0.08-0.20 length of unguis | 7 |
| – Telson with four to five pairs of dorsolateral spines | 7. Corneal diameter less than 0.08 of carapace length; hepatic spine at about same level as posterior rostral series (epigastric) tooth; dactylus of third pereiopod 0.17 of propodal length, accessory tooth about 0.20 length of unguis; dorsolateral telsonal spines minute, about 0.03 telsonal length; R. 2 + 6-8/2-4 (1 + 9/3) | <i>P. alcocki</i> Kemp, 1922 |
| 3. Rostrum overreaching scaphocerite; hepatic spine normal; corneal diameter about 0.16 of carapace length; dorsal rostral margin concave; propodus of third pereiopod with pair of distoventral spines and four spinules on flexor margin; R. 3 + 6/4 | – Corneal diameter about 0.10 of carapace length; hepatic spine anterior to level of posterior rostral series (epigastric) tooth; dactylus of third pereiopod about 0.28 of propodal length, accessory tooth about 0.07 length of unguis; dorsal telsonal spines minute, about 0.04 telsonal length; R. 1 + 7/1 | <i>P. tangeroa</i> Bruce, 2005 |
| – | 8. Ambulatory dactylus with accessory tooth almost as long as unguis, laterally twisted; R. 1 + 7-9/2-3 | <i>P. poupini</i> Bruce, 1990 |
| 4. Cornea markedly reduced, diameter about 0.10 of carapace length; dorsal telsonal spines minute | – Ambulatory dactylus with accessory tooth not unusually long or twisted | 9 |
| – Cornea not markedly reduced, diameter more than 0.13 of carapace length; dorsal telsonal spines not minute | 9. Rostrum distinctly exceeding antennular peduncle | 10 |
| 5. Propodus of ambulatory pereiopod without distoventral or ventral spines, dactylus with accessory tooth minute, at most 0.11 length of unguis; rostrum relatively deep, distally with strong upward curve; dorsal telsonal spines relatively large, 0.045 of telsonal length; R. 1-2 + 7/2 | – Rostrum not reaching end of antennular peduncle; pigmented cornea large, diameter about 0.16-0.18 of carapace length | 12 |
| – | 10. Hepatic spine distinctly lower than antennal spine; R. 1-2 + 5-9/3-4 | <i>P. aleator</i> Bruce, 1991a |
| – | | |



Fig. 16. A, *Palaemonella* sp., ♂ (cl 2.8 mm), stn. DW 2376. B-D, *Periclimenes boucheti* n. sp.: B, holotype ovig. ♀ (cl 6.8 mm), stn. CA 2373; C, paratype ♂ (parasitized by rhizocephalan) (cl 7.2 mm), stn. CA 2373; D, additional material ovig. ♀ (cl 10.2 mm), stn. CA2381. E, *Periclimenes dentidactylus* Bruce, 1984, ♂ (cl 6.0 mm), stn. CP 2362. F-H, *Periclimenes hertwigi* Balss, 1913: F, ♂ (cl 7.1 mm), stn. CA 2343; G, H, ♂ (cl 6.7 mm), stn. CP 2337.



Fig. 17. A, *Periclimenes laccadivensis* (Alcock and Anderson, 1894), ovig. ♀ (cl 4.2 mm), stn. CP 2359. B, *Periclimenes leptunguis* n. sp., holotype ovig. ♀ (cl 8.1 mm), stn. CP 2359. C-D, *Periclimenes ngi* n. sp.: C, holotype ♀ (cl 7.3 mm), stn. CP 2343; D, paratype ♀ (cl 7.3 mm), stn. CP 2381. E, *Periclimenes panglaonis* n. sp., holotype ♀ (cl 5.5 mm), stn. CP 2332. F, *Periclimenes* sp., ♀ (cl 2.9 mm), stn. CP 2359.

- Hepatic spine very slightly lower than, almost at same level of antennal spine; R. 2 + 6-7/3. 11
- 11. Hepatic spine normal; rostral teeth deep
- *P. loyautensis* Li and Bruce, 2006
- Hepatic spine with very stout base; rostral teeth shallow
- *P. panglaonis* n. sp.
- 12. Rostrum shallow, proximally elevated over orbital region, tapered distally, ventral margin straight, with one tooth; ambulatory dactylus with accessory tooth reaching about proximal 0.4 length of unguis; R. 2-3 + 5-6/1
- *P. forgesi* Li and Bruce, 2006
- Rostrum deep, proximally not elevated over orbital region
- 13
- 13. Rostrum markedly tapering distally, without postorbital rostral teeth, carpus of first pereiopod short, distinctly shorter than chela and merus, fixed finger of major second pereiopod feebly bidentate; R. 1 + 5-6/2
- *P. brevirostris* Bruce, 1991a
- Rostrum not strongly tapering distally, with 1-2 postorbital rostral teeth, carpus of first pereiopod long, distinctly longer than chela,

subequal to merus, fixed fingers of both second pereiopods deeply bidentate distally; R. 2 + 5-7/1-2

..... *P. manihine* Bruce, 2006

Periclimenes sp.
Figs. 14E, 17F

Material Examined.—stn. CP 2359, 8°49.9'N, 123°34.9'E, 437-443 m, sandy, 26 May 2005, 1 ♀ (cl 2.9 mm) (NTOU).

Color.—Body semi-translucent, covered with small reddish spots, somewhat pinkish; rostral mid rib, antennular peduncle, antenna and uropods reddish, bases of pleopods, bases of uropods and telson light orange; pereiopods semi-translucent. Distal parts of merus and ischium of pereiopods each with pale reddish band.

Remarks.—The specimen is partly damaged and right first and second pereopods are lacking, chela of left second pereopod is broken and the distal part is missing, distal 0.5 of telson is lost but the general morphology leads us to identify the specimen to the genus *Periclimenes*. The small specimen can be determined as matured female from the developed ovary that can be seen through the dorsal surface of the carapace in this preserved specimen. The rostrum is very deep, with well developed and very sharp lateral carinae and relatively numerous dorsal teeth (3 + 8); the ambulatory pereopods are slender, the propodus of the third pereopod is about 18 times longer than deep, the dactylus is simple, very slender and elongate, about 0.3 of the propodal length, 7.0 times longer than its proximal depth, the flexor margin is sinuous. It may represent an undescribed species similar to other deep water *Periclimenes* spp.; however, more and complete specimens are needed to determine its taxonomic position.

Plesiopontonia monodi Bruce, 1985

Fig. 15

Plesiopontonia monodi Bruce, 1985: 250, figs. 15-17.—Chace and Bruce, 1993: 128.

Material Examined.—stn. CP 2392, 9°30.1'N, 123°43.4'E, 242-436 m, sandy/muddy, 30 May 2005, 1 ♀ (cl 5.3 mm) (NTOU).

Color.—Unknown.

Distribution.—Type locality: Balayan Bay, Philippines. Also known now from Panglao, Philippines; 242-436 m.

Remarks.—The single female specimen agrees very well with the original description of the species based on the sole male holotype from Balayan Bay, Luzon, Philippines (Bruce, 1985), except for the large body size and one additional dorsal rostral tooth. The species had been reported only from the type locality and the present specimen is the second record of the species and the genus. The holotypic specimen lacked the left second pereopod and it had been unclear from the characters of the right second pereopod whether the second pereopods were similar and subequal or not. The second pereopods of the present specimen are subequal in shape and they extend beyond the carpus by the length of chela and the distal 0.5 of the carpus, beyond the tip of the scaphocerite by the length of fingers and the distal 0.8 of the palm. The chelae are covered with sparse fine tubercles and short setae, and the fingers each have a subdistal cluster of long setae. The chela of right second pereopod is slightly larger than the left, 1.2 times as long and slightly more robust with the teeth on the cutting edges of the fingers stronger than those of the left chela.

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REFERENCES

- Alcock, A., and A. R. Anderson. 1894. Natural History notes from H. M. Indian Marine Survey Steamer "Investigator", commander C. F. Oldham, R. N., commanding. Series II, no. 14: An account of a recent collection of deep sea Crustacea from the Bay of Bengal and Laccadive Sea. *Journal Asiatic Society of Bengal* (2) 63: 141-185.
- Balss, H. 1913. Diagnosen neuer ostasiatischer Macruren. *Zoologischer Anzeiger* 42: 234-239.
- . 1914. Ostasiatische Decapoden, II: Die Natantia und Reptantia Dekapoden, part 7 in volume 2 of Beiträge zur Naturgeschichte Ostasiens. *Abhandlungen der Bayerischen Akademie der Wissenschaften*, München, ed. F. Doflein. Vol. supplement 2, 10: 1-101.
- Borradaile, L. A. 1898. A revision of the Pontoniidae. *Annals and Magazine of Natural History* (7) 2: 376-391.
- . 1915. Notes on Carides. *Annals and Magazine of Natural History* (8) 15: 205-213.
- Bruce, A. J. 1967. Notes on some Indo-Pacific Pontoniinae, III-IX: descriptions of some new genera and species from the western Indian Ocean and the South China Sea. *Zoologische Verhandlungen* 87: 1-73.
- . 1972. *Filophryxus dorsalis* gen. nov., sp. nov., an unusual popyrid parasite from eastern Australia. *Parasitology* 65: 351-358.
- . 1981. Decapod Crustacea: Pontoniinae. In, *Résultats des campagnes MUSORSTOM, I: Philippines (18-28 Mars 1976)*. *Mémoires ORSTOM* 91: 189-215.
- . 1983. The pontoniine shrimp fauna of Australia. *Australian Museum Memoir* 18: 195-218.
- . 1984. *Periclimenes dentidactylus*, a new deep water pontoniine shrimp from Makassar Strait, Indonesia. *Marine Research Indonesia* 24: 7-17.
- . 1985. Decapod Crustacea: Pontoniinae (MUSORSTOM II). In, *Résultats des campagnes MUSORSTOM, I et II. Philippines, Tome 2. Mémoires du Muséum national d'Histoire naturelle* 133: 229-260.
- . 1990. Crustacea Decapoda: Deep-sea palaemonoid shrimps from New Caledonian Waters. In, A. Crosnier (ed.), *Résultats des Campagnes MUSORSTOM, Vol. 6, Mémoires du Muséum national d'Histoire naturelle, A, Zoologie* 145: 149-215.
- . 1991a. Crustacea Decapoda: Further deep-sea palaemonoid shrimps from New Caledonian waters. In, A. Crosnier (ed.), *Résultats des Campagnes MUSORSTOM Vol. 9. Mémoires du Muséum national d'Histoire naturelle, A, Zoologie* 152: 299-411.
- . 1991b. Shallow-water palaemonoid shrimps from New Caledonia (Crustacea: Decapoda). In, B. Richer de Forges (ed.), *Le benthos des fonds meubles des lagons de Nouvelle-Calédonie, Vol. 1. Études et Thèses; Paris, ORSTOM*: 211-279.
- . 1992. Two New Species of *Periclimenes* (Crustacea: Decapoda: Palaemonidae) from Lizard Island, Queensland, with Notes on Some Related Taxa. *Records of the Australian Museum* 44: 45-84.
- . 2005. Pontoniine shrimps from the 2003 NORFANZ Expedition, 10-May-16 June (Crustacea: Decapoda: Palaemonidae). *Zootaxa* 981: 1-20.
- . 2006. *Periclimenes manihine* sp. nov., a new pontoniine shrimp of the *P. alcocki* species group (Crustacea: Decapoda: Palaemonidae). *Zootaxa* 1309: 45-54.
- Chace, F. A. Jr., and A. J. Bruce. 1993. The caridean shrimps (Crustacea: Decapoda) of the Albatross Philippine Expedition 1907-1910, Part 6: Superfamily Palaemonoidea. *Smithsonian Contributions to Zoology* 543: 1-152.
- Debelius, H. 1999. *Crustacea Guide Of The World*. IKAN-Unterwasserarchiv, Frankfurt. 321 pp.

- Hayashi, K.-I. 1986. In: Japan Fisheries Resource Conservation Association. In, K. Baba, K.-I. Hayashi, and M. Toriyama (eds.), Decapod Crustaceans from Continental Shelf and Slope Around Japan. Tokyo. 336 pp.
- , and J. Ohtomi. 2001. A new species of the genus *Periclimenes* (Decapoda: Caridea: Palaemonidae) collected from hydrothermal vent fields in Kagoshima Bay, Japan. *Crustacean Research* 30: 160-171.
- Holthuis, L. B. 1952. The Decapoda of the Siboga Expedition, part XI: The Palaemonidae collected by the Siboga and Snellius expeditions with remarks on other species, part II. Subfamily Pontoniinae. Siboga-Expeditie. Vol. 39a10. Los Angeles, California. 254 pp.
- Kemp, S. 1922. Notes on Crustacea Decapoda in the Indian Museum, XV: Pontoniinae. *Records of the Indian Museum* 24: 113-288.
- Kobayashi, Y. 2000. Living organisms from Seashore. Tokyo: Yama-Kei Publishers Co., Ltd. 281 pp.
- Li, X. 2000. Catalog of the Genera and Species of Pontoniinae Kingsley, 1878. Xueyuan Press, Beijing. 319 pp.
- , and A. J. Bruce. 2006. Further Indo-West Pacific palaemonoid shrimps (Crustacea: Decapoda: Palaemonoidea), principally from the New Caledonian region. *Journal of Natural History* 40: 611-738.
- Maihara, Y., and K. Suzuki. 1993. Ecological notes on the caridean shrimp, *Tuleariocaris zanzibarica* Bruce, as a symbiont of the long-spined sea urchins in Suruga Bay, Central Japan. *Bulletin of Institute of Oceanic Research and Development, Tokai University* 14: 71-81.
- Mitsuhashi, M., and T.-Y. Chan. 2006. A new genus and species of deep-water pontoniine shrimp (Decapoda: Caridea: Palaemonidae) from Taiwan. *Zoosystema* 28: 389-398.
- Minemizu, R. 2000. Marine decapod and stomatopod crustaceans mainly from Japan. Bun-ichi Co., Ltd., Tokyo. 344 pp.
- Nobili, G. 1904. Diagnoses préliminaires de vingt-huit espèces nouvelles de Stomatopodes et Décapodes Macroures de la mer Rouge. *Bulletin du Muséum d'Histoire Naturelle* 10: 288-238.
- Okuno, J. 1999. *Palaemonella hachijo*, a new species of shrimp (Crustacea: Decapoda: Palaemonidae) from a submarine cave in southern Japan. *Proceedings of the Biological Society of Washington* 112: 739-745.
- . 2000. Additional specimens of *Palaemonella hachijo* Okuno, 1999 (Decapoda, Caridea, Palaemonidae). *Crustaceana* 73: 1297-1299.
- Yokoya, Y. 1936. Some rare and new species of Decapod Crustaceans found in the vicinity of the Misaki Marine Biological Station. *Japanese Journal of Zoology* 7: 129-146.

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