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Crustacea Decapoda : Further deep-sea Palaemonoid shrimps from New Caledonian waters

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ABSTRACT

A small collection of palaemonoid shrimps, mainly Pontoniinae, from New Caledonian waters of over 100 m depth, has been studied and found to represent 27 taxa, including eight new species of *Periclimenes*, one new species of both *Periclimenaeus* and *Mesopontonia*, and three specimens, including a single ovigerous female, representing a new genus, *Amphipontonia kanak*. Seven species were recorded from New Caledonian waters for the first time. The species of *Periclimenaeus*, from 370-450 m, represents the greatest depth from which this mainly shallow-water genus has been reported. Two species, a *Periclimenes* and a *Mesopontonia*, both new, were found together in association with a hexactinellid sponge host, *Phoronema* sp., the first reported association of pontoniine shrimps with a hexactinellid host. Another new *Periclimenes*, with a remarkable pectinate ambulatory dactylus, is also possibly associated with the "living fossil" crinoid, *Gymnocrinus richeri*.

The present study increases to 57 the number of palaemonoid shrimps known from Indo-West Pacific marine waters exceeding 100 m depth, and clearly indicates that these shrimps are quite well represented in deeper tropical seas. A list of the Indo-West Pacific palaemonoid shrimps known from over 100 m depth, with a new key to the deep-water Indo-West Pacific species of the genus *Periclimenes* is provided.

RÉSUMÉ

Crustacea Decapoda : Nouvelles récoltes de crevettes Palaemonides des eaux profondes de la Nouvelle-Calédonie.

Une petite collection de crevettes Palaemonides, surtout des Pontoniinae, provenant des eaux de Nouvelle-Calédonie, à plus de 100 mètres de profondeur, a été étudiée. Vingt-sept espèces y sont représentées. Huit nouvelles espèces de *Periclimenes*, une de *Periclimenaeus* et une de *Mesopontonia* sont décrites. Un genre et une espèce nouveaux, *Amphipontonia kanak*, représentés par trois spécimens dont une femelle ovigère, sont également décrits. Sept espèces déjà décrites sont signalées pour la première fois dans les eaux de Nouvelle-Calédonie. Le *Periclimenaeus* a été récolté

entre 370-450 m; ce genre n'avait pas encore été trouvé à de si grandes profondeurs. Deux espèces nouvelles, un *Periclimenes* et une *Mesopontonia*, ont été récoltées en association avec une éponge hexactinellide; c'est la première fois qu'une telle association est observée parmi les crevettes pontoniines. Un autre *Periclimenes*, caractérisé par des dactyles ambulatoires remarquables, vit peut-être en association avec le crinoïde *Gymnocrinus richeri*, véritable "fossile vivant".

La présente étude porte à 57 le nombre des crevettes palaemonides connues des eaux de l'Indo-Ouest-Pacifique de plus de 100 mètres de profondeur et indique clairement que ces crevettes sont bien représentées dans ces eaux. Une liste de ces crevettes est donnée et une nouvelle clé est proposée pour les *Periclimenes* indo-ouest-pacifiques d'eau profonde.

INTRODUCTION

A previous report (BRUCE, 1990b) indicated the presence of 33 species of Indo-West Pacific Palaemonoid shrimp, representatives of eleven genera, in waters of over 100 m depth. Since then three further deep-water species of *Periclimenes* have been reported (BRUCE, 1989b, 1990a, in press a). The present report provides data on a further 14 species which are now added to the deep-water pontoniine fauna. The present collection of 27 species, includes specimens of *Palaemonella dolichodactylus*, *Periclimenes tenuirostris* and *Anchistus pectinis*, not previously known from over 100 m depths. Also included are one new genus, *Amphipontonia*, and new species of the following genera, *Periclimenes* (8 spp.), *Periclimenaeus* (1 sp.), and *Mesopontonia* (1 sp.). Seven species are now recorded for the first time from New Caledonian waters. The present study has now increased the known number of deep-water Palaemonoid shrimps to 57, with 39 species of eight genera known with certainty from depths of 200 m or more.

The specimens were obtained principally by the benthic operations of the following expeditions : CHALCAL 1 (1984), Chesterfield Islands; BIOCAL (1985), Isle of Pines and Loyalty Islands; MUSORSTOM 4 (1985), New Caledonia; MUSORSTOM 5 (1986), Lord Howe Ridge; CHALCAL 2 (1986), Norfolk Ridge; MUSORSTOM 6 (1989), Loyalty Islands Ridge; SMIB 5 (1989), Norfolk Ridge and CALSUB (1989), Isle of Pines and Loyalty Islands. Full details of the first six expeditions are reported in RICHER DE FORGES (1990) and of the last two in ANONYMOUS (1989) and in GRANDPERRIN & RICHER DE FORGES (1989) respectively.

Specimens held in the collections of the Muséum national d'Histoire naturelle, Paris are designated by the MNHN-Na catalogue numbers. Specimens donated to the Northern Territory Museum, Darwin, are indicated by NTM Cr. numbers. Carapace length refers to the postorbital carapace length.

SPECIES LIST

Palaemonidae : Pontoniinae

- | | |
|--|--|
| 1. <i>Palaemonella dolichodactylus</i> Bruce, 1991 | 16. <i>Periclimenes pectinipes</i> sp. nov. |
| 2. <i>Periclimenes laccadivensis</i> (Alcock & Anderson, 1884) | 17. <i>Periclimenes platyrhynchus</i> sp. nov. |
| 3. <i>Periclimenes alcocki</i> Kemp, 1922 | 18. <i>Periclimenes setirostris</i> sp. nov. |
| 4. <i>Periclimenes latipollex</i> Kemp, 1922 | 19. <i>Periclimenes</i> sp. A |
| 5. <i>Periclimenes hertwigi</i> Balss, 1913 | 20. <i>Periclimenaeus jeancharcoti</i> sp. nov. |
| 6. <i>Periclimenes foveolatus</i> Bruce | 21. <i>Anchistus pectinis</i> Kemp, 1925 |
| 7. <i>Periclimenes rectirostris</i> Bruce, 1981 | 22. <i>Pontonia monnioti</i> Bruce, 1990 |
| 8. <i>Periclimenes franklini</i> Bruce, 1990 | 23. <i>Amphipontonia kanak</i> gen. nov., sp. nov. |
| 9. <i>Periclimenes vaubani</i> Bruce, 1990 | 24. <i>Altopontonia disparostris</i> Bruce, 1990 |
| 10. <i>Periclimenes tenuirostris</i> Bruce, 1991 | 25. <i>Mesopontonia gorgoniophila</i> Bruce, 1967 |
| 11. <i>Periclimenes aleator</i> sp. nov. | 26. <i>Mesopontonia monodactylus</i> sp. nov. |
| 12. <i>Periclimenes brevirostris</i> sp. nov. | |
| 13. <i>Periclimenes forcipulatus</i> sp. nov. | |
| 14. <i>Periclimenes leptodactylus</i> sp. nov. | |
| 15. <i>Periclimenes ordinarius</i> sp. nov. | |

Anchistioididae

27. *Anchistioides willeyi* (Borradaile, 1899)

SYSTEMATIC ACCOUNT

Family PALAEMONIDAE

Subfamily PONTONIINAE

Genus *PALAEMONELLA* Dana, 1852*Palaemonella dolichodactylus* Bruce, 1991*Palaemonella dolichodactylus* Bruce, 1991 : 308-311, figs 6 f-l, 7.

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 64, 24°48.0'S, 168°09.0'E, Norfolk Ridge, 250 m, 3 September 1985 : 1 ♂, 1 ovig. ♀ (MNHN-Na 12024).

REMARKS. — Both specimens lack the second pereiopods and other pereiopods, but agree in all discernible features with this species. The male has a rostral dentition of 1 + 6/2(?), carapace length 3.0 mm, and the female 1 + 7/2, carapace length 3.4 mm. The ambulatory pereiopods appear to show a feeble segmentation as in the type material.

Previously recorded from 44-70 m, the present records, if correct, represent a considerable extension of the bathymetric range of this species.

DISTRIBUTION. — Type locality : Lagon Est, New Caledonia (BRUCE, 1991). Also known only from Ile Ouen, New Caledonia. No further records.

Genus *PERICLIMENES* Costa, 1844*Periclimenes laccadivensis* (Alcock & Anderson, 1884)

Fig. 1

Restricted synonymy :

Palaemonella laccadivensis Alcock & Anderson, 1894 : 157.*Palaemon (Brachycarpus) laccadivensis* - ALCOCK, 1901 : 138 (*partim*).*Periclimenes laccadivensis* - BRUCE, 1979 : 225.

MATERIAL EXAMINED. — New Caledonia. CHALCAL 2 : stn CP 25, 23°38.6'S, 167°43.12'E, Isle of Pines, 418 m, 30 October 1986 : 1 ovig. ♀ (MNHN-Na 12029).

REMARKS. — The single example has a carapace length of 4.2 mm and a rostral dentition of 1 + 9/4, and is in good condition, lacking only the right second pereiopod. The rostrum extends distally to the end of the antennular peduncle and has one more ventral tooth than in the type material, but is otherwise generally similar, with three teeth present on the carapace posterior to the orbital margin, the first two appearing semi-articulated. The eye has a well pigmented globular cornea, without an accessory pigment spot, with a diameter about 0.18 of the carapace length. The chela of the major second pereiopod is about 1.5 and the minor 1.2 of the carapace length. The propod of the third pereiopod is about 0.75 of the carapace length, 10.0 times longer than the central depth and 5.3 times longer than the dactyl. It bears a pair of long slender distoventral spines with three single distal ventral spines. This segment was noted as devoid of spines in a Tasmanian specimen (BRUCE, in press a), but these may have been lost due to accident. KEMP (1922) does not note the condition in the type material. The distal propod also bears numerous long simple setae distally, particularly on the medial aspect. The dactyl appears similar to KEMP's figure (1922 : 153, fig. 20 c) and has a clearly demarcated unguis. The specimen is well calcified, suggesting that the soft membranous integument reported in the type material by KEMP is due to recent moulting.

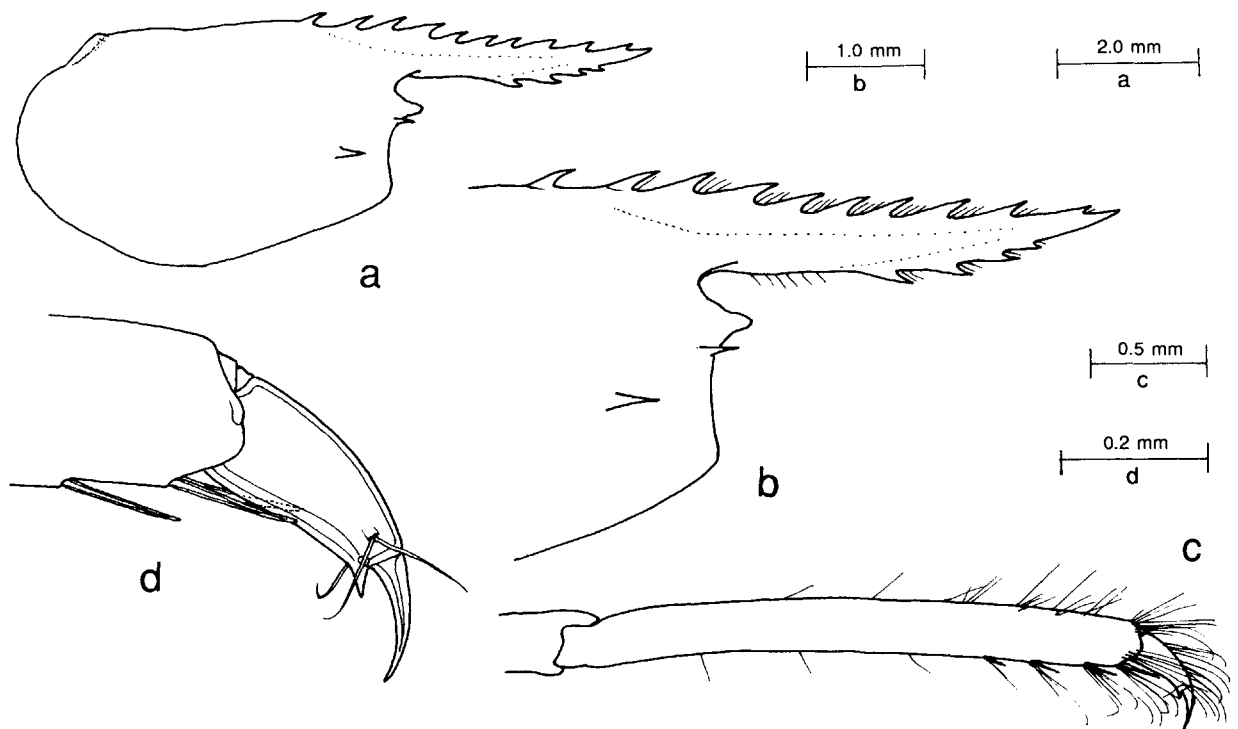


FIG. 1. — *Periclimenes laccadivensis* (Alcock & Anderson, 1894), ovig. ♀, CHALCAL 2, stn CP 25, 418 m : a, carapace and rostrum; b, anterior carapace and rostrum; c, third pereopod, propod and dactyl; d, same, distal propod and dactyl, setae omitted.

DISTRIBUTION. — Not previously recorded from New Caledonian waters. Type localities : Laccadive Sea, 10° 47'45"N, 72° 40'20"E, 1285 m and 7° 17'30"N, 76° 54'30"E, 786 m. Also known from the western Indian Ocean, 4° 41'N, 48° 38'E, 628 m; the South China Sea, 19° 02'N, 112° 39'E, 274-289 m, and off Tasmania, 40° 20'S, 148° 37'E, 720 m. The specimens reported from Hawaii (RATHBUN, 1906) are not conspecific.

Periclimenes alcocki Kemp, 1922

Figs 2-5

Restricted synonymy :

Palaemon (Brachycarpus) laccadivensis Alcock, 1901 : 138 (*partim*).

Periclimenes (Periclimenes) laccadivensis - KEMP, 1922 : 154 - 156, figs 21-24.

MATERIAL EXAMINED. — **Loyalty Islands.** MUSORSTOM 6 : stn CC 470, 21° 04.4'S, 167° 33.2'E, 560 m, 21 February 1989 : 1 ovig. ♀ (MNHN-Na 12032).

DESCRIPTION. — Large, stoutly built, well calcified pontonine shrimp, of subcylindrical body form, lacking right second pereopod.

Carapace smooth, glabrous; rostrum well developed, compressed, slightly depressed, upturned distally, moderately deep, distally acute, reaching almost to end of antennular peduncle, about 0.5 of carapace length; dorsal carina well developed, continuing posteriorly onto anterior third of carapace, with stout, blunt epigastric tooth at about 0.25 of carapace length, with feebly developed tubercle posteriorly, dorsal carina deepest just posterior to orbital region, with eight low feebly acute similar teeth, first tooth at level of posterior orbital margin, clearly separated

from epigastric tooth, distal tooth slightly remote from tip, interspaces decreasing in size distally, feebly setose; lateral carinae well developed, not expanded proximally, ventral carina distinct, distally convex, with three small acute teeth on distal third; orbit feebly developed, inferior orbital angle acutely produced in lateral view, antennal spine short, robust, marginal, hepatic spine large, stout, slightly below level of antennal spine, at about 0.1 of carapace length, anterolateral angle of branchiostegite not produced, bluntly obtuse.

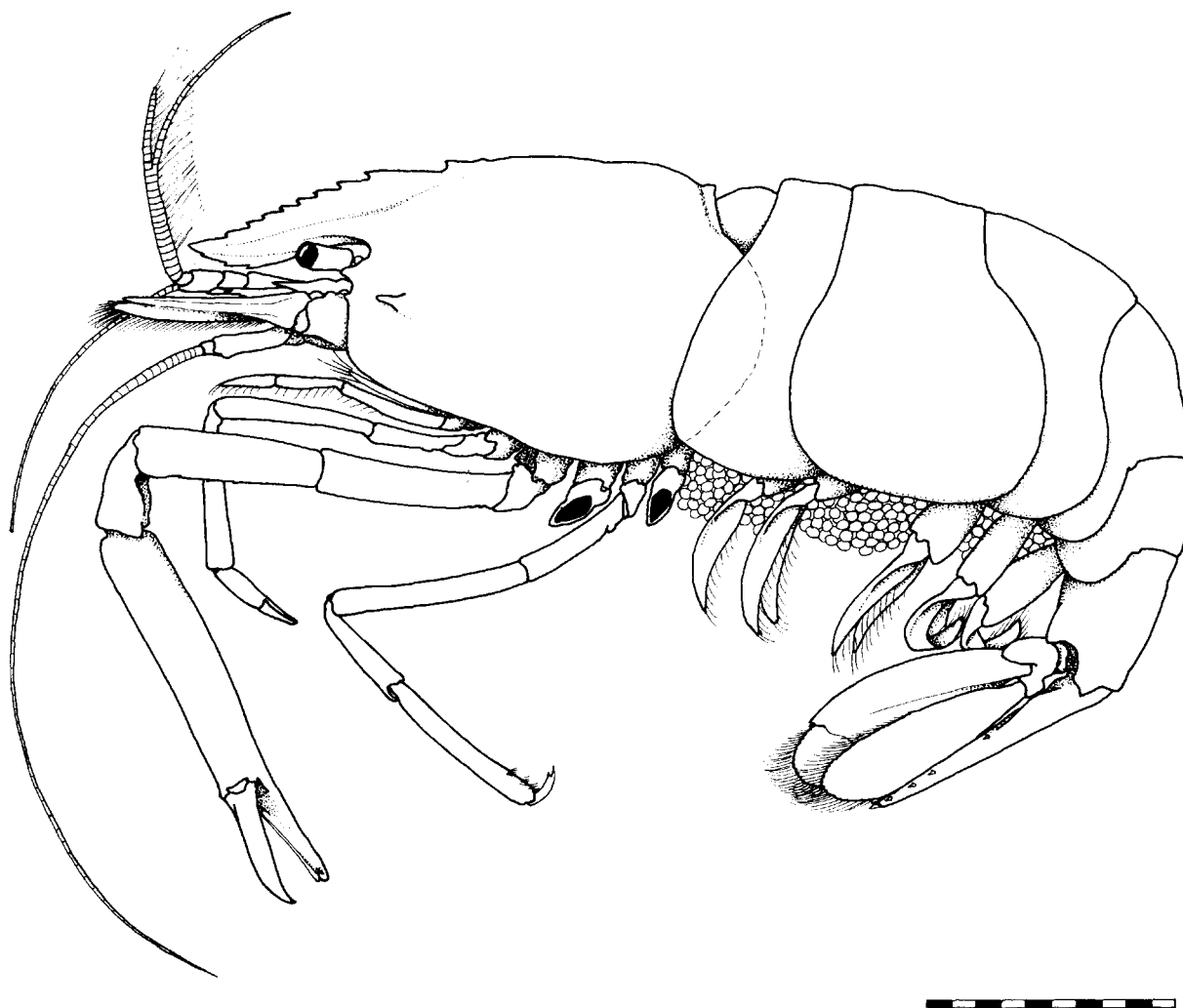


FIG. 2. — *Periclimenes alcocki* Kemp, ovig. ♀, MUSORSTOM 6, stn CC 470, Loyalty Islands, 560 m. Scale bar in millimeters.

Abdomen smooth, glabrous; third abdominal segment not posterodorsally produced, non-carinate, pleura of first three segments broadly rounded, fourth and fifth posteriorly produced, rounded, fifth segment about 0.6 of sixth segment length, sixth segment compressed, about 1.5 times longer than deep, feebly tapering posteriorly, posteroventral angle small, blunt, posterolateral angle acute. Telson about 1.8 times sixth segment length, moderately slender, about 3.0 times longer than anterior width, lateral margins straight, feebly convergent posteriorly, with four pairs of small marginal dorsal spines, most distal pair smaller than anterior pairs, at about 0.45, 0.65, 0.8 and 0.95, posterior margin broadly rounded, about 0.3 of anterior width, with small rounded median eminence, with three pairs of short blunt spines, lateral spines very small, about 0.5 of length of anterior dorsal spines, intermediate spines stout, blunt, about 0.03 of telson length, submedian spines feeble, non-setulose, about 0.4 of submedian spine length, more feeble than lateral spines.

Eye with small hemispherical, well pigmented cornea slightly oblique, without accessory pigment spot, about 0.75 of carapace length, stalk about 1.4 times longer than wide, subcylindrical, moderately compressed.

Antennular peduncle slightly exceeding tip of rostrum, proximal segment about 1.6 times longer than wide, medial margin straight, sparsely setose, with stout acute tooth ventrally at about 0.5 of length, lateral margin feebly convergent anteriorly, with broad distolateral lobe, with transverse setose anterior margin and strong lateral tooth reaching to about 0.8 of intermediate segment length; stylocerite acute, slender, reaching to about 0.6 of proximal segment length, statocyst normal, with granular statolith; intermediate segment about 0.3 of proximal segment length, with large setose lateral flange, medial margin strongly setose, obliquely articulated with distal

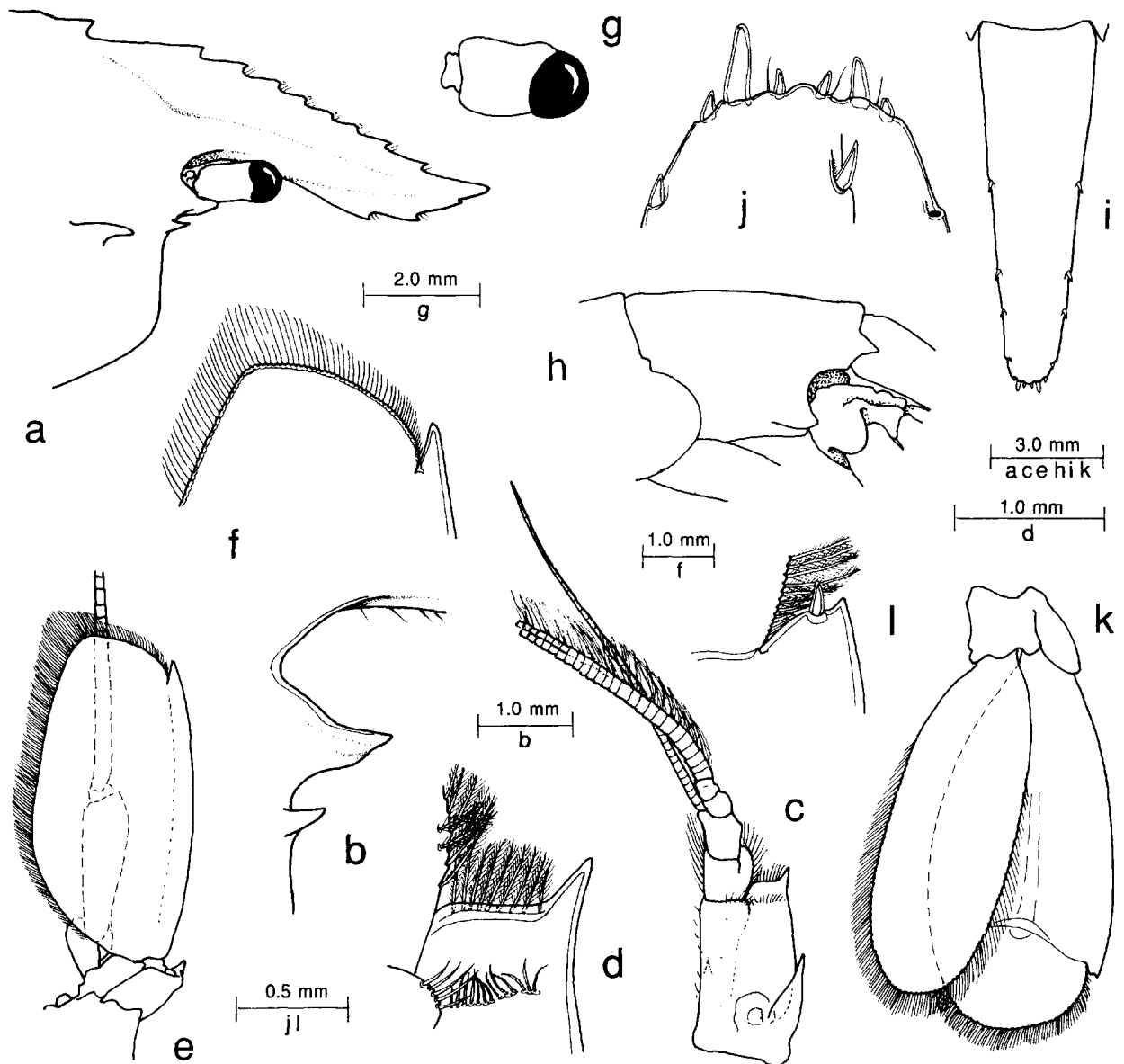


FIG. 3. — *Periclimenes alcocki* Kemp, ovig. ♀ : a, anterior carapace and rostrum; b, same, inferior orbital angle; c, antennule; d, same proximal segment, distolateral angle; e, antenna; f, scaphocerite, distal lamella; g, eye; h, third abdominal segment; i, telson; j, same, posterior spines; inset, anterior dorsal spine; k, uropod; l, same, exopod, distolateral angle.

segment; distal segment about 1.4 times intermediate segment length, 0.4 of proximal segment length, 1.1 times longer than wide; upper flagellum well developed, biramous, with proximal 20 segments fused, strongly compressed, subequal to 0.4 of carapace length, shorter free ramus with 7 segments, about 0.28 of fused portion length, longer ramus slender, subequal to fused portion length, lower flagellum slender, filiform, about 0.6 of lower upper ramus length; densely provided with numerous aesthetascs, about 50 groups throughout almost whole length of shorter ramus.

Antenna with robust basicerite, with stout distolateral tooth, carpocerite subcylindrical, reaching to about 0.5 of scaphocerite length, about 3.0 times longer than distal width, flagella well developed, incomplete, scaphocerite reaching well beyond antennular peduncle and tip of rostrum, exceeding former by about 0.3 of length of lamella, lamella large, broad, about 0.6 of carapace length, about 2.1 times longer than wide, maximum width proximally, at about 0.37 of length, lateral margin convex, anterior margin broadly produced, bluntly angular, extending well beyond stout lateral tooth.

Epistome normal, unarmed. First to third thoracic sternites moderately broad, unarmed, fourth without median process, with low transverse anterior ridge, low transverse posterolateral plates separated by small median notch; fifth sternite with well separated posterolateral plates only; posterior sternites very narrow, unarmed.

Mandible normal, without palp; molar process stout, strongly transversely compressed, with three large blunt teeth with oblique transverse central carina, small group of stout setose posteriorly; incisor process well developed, feebly obliquely truncate distally, with three large acute teeth, central tooth smaller than outer teeth. Maxillula with deeply bilobed palp, upper lobe large, subacute distally, lower lobe small, with small ventral tubercle bearing short simple seta; upper lacinia normal, with about 12 short stout simple spines, numerous setae distally; lower lacinia slender, tapering, with numerous serrulate spiniform setae distally. Maxilla with simple, tapering, angulate palp, with several short plumose setae proximolaterally; basal endite deeply bilobed, upper lobe larger, longer than lower lobe, moderately swollen, with sparse simple setae distally, lower lobe more slender, subcylindrical, with sparse simple setae distoventrally, coxal endite obsolete, medial margin with small rounded lobe; scaphognathite well developed, large, broad, 2.5 times longer than broad, posterior lobe large, about 1.6 times longer than wide, anterior lobe 1.3 times longer than broad, medial margins deeply emarginate, anterior portion broadly rounded. First maxilliped with slender tapering palp, slightly exceeding anterior margin of basal endite, with preterminal setae; basal endite large, elongate, feebly tapering, broadly rounded distally, medial margin straight, densely setose, separated by deep notch from coxal endite; coxal endite feebly produced medially, sparsely setose, with strong ventral thickening; exopod with flagellum well developed, broad, with numerous long plumose setae, caridean lobe large, broad, subequal to combined basal-coxal endites length, epipod large, triangular, feebly bilobed. Second maxilliped with normal endopod; dactylar segment normal, about 3.3 times longer than wide, with numerous long coarsely serrulate spines medially, propodal segment broad, not strongly produced distomedially, with numerous long spiniform setae; carpus with ventromedial angle acutely produced, ischiomerus and basis normal, basis medially excavate, margin sparsely setose; exopod with well developed flagellum, distally broad, with numerous long plumose setae distally, proximolaterally with several short, feebly plumose setae; coxa medially produced, rounded, with numerous short simple setae; epipod very large, oval, without podobranch. Third maxilliped with normal endopod, reaching to about distal end of carpocerite; ischiomerus distinct from basis, compressed, about 4.0 times longer than wide, subuniform, medial margin with numerous long simple setae, lateral margin setose, without spines, penultimate segment about 0.6 of proximal segment length, 3.6 times longer than proximal width, slightly tapering distally, with about nine groups of spiniform setae medially, distal segment about 0.5 of proximal segment length, subcylindrical, tapering distally, 4.0 times longer than proximal width, with 7-8 transverse rows of short spines medially; basis about 1.3 times broader than long, medial margin sparsely setose; exopod well developed, extending to about 0.3 of penultimate segment length, distally broad, with numerous long plumose setae; coxa with small setose distoventral process, with large oval lateral plate; arthrobranch well developed, with 12 lamellae. Paragnaths not examined.

First pereopod slender, exceeding scaphocerite by chela, carpocerite by half propod; chela with palm feebly compressed, about 2.5 times longer than distal width, feebly tapered proximally, with about 10 rows of short serrulate setae proximoventrally, fingers about 0.75 of palm length, slender, feebly subspatulate, with entire sharp lateral cutting edge, small acute hooked tips distally, dactyl about 4.0 times longer than proximal depth, both fingers with numerous groups of long setae; carpus about 1.5 times chela length, 6.0 times longer than distal

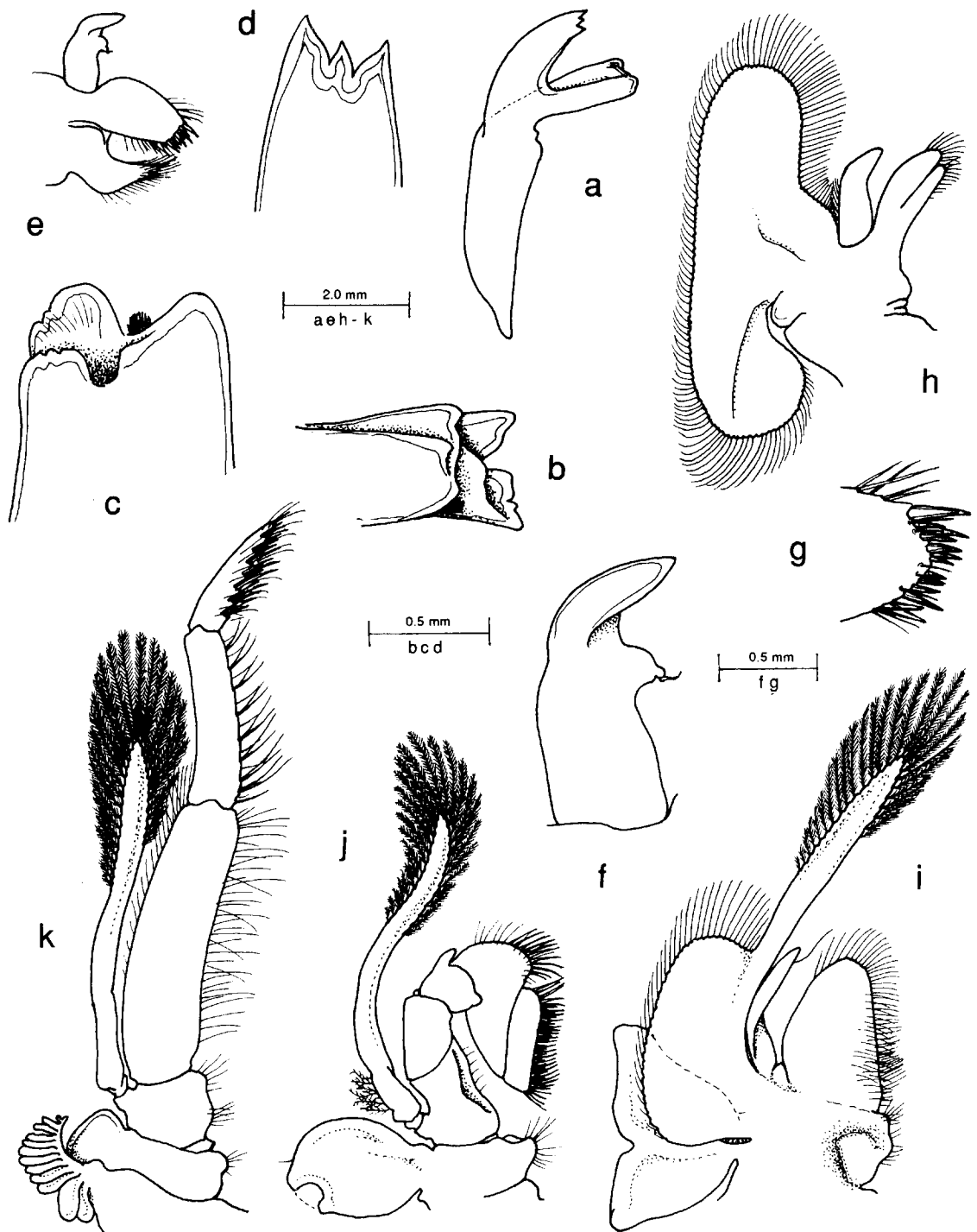


FIG. 4. — *Periclimenes alcocki* Kemp, ovig. ♀ : a, mandible; b, same, molar process, lateral; c, same, dorsal; d, same, incisor process; e, maxillula; f, same, palp; g, same upper lacinia, distal end; h, maxilla; i, first maxilliped; j, second maxilliped; k, third maxilliped.

width, distinctly tapering proximally, with transverse row of serrulate setae distoventrally; merus subequal to carpal length, 7.0 times longer than wide, uniform, feebly bowed; ischium subequal to chela length, 0.6 of carpal length, 3.7 times longer than distal width, sparsely setose ventrally; coxa normal, with small feebly setose distoventral process.

Second pereiopod preserved in left side only, extending distally to exceed carpoplite by chela and distal third of merus; chela well developed, about 1.2 times carapace length, palm subcylindrical, feebly compressed, about 4.7 times longer than deep, subuniform, very minutely tuberculate, most marked ventrally, fingers about 0.45 of palm

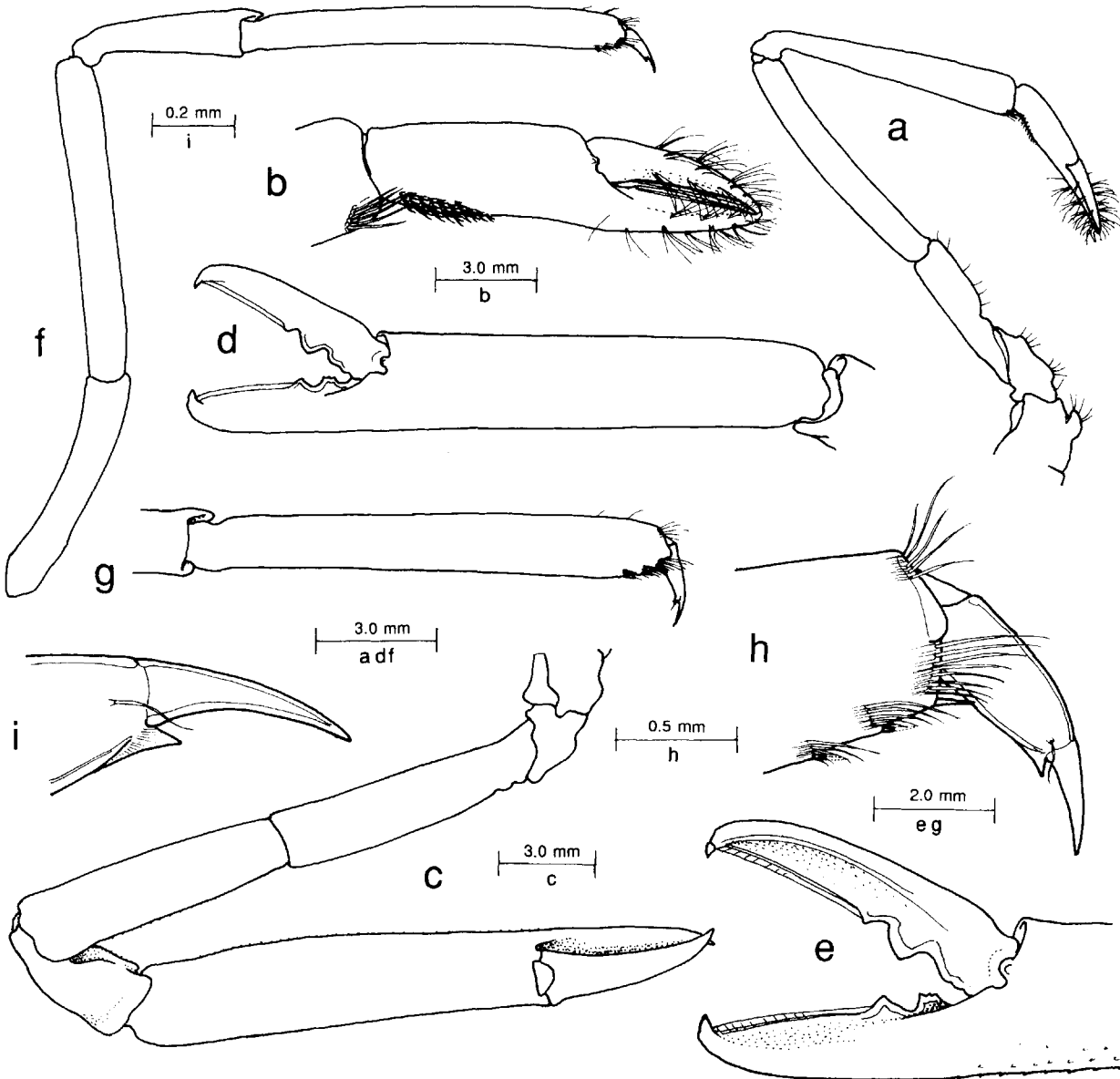


FIG. 5. — *Periclimenes alcocki* Kemp, ovig. ♀ : a, first pereiopod; b, same, chela; c, second pereiopod; d, same, chela; e, same, fingers; f, third pereiopod; g, same, propod and dactyl; h, same, distal propod and dactyl; i, same, unguis.

length, dactylus 4.0 times longer than proximal depth, with small articulated acute hooked tip, cutting edge situated laterally, distally sharp, entire, proximally with small distal and large proximal acute teeth, later opposing into small fossa on fixed finger, fixed finger similar, with larger non-articulate hooked tip, proximal cutting edge with acute distal tooth, truncate proximal tooth with crenulate margin, fingers sparsely setose; carpus about 0.25 of chela length, robust, 1.9 times longer than distal width, distally feebly excavate, margins unarmed, tapering proximally, minutely tuberculate ventrally; merus about 0.5 of chela length, 0.5 of palm, 4.3 times longer than central width, feebly tapering proximally, with rounded distoventral lobe laterally, ventral surface minutely tuberculate; ischium subequal to meral length, 4.7 times longer than central width, feebly tapering proximally, unarmed ventral surface non-tuberculate; basis and coxa robust, without special features.

Ambulatory pereiopods slender, third exceeding carapocerite by propod and dactyl, scaphocerite by distal third of propod and dactyl; dactyl slender about 0.18 of propod length, unguis distinct, about 0.6 of corpus length, 3.0 times longer than basal width feebly curved, carpus compressed, 2.0 times longer than central depth, feebly tapering distally, proximal carpus width about 0.5 of distal propod width, ventral margin feebly convex, with acute compressed distoventral tooth, about 0.2 of unguis length, with single short sensory seta distolaterally; propod about 0.5 of carapace length, 7.8 times longer than distal width, feebly expanded distally, with single slender distoventral spine, two distal ventral spines, three transverse rows of short simple setae distoventrally, major part of ventral border unarmed, non-setose; carpus about 0.45 of propod length, 3.5 times longer than distal width, with well developed distal dorsal lobe, unarmed; merus about 0.8 of propod length, 7.5 times longer than wide, uniform, unarmed; ischium about 0.65 of propod length, 0.7 of merus length, 5.0 times longer than distal width, feebly tapered proximally; basis and coxa normal; fourth and fifth pereiopods similar.

Pleopods without special features.

Uropods subequal to telson length; protopodite with distolateral lobe broadly rounded; exopod broad, 2.0 times longer than wide, lateral margin convex, non-setose, with small distolateral lobe with small acute lateral tooth with larger mobile spine medially, diaeresis distinct, at 0.75 of length; endopod about 0.95 of exopod length, 2.8 times longer than wide.

MEASUREMENTS (mm). — Carapace length, 14.0; carapace and rostrum, 21.5; total body length (approx.), 61.5; second pereiopod chela, 19.0; length of ovum, 0.5.

COLOURATION AND HOST. — No data.

REMARKS. — KEMP (1922) described *P. alcocki* on the basis of a single ovigerous female specimen in the collections of the Zoological Survey of India (catalogue number 4787/7) which was part of the material described by ALCOCK and ANDERSON (1894) under the name of *Palaemonella laccadivensis*, subsequently placed in the genus *Periclimenes* by KEMP in the same work. KEMP's description of this important deep-water species was brief and incompletely illustrated and the species is here considered worthy of a new description.

The present specimen agrees well with KEMP's description but is distinctly larger than his specimen, some 50 mm in total body length, and is the largest species of pontonine shrimp so far reported from over 100 m depth. The following points may be noted. The tuberculation of the second pereiopod is minute, and could be easily overlooked. The distolateral tooth on the proximal segment of the antennular peduncle is much longer and more slender in KEMP's specimen, far exceeding the level of the proximal end of the distal segment of the peduncle. The distolateral tooth of the scaphocerite is larger and longer in the type specimen, and reaches to the level of the distal margin of the lamella. The inferior orbital angle of the New Caledonian specimen appears longer, and more acute in lateral view, than in the type specimen, in which it scarcely exceeds the end of the antennal spine. The integument of the present specimen is rigid and well calcified, not soft and membranous as in the type, probably due only to the latter specimen having recently moulted.

DISTRIBUTION. — Not previously reported from New Caledonian waters. Type locality : Laccadive Sea, 9°34'57"N, 75°36'30"E, 730 m. Also reported from Japan, 350 m (KUBO, 1940); Madagascar, 395 m (BRUCE, 1978); the Philippines Islands, 187-195 m, 350-326 m (BRUCE, 1981, 1985) and Australia, 330 m (BRUCE, 1983).

Periclimenes latipollex Kemp, 1922

Fig. 6

Restricted synonymy :

Periclimenes (Periclimenes) latipollex Kemp, 1922 : 150-152, fig. 18, pl. 4, fig.3. — HOLTHUIS, 1952 : 47-48, figs 13-14.

MATERIAL EXAMINED. — Chesterfield Islands. MUSORSTOM 5 : stn CP 269, 24°47.0'S, 159°37.3'E, Middleton Chain, 270-250 m, 9 October 1986 : 1 ovig. ♀ (MNHN-Na 12031).

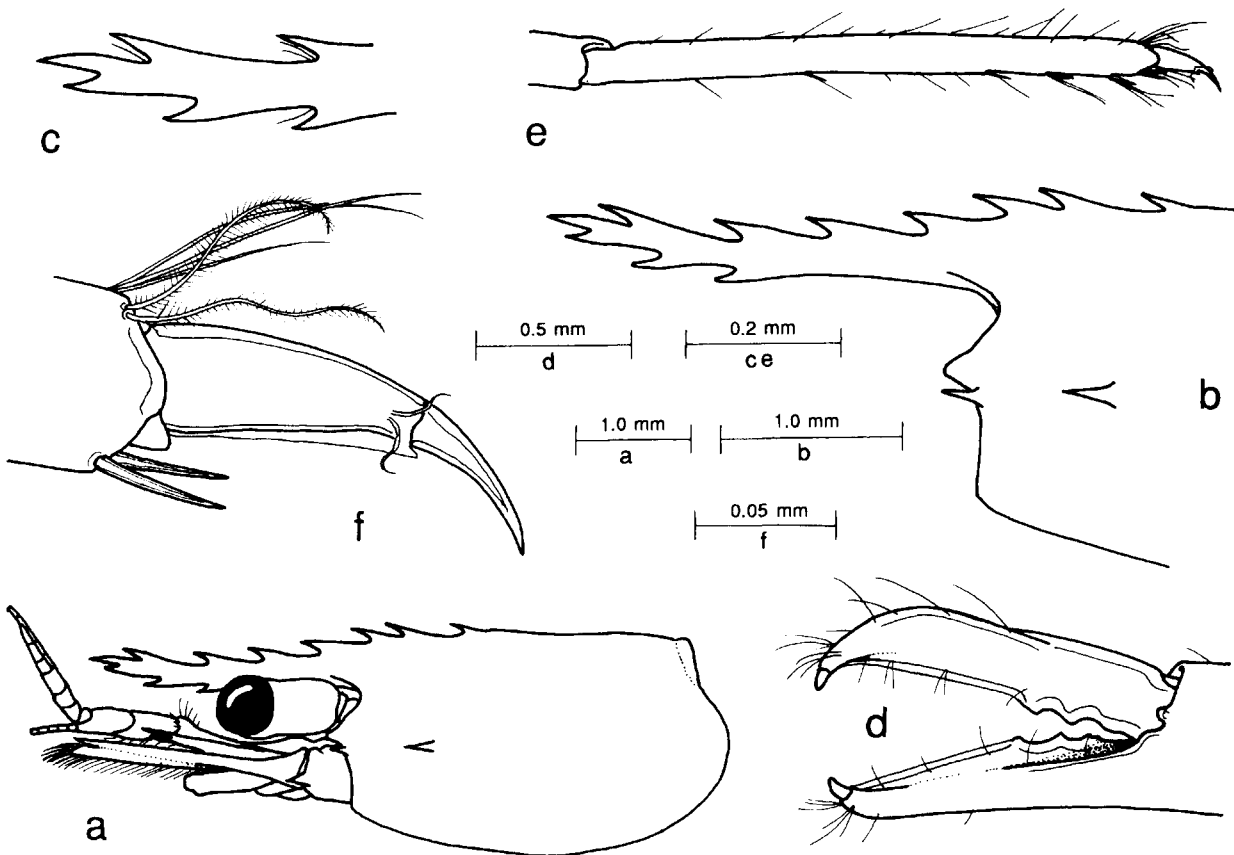


FIG. 6. — *Periclimenes latipollex* Kemp, ovig. ♀, MUSORSTOM 5, stn CP 269, Middleton Chain, 250-270 m : a, carapace, rostrum, eye and antennal peduncles, lateral; b, anterior carapace and rostrum, lateral; c, tip of rostrum; d, second pereiopod, fingers, medial aspect; e, third pereiopod, propod and dactyl; f, same, distal propod and dactyl, many setae omitted.

REMARKS. — The single specimen, carapace length 2.85 mm, agrees closely with the original description provided by KEMP (1922). It differs slightly in that the rostrum is shorter, distinctly less than the carapace length, and rather less markedly slender, with the distal teeth relatively larger. The rostrum reaches to about the end of the antennular peduncle, distal margin of the spine and lamella of the scaphocerite, all of which are co-extensive. The hepatic and antennal spines are on the same level, as in the type material. The cornea is large, well pigmented, about 0.2 of the carapace length, without accessory pigment spot. The first pereiopod appears much longer than in KEMP's figure, but corresponds more to his description, reaching beyond the scaphocerite by the length of the

fingers and half the palm. Only the right second pereopod is preserved. The chela is about 1.3 times the carapace length, with the palm smooth, subequal to the carapace length. The fingers are about 0.3 of the palm length, with the dactylus bearing a well marked lateral flange and the cutting edge with two small acute teeth proximally, fitting into a groove in the proximal cutting surface of the fixed finger, which bears four small subacute teeth in the proximal cutting margin. The ambulatory pereopods are moderately robust, with the third exceeding the scaphocerite by the dactyl and distal half of the propod, which is about 0.7 of the carapace length, 14.0 times longer than wide, uniform, with a pair of slender distoventral spines, which are almost equal in length to the whole width of the base of the dactylar corpus, and four single isolated ventral spines. The dactyl is about 0.15 of the propod length, with a small blunt accessory tooth, the ventral margin is straight, laminar and sharp, and the unguis is clearly demarcated from the corpus. KEMP's material differs slightly in these features, where the second pereopod dactyl has only a single tooth on the cutting edge and the fixed finger has two, the third pereopod propod is stouter, with only a single short distoventral spine, and the dactyl has a long slender accessory tooth. HOLTHUIS (1952) notes that in his specimens, the accessory tooth is minute.

No information concerning the host of the present specimen is available, but *P. latipollex* has been reported in association with gorgonians (*Acanthogorgia flabellum* Hickson in BRUCE, 1971).

DISTRIBUTION. — Not previously recorded from New Caledonian waters. Type locality : Mergui Archipelago, 112 m. Also reported from the Kei Islands, Indonesia, 304 m; Somalia, 73-82 m; Kenya, 155 m; and the Philippines, 133-185 m.

Periclimenes cf. *hertwigi* Balss, 1913

Fig. 7

Restricted synonymy :

Periclimenes hertwigi Balss, 1913 : 235. — BRUCE, 1990b : 151-153, figs 1-2.

Periclimenes Hertwigi - Balss, 1914 : 49, figs 28-30.

MATERIAL EXAMINED. — **New Caledonia**. CALSUB : dive 21, 22°45'S, 167°09'E, Isle of Pines, 344-330 m, 12 March 1989 : 1 ♂, 1 ovig. ♀ (MNHN-Na 12050).

HOST. — *Asthenosoma* sp. [Echinodermata : Echinothuridae].

REMARKS. — The specimens closely resemble those previously reported from New Caledonia by BRUCE (1990), from unidentified hosts. The male, carapace length 6.6 mm, has a rostral dentition of 5/2, with the rostrum reaching to slightly beyond the end of the intermediate segment of the antennular peduncle. In the female, carapace length 7.2 mm, the rostrum reaches almost to the end of the antennular peduncle, with a dentition of 6/2. The two distal ventral teeth are small and situated on the distal fifth of the rostrum with the first dorsal tooth just posterior to the level of the orbital notch. In the male, two ventral rostral teeth occupy the distal two fifths of the rostrum and the first two dorsal teeth are situated posterior to the level of the orbital notch. The dactyls of the ambulatory pereopods appear to distinctly differ from those of previously described specimens. The distoventral angle of the corpus is produced in the form of 2-3 slender tooth-like processes, much more solidly developed than the thin laminar ventral carina from which they extend distally. The male and female show basically similar teeth, with three in the male and two in the female. The unguis is feebly demarcated in both specimens and appears continuous with the adjacent distoventral tooth. The proximal ventral region of the unguis proper has been reported by HOLTHUIS (1952) to show some shallow lobes in the Siboga specimen of *P. hertwigi*. In the present material a series of about half a dozen small acute denticles are present in this position. The distoventral and distal ventral spines on the propod are well developed and minutely denticulate along most of their dorsal margins.

The usual condition of the distoventral margins of the ambulatory dactylar corpus appears to be a thin lamella with various irregular crenulations. This contrasts with the small, but relatively slender and solid teeth in the present specimens. The similarity in male and female also suggests that the condition is not due to individual variation, but has a genetic basis, implying that they may represent a separate taxon distinct from *P. hertwigi*.

s. str. Possibly a complex of related species, associated with different deep-water echinoid host genera may be involved. Little data is presently available but Japanese specimens have been reported in association with *Phormosoma* sp. (KUBO, 1940) and specimens from Queensland, Australia, from *Areosoma thetidis* (H.L. Clark) (BRUCE, 1972). The association of the New Caledonian specimens with *Asthenosoma* sp., constitutes a new host record.

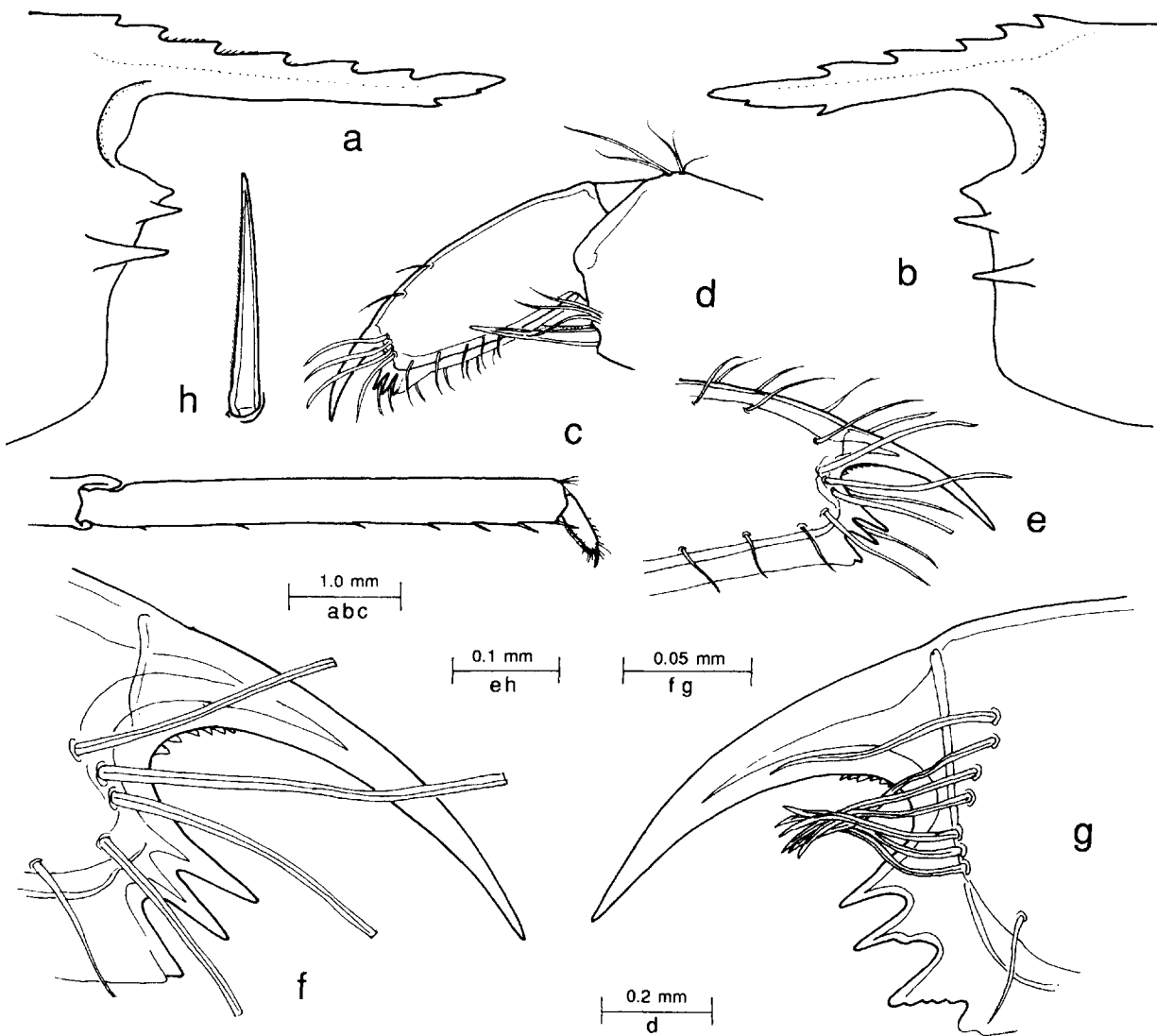


FIG. 7. — *Periclimenes* cf. *hertwigi* Balss, CALSUB, dive 21, Isle of Pines, 330-344 m : a-b, anterior carapace and rostrum; c, third pereiopod; d, same, distal propod and dactyl; e, same, distal dactyl; f-g, same, unguial region; h, same, spine from distoventral propod.

a, c-f, h : ♀; b, g : ♂.

DISTRIBUTION. — Previously reported from New Caledonian waters by BRUCE (1990b). Type locality : Sagami Bay, Japan, 120 m (BALSS, 1913). Also reported from Japan, 305 m, by KUBO (1940), FUJINO & MIYAKE (1970); Indonesia, 304 m (HOLTHUIS, 1952); Queensland, Australia, 275 m (BRUCE, 1972) and New Caledonia, 405-600 m (BRUCE, 1990b).

Periclimenes foveolatus Bruce, 1981

Fig. 8, 72

Periclimenes foveolatus Bruce, 1981 : 196-201, figs 6-9, 17 a-b, 18 b, e.

MATERIAL EXAMINED. — Loyalty Islands. MUSORSTOM 6 : stn DW 475, 21°08.95'S, 167°55.4'E, 236 m, 22 February 1989 : 1 ovig. ♀ (MNHN-Na 12041).

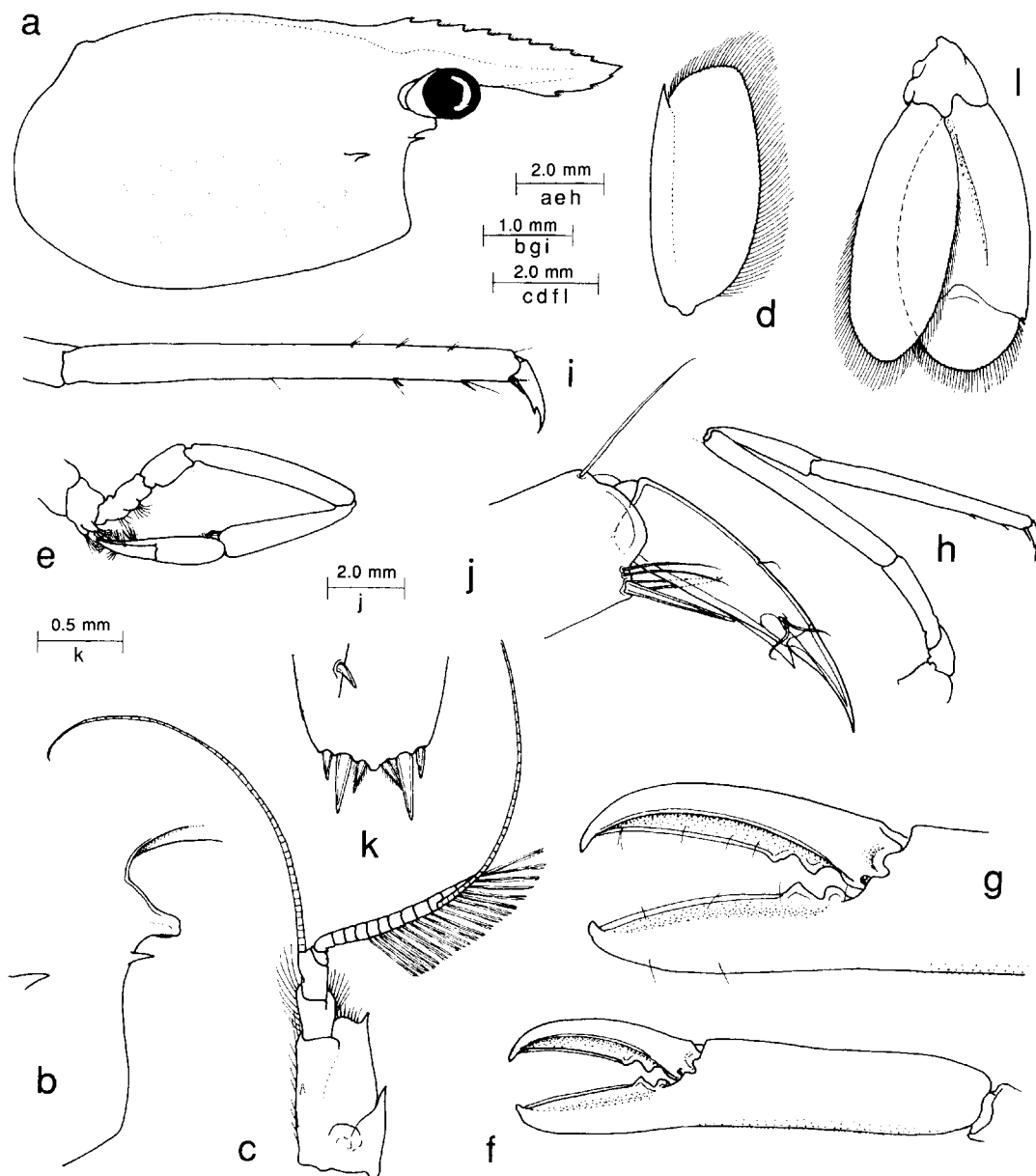


FIG. 8. — *Periclimenes foveolatus* Bruce, MUSORSTOM 6, stn DW 475, Loyalty Islands, 236 m, ovig. ♀ : a, carapace and rostrum; b, same, inferior orbital angle; c, antennule; d, scaphocerite; e, first pereiopod; f, second pereiopod, chela; g, same, fingers; h, third pereiopod; i, same, propod and dactyl; j, same, dactyl and distal propod; k, posterior telson spines; inset, dorsal spine; l, uropod.

REMARKS. — The single example, with a rostral dentition of 9/3, agrees closely with the original description of this species except that the foveolation of branchiostegite and pleura is much less readily discernible, however, with careful illumination it can be made out. The tuberculation of the major second pereiopod chela is also minute and only discernible with difficulty. The specimen has a carapace length of 7.6 mm and lacks the minor (right) second pereiopod.

COLOURATION. — Generally pinkish, spotted with red and white. Rostrum with dorsal carina largely transparent, with tip white, large white spots over second-third and fifth-sixth teeth, with smaller red patches over first, fourth, seventh and ninth teeth; ventral carina with large white spot over first-second teeth, proximally with smaller red patches; carapace generally pinkish, becoming translucent white over lower branchiostegite; postrostral carina anteriorly with large white spots, with smaller red patches anteriorly and posteriorly, posteriorly with smaller red spot with white patches anteriorly and posteriorly; laterally with numerous circular orange-red spots, largest over upper branchiostegite, smaller dorsally, with scattered small white dots; abdomen generally similar to carapace, first segment with pair of large submedian white spots dorsally, third segment with red-white-red posteromedian dots, fourth with white posteromedian dot, with submedian red spots anteriorly, fifth with large red patch with smaller marginal white zone; sixth with preterminal band of red, posterodorsal margin white; caudal fan densely white, with distal margins of telson and uropods deep red. Eye translucent with dorsal red patch. Antennular peduncle distally red, flagella translucent; antenna with distal half of carapocerite deep red, proximal half white and red; scaphocerite with red lateral spots. First pereiopod with fingers white, palm of chela deep red, carpus distally densely white, proximally red. Second pereiopod with distal half of fingers red, proximal half and distal palm densely white, proximal palm reddish with central translucent zone, carpus and distal fourth of merus densely white, proximal merus reddish with central translucent zone; ischium similar; basis and coxa white. Ambulatory pereiopods with dactyl and propod white, latter with subproximal ring of red, carpus white, with central red band, merus and ischium as in second pereiopods, ischiomeral joint region densely white. Pleopods orangeish, with scattered red and white spots. (From colour transparencies by P. LABOUTE).

DISTRIBUTION. — Type locality : Philippine Islands, off Ambil Island, 14°01'N, 120°15.8'E, 188-191 m (BRUCE, 1981). No subsequent records.

Periclimenes rectirostris Bruce, 1981

Figs 73-74

Periclimenes rectirostris Bruce, 1981 : 204-211, figs 12-15.

MATERIAL EXAMINED. — **Chesterfield Islands**. MUSORSTOM 5 : stn CP 312, 22°17.2'S, 159°24.8'E, 315-320 m, 12 October 1986 : 1 ♀ (MNHN-Na 12039). — Stn CP 316, 22°25.13'S, 159°24.0'E, 330 m, 13 October 1986 : 1 ♂ (MNHN-Na 12040).

REMARKS. — The male specimen has a rostral dentition of 13/2 and a carapace length of 9.1 mm. The female specimen has a damaged rostrum, lacks both second pereiopods with the right pereiopod regenerating, has a damaged caudal fan and a carapace length of 6.0 mm. In the male specimen, the second pereiopods are subequal and similar. The specimens agree closely with the type material, the only noteworthy difference being the presence of only two ventral rostral teeth in the male specimen, the female has at least three in the remaining part of the rostrum. In the type specimens four teeth are present in the male and five in the female.

The host of *P. rectirostris* has not yet been identified. BRUCE (1985) suggested that it may be associated with the echinoid *Eremopyga denudata* (de Meiger). The colouration of the present specimens may lend some support to this proposal. Other echinoid associates such as *Tuleariocaris* species and *Stegopontonia commensalis* are also provided with contrasting longitudinal lateral white lines along the whole length of the body. In these species, the lines are distinctly narrow, much less broad than are found in *P. rectirostris*.

COLOURATION. — General coloration pinkish-red with broad white lateral band. Rostrum deep red with dorsal half of dorsal carina transparent, lateral carinae intense creamy white, becoming whitish posteriorly, extending over

anterior 0.8 of dorsal carapace, with median postrostral line transparent, outlined by reddish zone; most of dorsal carapace reddish, with large bluish-green ovary visible; lateral carapace with conspicuous longitudinal translucent band extending posteriorly from inferior orbital region, broadening posteriorly, with upper and lower submarginal lines of dense white enclosing broad translucent white zone densely speckled with minute white dots; lower branchiostegite translucent, whitish. Abdomen generally reddish, increasing in intensity posteriorly, deep red on fifth-sixth abdominal segments, with broad longitudinal white band similar to, and continuous with that of carapace, tapering posteriorly, becoming narrow at posterolateral angle of sixth abdominal segment, pleura reddish, finely speckled with white; telson pinkish, lateral margins white, continuous with main longitudinal band, uropods pinkish with lateral exopod white (?). Antennal peduncle and flagella deep red, as in rostrum; basicerite and lateral scaphocerite white; eye stalk translucent pinkish, cornea black. Mouthparts, first pereopod and ambulatory pereopods translucent white. (From colour transparencies by P. LABOUTE).

DISTRIBUTION. — Type locality : Lubang, Philippine Islands, 13°53.2'N, 120°09.8'E, at 129-134 m (BRUCE, 1981). No further records.

Periclimenes franklini Bruce, 1990

Fig. 9

Periclimenes franklini Bruce, 1990a : 55-64, figs 1-5.

MATERIAL EXAMINED. — New Caledonia. MUSORSTOM 4 : stn 178, 18°56.3'S, 163°12.9'E, 520 m, 18 September 1985 : 1 ♀ (MNHN-Na 12034). — Stn CP 184, 19°04.0'S, 163°27.5'E, 260 m, 18 September 1985 : 1 ovig. ♀ (MNNH-Na 12035).

CHALCAL 2 : stn CP 27, 23°15.29'S, 168°04.7'E, 289 m, 31 October 1986 : 1 ovig. ♀ (MNHN-Na 12033).

SMIB 5 : stn DW 102, 23°19.6'S, 168°04.7'E, 305 m, 14 September 1989 : 1 ♀ (MNHN-Na 12036).

CALSUB : dive 18, 22°46'S, 167°20'E., SW of Isle of Pines, 270 m, 9 March 1989 : 1 ovig. ♀ (MNHN-Na 12037).

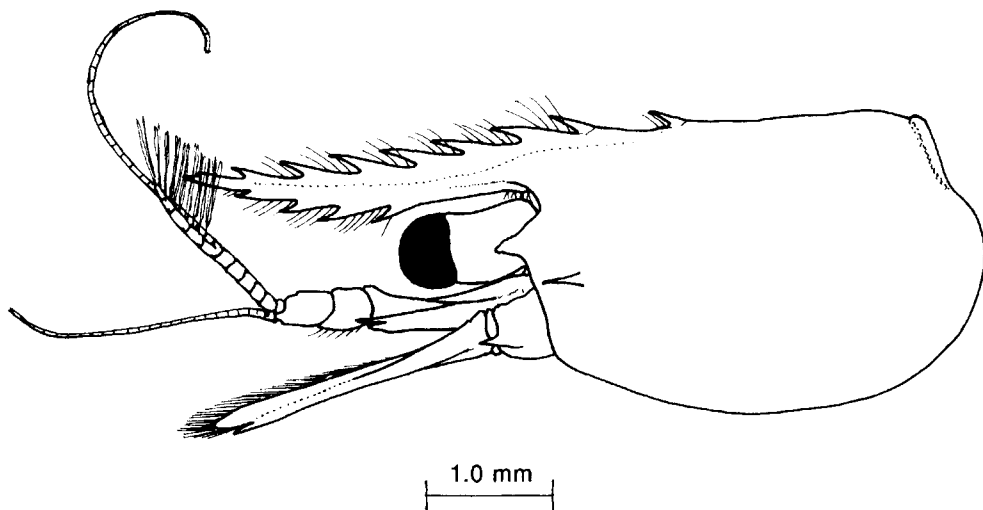


FIG. 9. — *Periclimenes franklini* Bruce, ovig. ♀, CALSUB, dive 18, Isle of Pines, 270 m, carapace, rostrum, eye and antennal peduncles.

REMARKS. — This species has not been previously recorded from New Caledonian waters and was only recently described from three specimens from 296-302 m from the opposite side of the Coral Sea, off Cairns, Australia. The present records extend the known distribution and also bathymetric range, to 260-520 m, with a significant increase in depth.

The CALSUB specimen lacks the second to fifth pereopods and has a carapace length of 3.1 mm, with a rostral dentition of $1 + 8/4$, with the rostrum distinctly exceeding the antennular peduncle, lamina shallow, about 0.9 of carapace length, with fairly long stiff setae, somewhat resembling those found in *P. setirostris* sp. nov. (see below)

The specimens agree well with the original description. The largest specimen, an ovigerous female, has a carapace length of 4.4 mm. The rostral dentition is $1 + 7-8/3$, as in the type material. As with the type material, the host animal, probably a gorgonian, remains unknown.

DISTRIBUTION. — Type locality : Coral Sea, 17°21.7'S, 146°48.52'E, 296-302 m. No further records.

Periclimenes vaubani Bruce, 1990

Periclimenes vaubani Bruce, 1990b : 174-181, figs 16-19, 38 a-d, 39 g.

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 66, 24°55.43'S, 168°21.67'E, Norfolk Ridge, 505-515 m, 3 September 1985 : 1 ovig. ♀ (NTM Cr. 007918).

REMARKS. — The single specimen agrees with the previous data, and has a carapace length of 2.8 mm, with a rostral dentition of $1 + 8/2$. The second pereopods are distinctly unequal and the dactyls of the chelae without lateral flanges. The specimen occurred within the known bathymetric range of this species, 445-650 m.

DISTRIBUTION. — Type locality : 23°38'S, 167°23.42'E, New Caledonia. Previously known only from the type specimens.

Periclimenes tenuirostris Bruce, 1991

Periclimenes tenuirostris Bruce, 1991 : 330-338, figs 13-16.

MATERIAL EXAMINED. — New Caledonia. MUSORSTOM 4 : stn DW 187, 19°08.3'S, 163°29.3'E, 65-120 m, 19 September 1985 : 2 ovig. ♀ (MNHN-Na 12047).

SMB 5 : stn DW 81, 22°38.2'S, 167°34.8'E, Norfolk Ridge, 110 m, 9 September 1989 : 1 ovig. ♀ (MNHN-Na 12048).

REMARKS. — The type material of this species was collected from 73-85 m. The specimens from stn DW 187 may have been collected from less than 100 m depth, but the specimen from stn DW 81 establishes the occurrence of this species below that depth.

The specimens from stn DW 187 had carapace lengths of 4.8, 4.2 mm, with rostral dentition $1 + 7/1-2$, the larger specimen with tip of the rostrum missing. The DW 81 specimen, carapace length 4.2 mm, has a rostral dentition of $1 + 9/4$, with the two distal ventral teeth very small. The stn DW 81 specimen, collected in 1989, showed no trace of colouration. The stn DW 187 specimen, collected in 1985, still had a distinct carmine colouration of the fingers, except the tips, of the single preserved second pereopod; similar reddish colouration of the fingers, excluding tips, and proximal and distal ends of the carpus of the first pereopod; and also on the distal margins of the rami of the uropods.

DISTRIBUTION. — Type locality : Grand Récif Sud, New Caledonia (BRUCE, 1991). No other records.

Periclimenes aleator sp. nov.

Figs 10-14

MATERIAL EXAMINED. — Loyalty Islands. BIOCAL : stn DW 46, 20°53.0'S, 167°17.0'E, 570-610 m, 30 August 1985 : 1 ovig. ♀, holotype (MNHN-Na 12027).

DESCRIPTION. — Small sized, slender pontoniine shrimp of subcylindrical body form; lacking right second pereiopod, some ambulatory pereiopods and pleopods.

Carapace smooth, glabrous; rostrum well developed, slender, horizontal, with feeble dorsal curvature, about 0.6 of carapace length, slightly exceeding antennular peduncle, dorsal carina distinct, extending posteriorly over anterior 0.6 of carapace length, with nine acute dorsal teeth, larger proximal five more closely grouped than distal teeth, first two situated behind posterior orbital margin; lateral carina distinct, feebly expanded posteriorly; ventral carina feebly developed over distal half of rostral margin, with four acute teeth, subequal, smaller than dorsal teeth; interdental spaces feebly setose; supraorbital teeth absent, epigastric tooth well developed, at about 0.3 of carapace length, without epigastric tubercle; orbit feebly developed, inferior orbital angle acutely produced; antennal spine small, slender, marginal, distinctly below, not exceeding inferior orbital angle; hepatic spine well developed, larger than antennal spine, at distinctly lower level, at level of first dorsal rostral tooth, remote from anterior carapace margin; anterolateral angle of branchiostegite not produced, bluntly subrectangular.

Abdomen smooth, glabrous; third abdominal segment not produced, non-carinate; pleura of first three segments broadly rounded, fourth and fifth posteriorly produced rounded, fifth segment about 0.65 of sixth segment length, with segment compressed, about 1.9 times longer than central depth, feebly tapering posteriorly, posteroventral angle small, subacute, posterolateral angle larger, acute. Telson about 1.5 times sixth segment length, slender, 4.0 times longer than anterior width, lateral margins sublinear, feebly posteriorly convergent, with four pairs of marginal dorsal spines, spines well developed, about 0.05 of telson length, at about 0.4, 0.6, 0.8, 0.9 of telson length, posterior margin about 0.4 of anterior telson width, angular, with small acute median process, with three pairs of spines, lateral spines subequal to dorsal spines, intermediate spines about 0.17 of telson length, slender, 8.0 times longer than proximal width, submedian spines slender, setulose, about 0.45 of intermediate spine length.

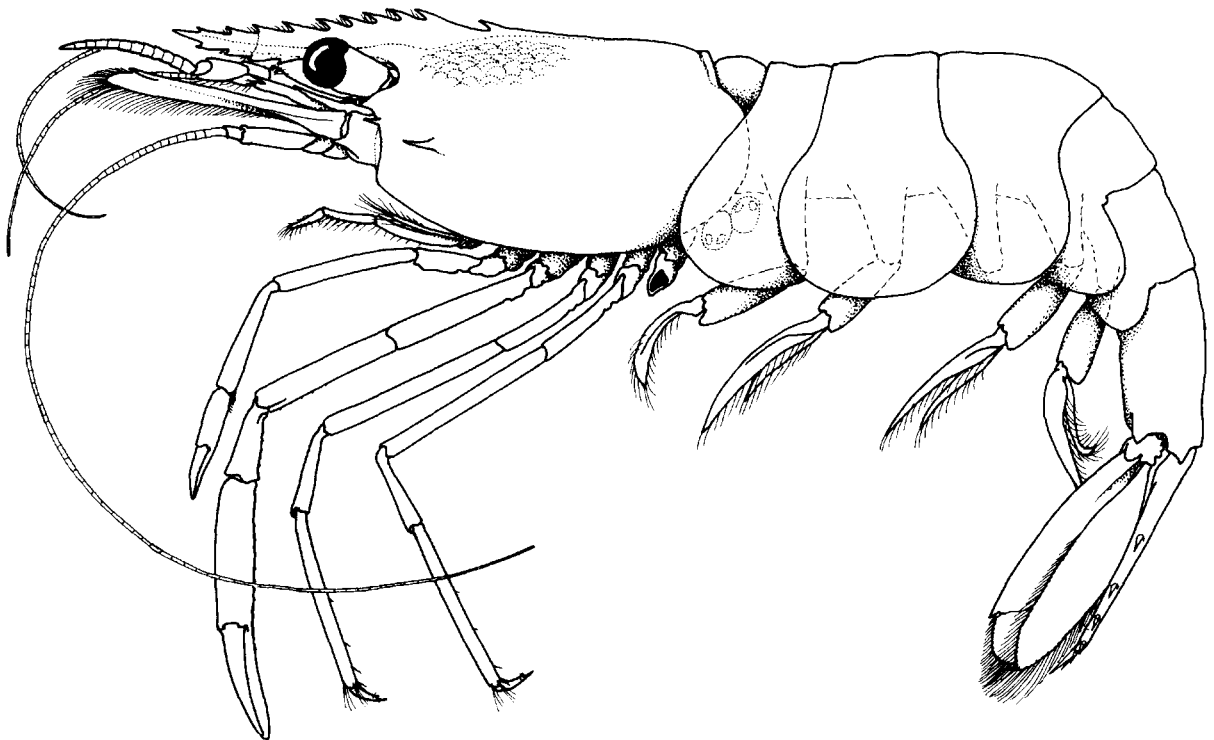


FIG. 10. — *Periclimenes aleator* sp. nov., holotype, ovig. ♀, BIOCAL, stn DW 46, Loyalty Islands, 570-610 m. Scale bar in millimeters.

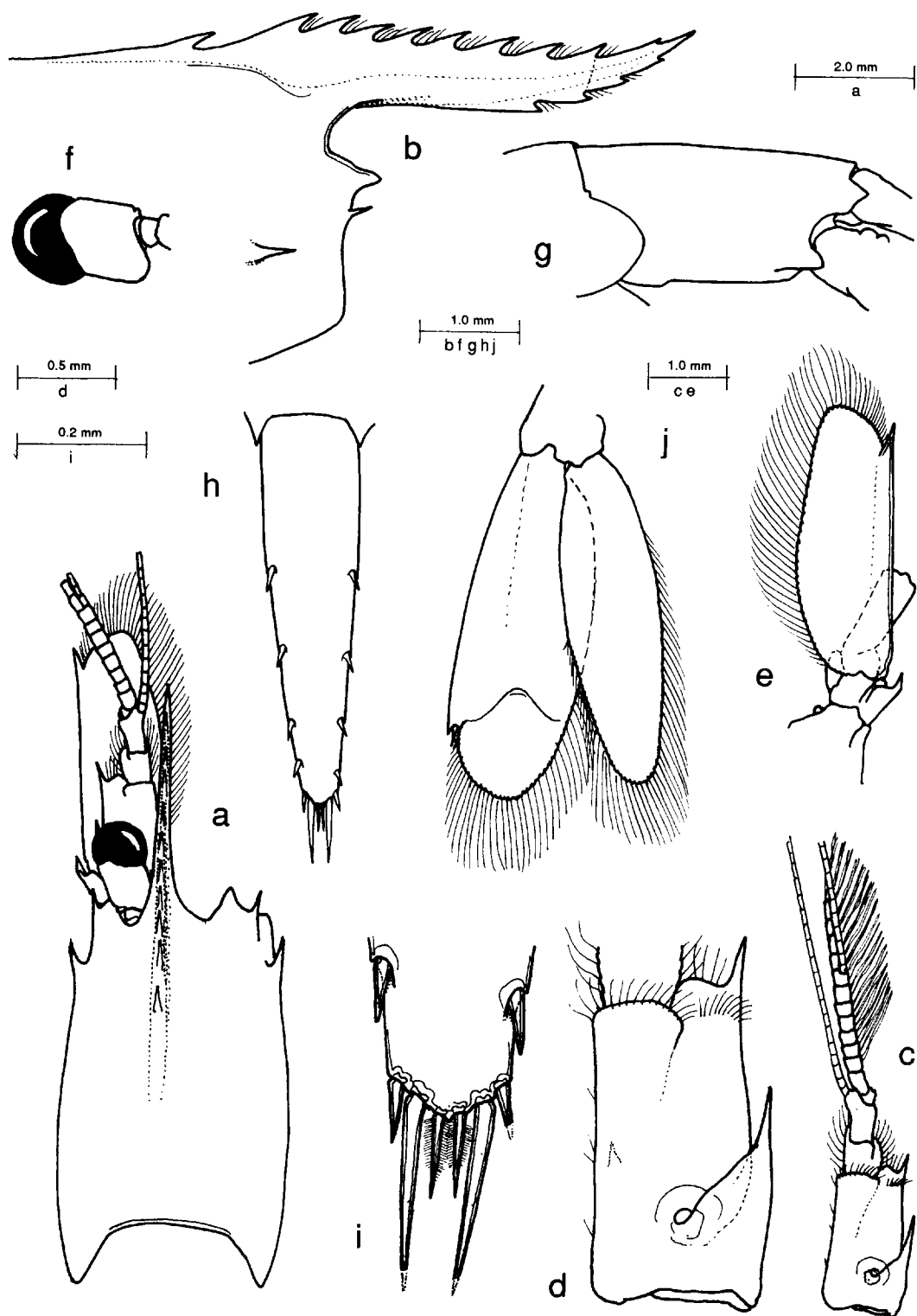


FIG. 11. — *Periclimenes aleator* sp. nov., holotype, ovig. ♀ : a, carapace, rostrum, right eye and antennae, dorsal; b, anterior carapace and rostrum, lateral; c, antennule; d, same, proximal segment; e, antenna; f, eye; g, sixth abdominal segment; h, telson; i, same, posterior dorsal and posterior spines; j, uropod.

Eye with well developed globular, well-pigmented cornea, without accessory pigment spot, obliquely oriented on stalk, corneal diameter about 0.16 of carapace length, stalk about as long as wide, uniform, feebly compressed.

Antennular peduncle reaching to about level of distal dorsal rostral tooth; proximal segment about 1.9 times longer than wide, medial margin straight, sparsely setose, with acute tooth ventrally at about 0.5 of length, lateral margin feebly sinuous, convergent, with well developed distolateral lobe with long slender lateral tooth, reaching to about 0.6 of intermediate segment length, stylocerite proximally broad, distally slender, acute, reaching to about 0.7 of proximal segment length, statocyst normal, with subcircular statolith; intermediate segment broad, 1.5 times wider than long, with well developed setose lateral flange, medial margin setose, obliquely articulated with distal segment; distal segment slender, about 1.5 times dorsal length of intermediate segment, about 1.6 times longer than distal width; upper flagellum biramous, with proximal eight segments fused, shorter free ramus with four segments, longer free ramus slender, filiform, about 0.9 of carapace length; lower flagellum, slender, filiform, about subequal to carapace length; with about 22 groups of aesthetascs.

Antenna with basicerite robust, with strong distolateral tooth, carpocerite subcylindrical, slightly compressed, reaching to about 0.4 of scaphocerite length, about 2.5 times longer than distal width, flagellum well developed, slender, about 3.0 times carapace length, scaphocerite extending well beyond antennular peduncle and rostrum, exceeding latter by about 0.25 of length of lamella, lamella about 2.8 times longer than greatest width, at about 0.4 of length, broad, feebly tapering distally, about 0.75 of carapace length, lateral margin straight, with strong distal tooth, distally exceeded by broad, bluntly angulate distal margin of lamella.

Epistome normal, unarmed. First three thoracic sternites broad, unarmed; fourth with broad triangular plates, most developed medially, separate by deep median fissure, fifth sternite similar, plate smaller, stouter; posterior sternites unarmed.

Mandible (right) normal, without palp; molar process stout, obliquely truncate distally, with five stout teeth, anterior and posterior groups of short setae; incisor process well developed, obliquely truncate distally, with three large acute teeth, central tooth slightly smaller than outer teeth, medial tooth with minute accessory tooth laterally, medial edge entire, unarmed. Maxillula with slender palp; distinctly bilobed, with long slender dorsal lobe, short, stout ventral lobe, with small ventral tubercle, without seta; upper lacinia moderately broad, feebly oblique distally, with about 7 short stout simple spines, with numerous short slender spiniform setae; lower lacinia short, stout, tapering with numerous long spiniform setae distally. Maxilla with slender tapering distally acute palp, proximal half of lateral margin with several short plumose setae; basal endite deeply bilobed, distal lobe longer, stouter than proximal lobe, with about 13, 8 short slender simple distal setae respectively; coxal endite obsolete, medial margin broadly convex; scaphognathite about 2.8 times longer than broad, posterior lobe broad, about 2.0 times longer than wide, anterior lobe 1.4 times longer than wide, distally narrow, with medial margin deeply concave. First maxilliped with slender simple palp; slightly exceeding distal margin of basal endite, with long preterminal papillose seta; basal endite broad, distally rounded with medial margin straight, densely fringed with slender feebly setulose setae; coxal endite distinct from basal, broadly convex, sparsely setose, with three elongate plumose setae distally; exopod with flagellum slender, with about six long plumose setae distally, caridean lobe large, broad; epipod triangular, bilobed. Second maxilliped with normal endopod; dactylar segment normal, about 3.2 times longer than broad, with numerous long coarsely serrulate spines medially, propodal segment broad, not produced distomedially, with about 7 long spiniform setae, numerous slender simple setae, carpus with ventromedial angle acutely produced, ischiomerus and basis normal, basis distomedially feebly excavate, exopod with slender flagellum, with 7 long plumose setae distally, six short plumose setae proximolaterally, coxa broadly produced medially, convex, with few long simple setae, epipod subrectangular, small, without podobranch. Third maxilliped with endopod slender, reaching to about proximal 0.3 of carpocerite; ischiomerus completely fused to basis, junction indicated by small medial notch, combined segment about 6.2 times longer than central width, slightly tapering distally, bowed, flattened centrally, distolateral margin sparsely setose, with two short, stout, distolateral spines, medial margin sparsely setose, with slender simple setae; penultimate segment about 0.5 of combined proximal segment length, 4.0 times longer than proximal width, feebly tapering distally, subcylindrical, sparsely setose laterally, with about 7 small groups of spiniform setae medially; terminal segment about 0.4 of combined proximal segment length, 5.0 times longer than proximal width, tapering, distally blunt, with about 7 transverse groups of setae ventromedially, larger setae ventrolaterally, basal region medially convex, sparsely setose; exopod with slender flagellum, with about 7 long plumose setae distally; coxa with small subacute setose

medial process, rounded lateral plate, small quadrilamellar arthrobranch. Paragnaths with well developed narrow alae, corpus short, broad, with oblique ventrolateral ridge.

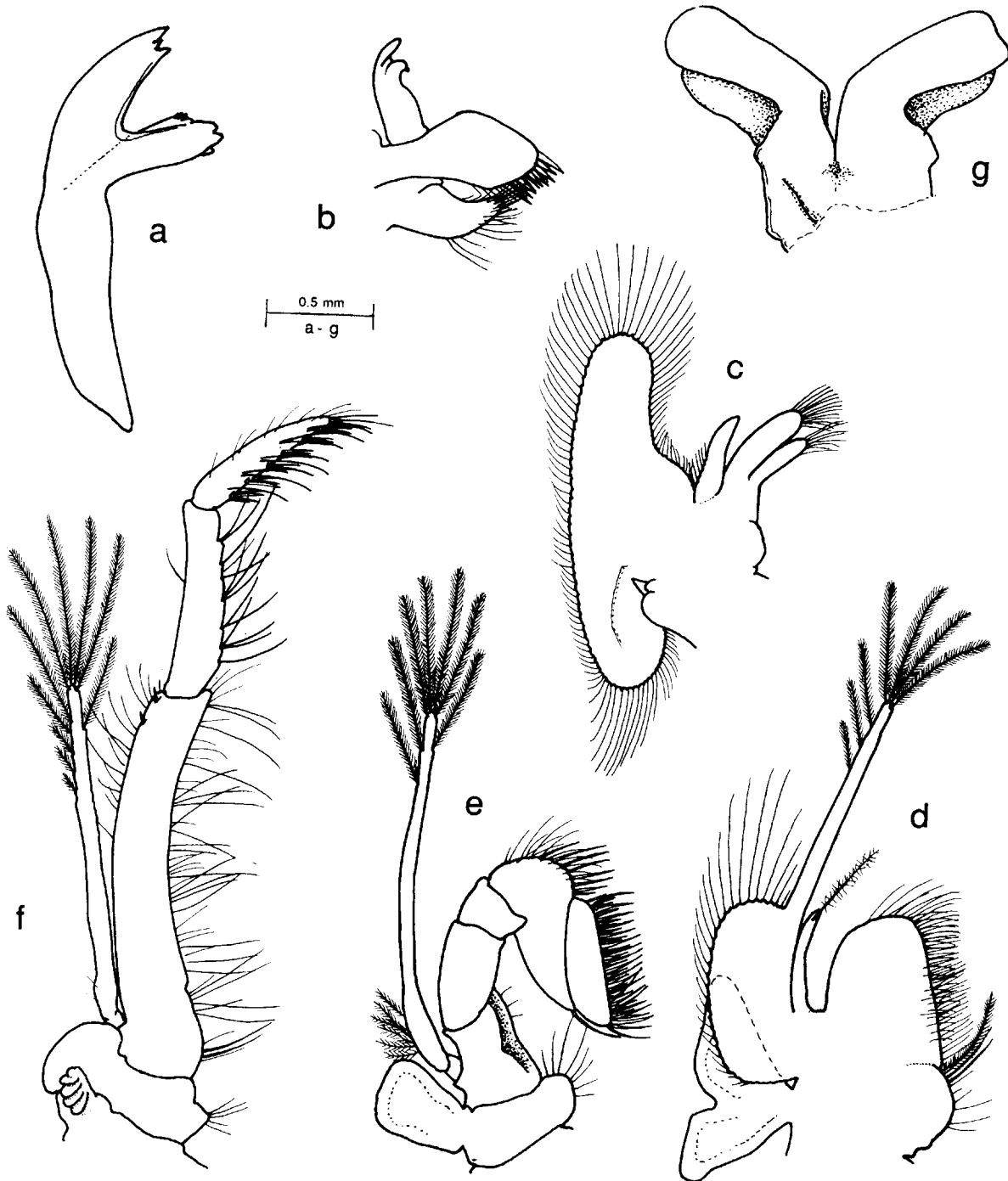


FIG. 12. — *Periclimenes aleator* sp. nov., holotype, ovig. ♀ : a, mandible; b, maxillula; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped; g, paragnaths.

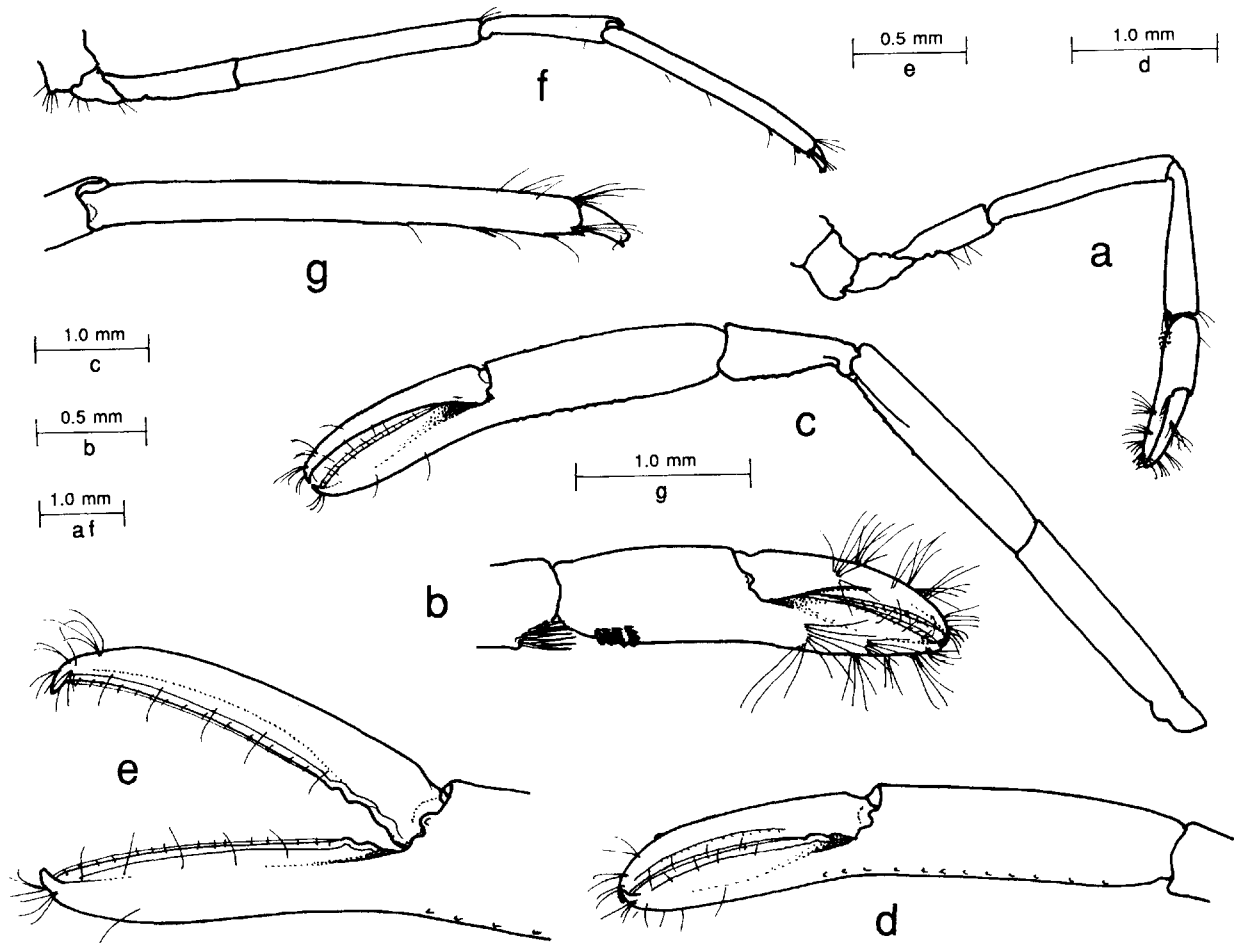


FIG. 13. — *Periclimenes aleator* sp. nov., holotype, ovig. ♀ : a, first pereiopod; b, same, chela; c, second pereiopod (minor?); d, same, chela; e, same, fingers; f, third pereiopod; g, same, propod and dactyl.

First pereiopod slender, exceeding scaphocerite by about half length of fingers, carpopocerite by chela and half of carpus, chela with palm subcylindrical, feebly compressed, about 2.0 times longer than deep, subuniform, with four transverse rows of short serrulate setae proximoventrally; fingers robust, subequal to palm length, feebly subspatulate, cutting edges lateral, entire, dactylus about 4.0 times longer than proximal depth, with small feebly hooked tip, fixed finger similar, both with numerous groups of simple setae; carpus about subequal to chela length, 4.5 times longer than distal width, tapering proximally, with transverse row of serrulate setae distoventrally; merus about 1.2 times chela length, 8.0 times longer than central width, uniform; ischium about 0.6 of chela length, 0.5 of meral length, 3.4 times longer than distal width, feebly carinate, sparsely setose ventrally, obliquely articulated with basis; basis about 0.5 of chela, carpus length, ventrally non-setose, coxa normal, with small, non-setose distoventral process.

Second pereiopod preserved on left side only (minor pereiopod?), extending to exceed carpopocerite by carpus and chela; chela well developed, about 0.8 of carapace length, palm subcylindrical, slightly compressed, about 3.4 times longer than deep, mainly smooth, with inconspicuous longitudinal row of small acute subventral tubercles, extending onto proximal part of fixed finger; fingers slightly deflexed, equal to about 0.85 of palm length, cutting edges feebly laterally situated, dactylus slender, 5.0 times longer than proximal depth, with stout hooked tip, distal 0.8 of cutting edge sharp, entire, proximal fifth with two small blunt teeth distally; fixed finger similar to dactyl, 5.0 times longer than proximal depth, cutting edge sharp for distal 0.9 of length, with two small blunt teeth, proximally; carpus about 0.4 of palm length, 2.5 times longer than distal width, feebly expanded, excavate

distally, tapered proximally, unarmed, with longitudinal row of 5 very small acute subventral tubercles; merus subequal to palm length, 5.0 times longer than central width, feebly tapered distally, distoventral angle unarmed, distal ventral border with small acute denticles; ischium subequal to meral length, about 6.0 times longer than distal width, subuniform, feebly tapered proximally, unarmed; basis and coxa slender, without special features.

Ambulatory pereiopods slender, third pereiopod exceeding carapocerite by dactyl, propod and 0.5 of carpus, scaphocerite by dactyl and 0.5 of propod; third pereiopod dactyl slender, about 0.16 propod length, unguis distinct from corpus, slender, curved, about 3.6 times longer than proximal width, about 0.6 of corpus length; corpus compressed, about 2.75 times longer than proximal depth, dorsal margin feebly convex, non-setose, ventral margin largely straight, sharp, with acute distal accessory tooth, about 0.25 of unguis length, with single distolateral sensory seta; propod about 0.6 of carapace length, about 12.0 times longer than deep, uniform, with terminal and preterminal pairs of long slender spines (damaged), with one (two?) single shorter distal ventral spines, with scattered small groups of long simple setae distally; carpus about 0.55 of propod length, 4.0 times longer than distal width, with distinct distodorsal lobe, unarmed; merus subequal to propod, 8.5 times longer than central width, subuniform, unarmed; ischium about 0.45 of propod length, 4.0 times longer than distal width, feebly tapered proximally basis and coxa normal; fourth and fifth pereiopods similar.

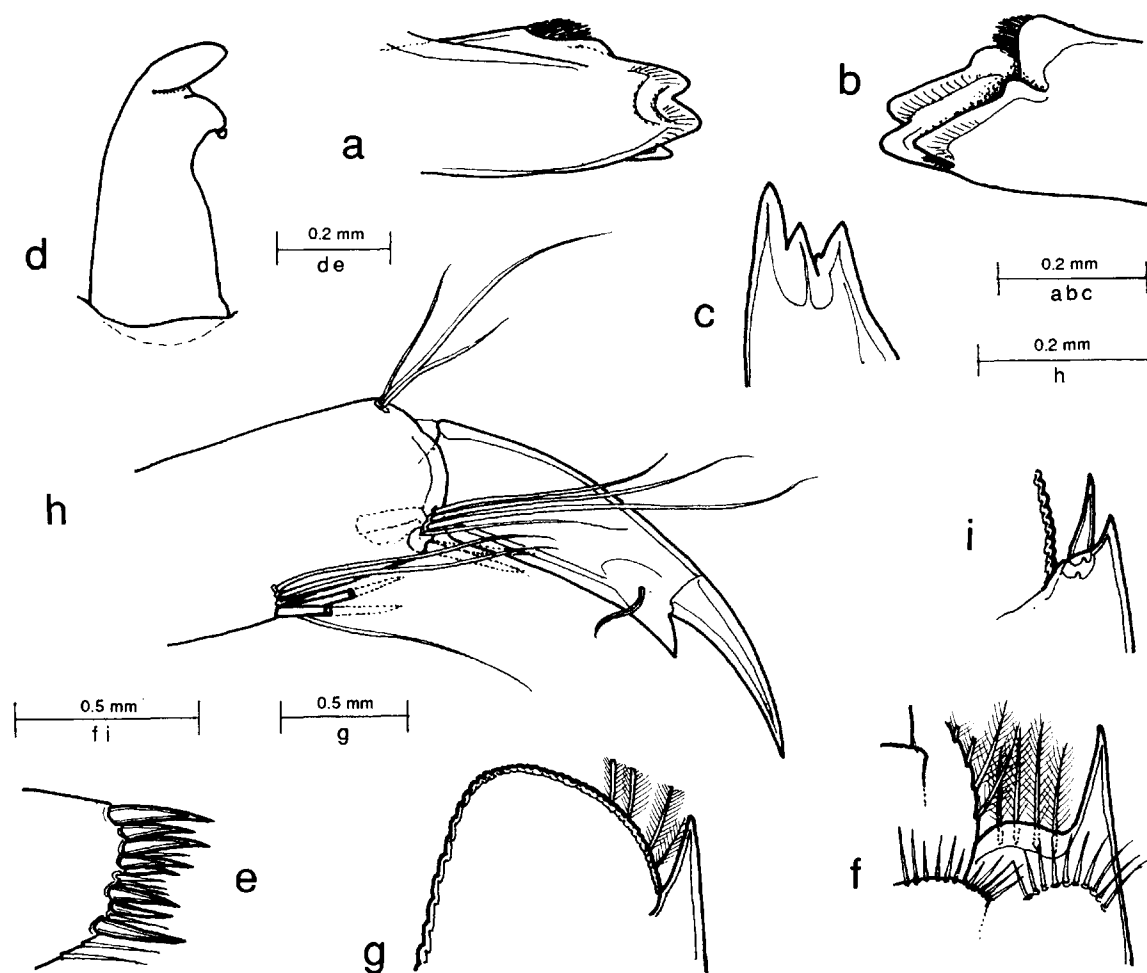


FIG. 14. — *Periclimenes aleator* sp. nov., holotype, ovig. ♀ : a-b, mandible, molar process, dorsal and ventral; c, same, incisor process; d, maxillula, palp; e, same, upper lacinia; f, antennule, proximal segment of peduncle, distolateral angle; g, scaphocerite, distal lamella; h, third pereiopod, distal propod and dactyl; i, uropod, distolateral angle of exopod.

Pleopods without special features.

Uropods exceeding telson length, reaching to about middle of intermediate spine length; protopodite with broadly rounded distolateral lobe; exopod about 2.8 times longer than broad, lateral margin feebly convex, non-setose, with small acute distal tooth at 0.45 of length, with larger mobile spine medially, diaeresis distinct; endopod about 0.9 of exopod length, 3.4 times longer than wide.

Ova small, two well developed eyed ova beneath abdomen only.

MEASUREMENTS (mm). — Carapace length, 4.5; carapace and rostrum, 8.0; total body length (approx.), 21.5; second pereopod chela, 4.0; length of ovum, 0.7.

COLOURATION AND HOST. — No data.

ETYMOLOGY. — *Aleator* (Latin), a gambler, relating to luck or contingency.

SYSTEMATIC POSITION. — With four pairs of dorsal telson spines, *P. aleator* appears to be most closely related to the other deep-water species of the genus that possess more than the typical number of two pairs of spines in this position. Of these, *P. aleator* most closely resembles *P. brevirostris* sp. nov., from which it may be distinguished by the longer rostrum, that distinctly exceeds the antennular peduncle, with a dentition of nine dorsal and four ventral teeth in addition to an epigastric tooth. In *P. brevirostris*, the rostrum falls distinctly short of the distal end of the antennular peduncle and has only five dorsal and two small ventral rostral teeth in addition to the epigastric tooth. All the rostral teeth in *P. brevirostris* are situated anterior to the level of the posterior orbital margin, whereas two are posteriorly situated in *P. aleator*, and the hepatic spine is less strongly developed than in *P. aleator*. In their other features the two species appear generally similar, but it may be noted that the medial margin of the incisor process of the mandible in *P. aleator* is unarmed, but that of *P. brevirostris* is minutely dentate.

REMARKS. — Full assessment of the relationships of *P. aleator* cannot be completed without information on the morphology of the major second pereopod. From its general resemblance to that of *P. brevirostris* it seems certain that the single preserved second pereopod is the minor appendage, and since this is feebly tuberculate ventrally, it seems most probable that the major pereopod will possess a more strongly tuberculate chela. The presence of a single ventral longitudinal row of tubercles on the palm, carpus and distal merus of the minor second pereopod, which can be very difficult to discern on the chela unless it is orientated at exactly the appropriate angle, may be a characteristic feature of this species but could also have been easily overlooked in others.

Periclimenes brevirostris sp. nov.

Figs 15-20

MATERIAL EXAMINED. — New Caledonia. MUSORSTOM 4 : stn CP 242, 22°05.8'S, 167°10.3'E, Isle of Pines, 500-550 m, 3 October 1985 : 1 adult ♀, holotype (MNHN-Na 12044).

CHALCAL 2 : stn CC 2, 24°55.48'S, 168°21.29'E, Norfolk Ridge, 500 m, 28 October 1986 : 1 ♂, paratype (MNHN-Na 12045).

DESCRIPTION. — Small sized pontoniine shrimps of generally slender subcylindrical body form.

Female holotype. Carapace smooth, glabrous; rostrum well developed, slender acute, horizontal, slightly up-turned distally, reaching to about end of intermediate segment of antennular peduncle, dorsal carina well developed, margin feebly concave, with five small acute similar teeth, equally spaced, with slightly longer bare tip distally; lateral carinae moderately developed; ventral carina obsolete, ventral margin convex, non-setose, with two small acute teeth distally, beyond level of most distal dorsal tooth; small epigastric tooth present at about 0.12 of carapace length; supraorbital teeth absent; orbit feebly developed, inferior orbital angle produced, acute in lateral view, antennal spine small, acute, marginal, slightly dorsally directed, not reaching level of apex of inferior orbital angle, hepatic spine well developed, slender, acute, slightly anterior to level of epigastric tooth, below level of antennal spine; anterolateral margin of branchiostegite not produced, broadly rounded.

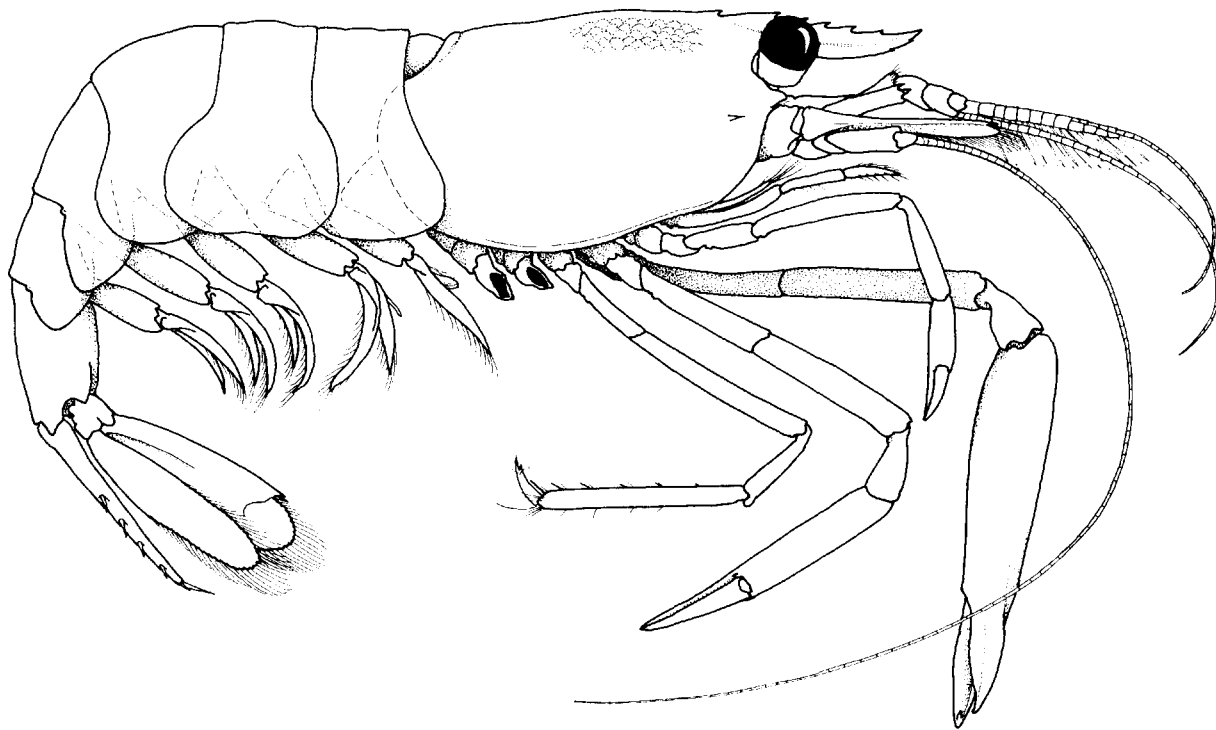


FIG. 15. — *Periclimenes brevirostris* sp. nov., holotype, ♀, MUSORSTOM 4, stn CP 242, Isle of Pines, 500-550 m. Scale in millimeters.

Abdomen smooth, glabrous; third abdominal segment not posterodorsally produced, non-carinate; pleura of first three segments broadly rounded, fourth and fifth pleura posteriorly produced, bluntly rounded; fifth segment about 0.66 of sixth segment length, sixth segment compressed, subuniform, about 1.5 times longer than deep, posteroventral angle small, subacute, posterolateral angle broad, acute. Telson about 1.6 times longer than sixth abdominal segment, 3.3 times longer than anterior width, lateral margins subparallel for anterior 0.3, convergent for posterior 0.7 of telson length, with four pairs of well developed similar, marginal dorsal spines, about 0.06 of telson length, at about 0.43, 0.53, 0.72 and 0.85 of telson length, posterior margin angular, with small acute median point, with three pairs of spines, lateral spines small, robust, about 0.85 of dorsal spine length, intermediate spines long, slender, about 0.15 of telson length, 8.5 times longer than basal width, submedian spines small, slender, non-setose, about 1.25 times lateral spine length.

Eye with large globular well pigmented cornea, without accessory pigment spot, slightly oblique, about 0.2 of carapace length, stalk short, stout, about as wide as long, width slightly less than corneal diameter, tapering slightly proximally.

Antennule with peduncle distinctly exceeding rostrum, shorter than scaphocerite; proximal segment about 1.9 times longer than wide, medial margin straight, setose, with small acute ventral tooth at about 0.5 of length, lateral margin feebly convergent, concave, with well developed distolateral lobe with strong acute lateral tooth, far exceeding anterior margin of lobe, reaching to about middle of intermediate segment, stylocerite long, slender, acute, reaching to about 0.66 of segment length, statocyst normal, with subcircular statolith; intermediate segment about 0.25 of proximal segment length, slightly wider than long, with well developed lateral lamella; distal segment about 0.35 of proximal segment length, 1.5 times intermediate segment length, 1.25 times longer than distal width; upper flagellum biramous, with proximal eight segments fused, shorter free ramus with four stout segments, longer free ramus with about 22 slender segments; lower flagellum slender, about 1.3 times carapace length; with about 22 groups of aesthetascs.

Antenna with stout basicerite, with acute distolateral tooth; carpocerite robust, 2.5 times longer than distal width, compressed, slightly tapered proximally, reaching to about 0.5 of scaphocerite length, flagellum well developed, slender, about 3.5 times carapace length; scaphocerite well developed, extending far beyond antennular peduncle, about 2.75 times longer than maximum width, situated at about 0.4 of length, slightly tapered distally,

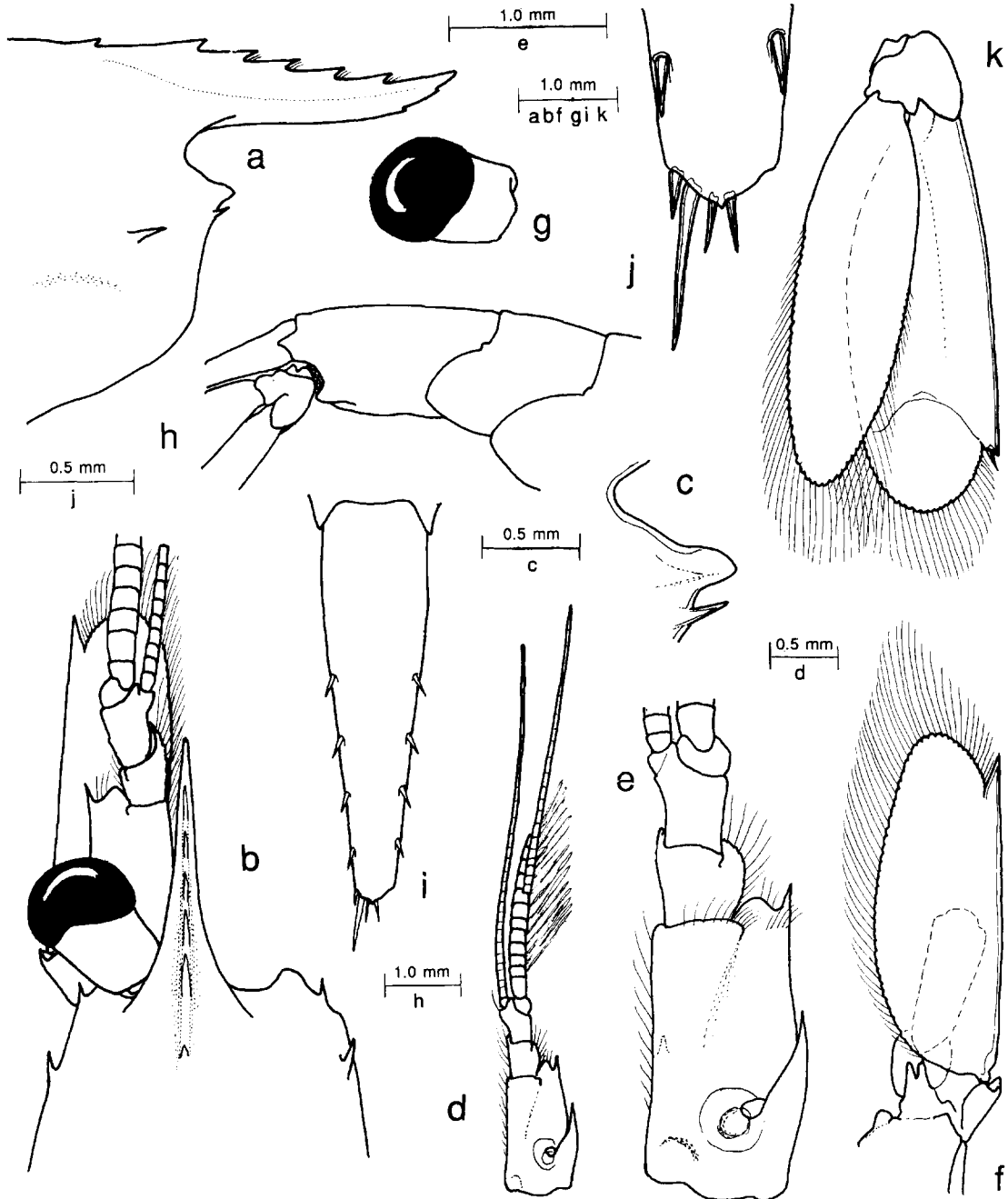


FIG. 16. — *Periclimenes brevirostris* sp. nov., holotype, ♀: a, anterior carapace and rostrum, lateral; b, anterior carapace, rostrum, right eye and antennal peduncles, dorsal; c, inferior orbital angle, lateral; d, antennule; e, same, peduncle; f, antenna; g, eye, dorsal; h, sixth abdominal segment, lateral; i, telson; j, same, posterior spines; k, uropod.

anterior margin produced, bluntly angular, lateral margin straight, with strong lateral distal tooth, well exceeded by anterior margin of lamella.

Epistome normal, unarmed. Second thoracic sternite with high raised transverse ridge, third and fourth with low transverse ridge, posterior sternites unarmed.

Mandible (right) with normal corpus, without palp; molar process robust, distally obliquely truncate, with three large blunt teeth and group of short spinules; incisor process slender, tapering distally, obliquely truncate, with three acute teeth, central tooth smaller than outer teeth, medial margin with three minute denticles distally. Maxillula with strongly bilobed palp, upper lobe longer, narrower than lower lobe with small ventral tubercle with short simple seta; upper lacinia slightly broadened, with about nine short, stout, simple spines distally, with numerous short setae; lower lacinia short, stout, tapering distally, with numerous long spiniform setae. Maxilla with simple palp, expanded proximally, tapering distally, subacute, with few short plumose setae proximolaterally; basal endite well developed, feebly bilobed distally, upper lobe larger than lower, with about 12, 11 short simple setae respectively, coxal endite obsolete, medial margin convex; scaphognathite well developed, slender, about 3.0 times longer than wide, distally narrow, medial margin strongly concave. First maxilliped with slender, distally acute palp, extending well beyond distal margin of basal endite, preterminal medial papillose setae; basal endite large, broadly rounded, with straight medial margin, with numerous long feebly setulose setae, coxal endite completely fused with basal endite, feebly bilobed, distomedial margin convex, with few short simple setae, single long robust serrulate seta distally; exopod with slender flagellum, with several plumose setae distally, caridean lobe well developed, narrow; epipod large, angularly bilobed. Second maxilliped with normal endopod; dactylar segment about 2.8 times longer than wide, with numerous short and long finely serrulate spines, propodal segment with distomedial angle enlarged with about nine long slender spines, carpus with ventromedial angle acute, ischiomerus and basis normal, basis feebly excavate medially, exopod with slender flagellum with several long plumose setae distally, single seta proximolaterally; coxa with angular medial protuberance, feebly setose, with subrectangular epipod laterally, without podobranch. Third maxilliped with slender endopod, reaching to about distal end of carpocerite; ischiomerus almost fully fused to basis, ischiomerus portion broad, compressed, about 5.2 times longer than central width, subuniform, lateral margin setose with single small preterminal spine, medial margin with numerous long sparsely setulose setae, penultimate segment about 4.4 times longer than central width, about 0.65 of ischiomerus region, subcylindrical, with four groups of long slender, finely serrulate spiniform setae medially, terminal segment about 0.8 of penultimate segment length, 0.5 of ischiomerus length, about 5.2 times longer than proximal width, tapering distally, with short simple apical spine, with seven transverse rows of serrulate spines on medial border, basis separated by small notch in medial margin from ischiomerus, as long as wide, medial margin broadly convex, sparsely setose; exopod with slender flagellum, with numerous long plumose setae distally; coxa feebly produced medially, lateral plate broadly rounded, with small 5-lamellar arthrobranch. Paragnaths with small simple alae, separated by wide v-shaped fissure, corpus short, stout, with feeble short, oblique curved ridges laterally.

First pereopod well developed, slender, exceeding carpocerite by chela and carpus; palm subcylindrical, moderately compressed, 2.0 times longer than deep, with five transverse rows of short serrulate spines proximovertrally; fingers about 0.85 of palm length, simple, with small hooked tips, entire cutting edges distolaterally, dactyl about 4.3 times longer than proximal depth, with sparse tufts of long setae, fixed finger similar; carpus about 0.8 of chela length, 3.5 times longer than distal width, strongly tapered proximally, with transverse row of serrulate setae distovertrally; merus 1.2 times chela length, 1.4 times carpus length, 6.0 times longer than central width, subuniform; ischium about 0.5 of merus length, 3.0 times longer than deep, sparsely setose medially; basis about 0.75 of ischial length, with small setose medial lobe; coxa with small distovertrally setose process.

Second pereopods well developed, markedly unequal, dissimilar; major (left) second pereopod exceeding antennular peduncle by carpus and chela, chela about 1.3 times carapace length, with palm subcylindrical, slightly oval, mainly smooth, with few very small acute tubercles ventrally and distodorsally, 3.5 times longer than deep, fingers about 0.45 of palm length, dactylus strongly depressed distally, expanded medially and laterally, about 4.2 times longer than proximal depth, 8.0 times longer than central depth, with stout hooked tip, cutting edge situated laterally, anterior 0.75 sharp, posterior fourth with two small acute teeth lateral to fossa; carpus about 0.25 of palm length, 1.3 times longer than distal width, strongly tapered proximally, feebly excavate distally, non-tuberculate, unarmed; merus about 0.8 of palm length, 4.5 times longer than central width, subuniform,

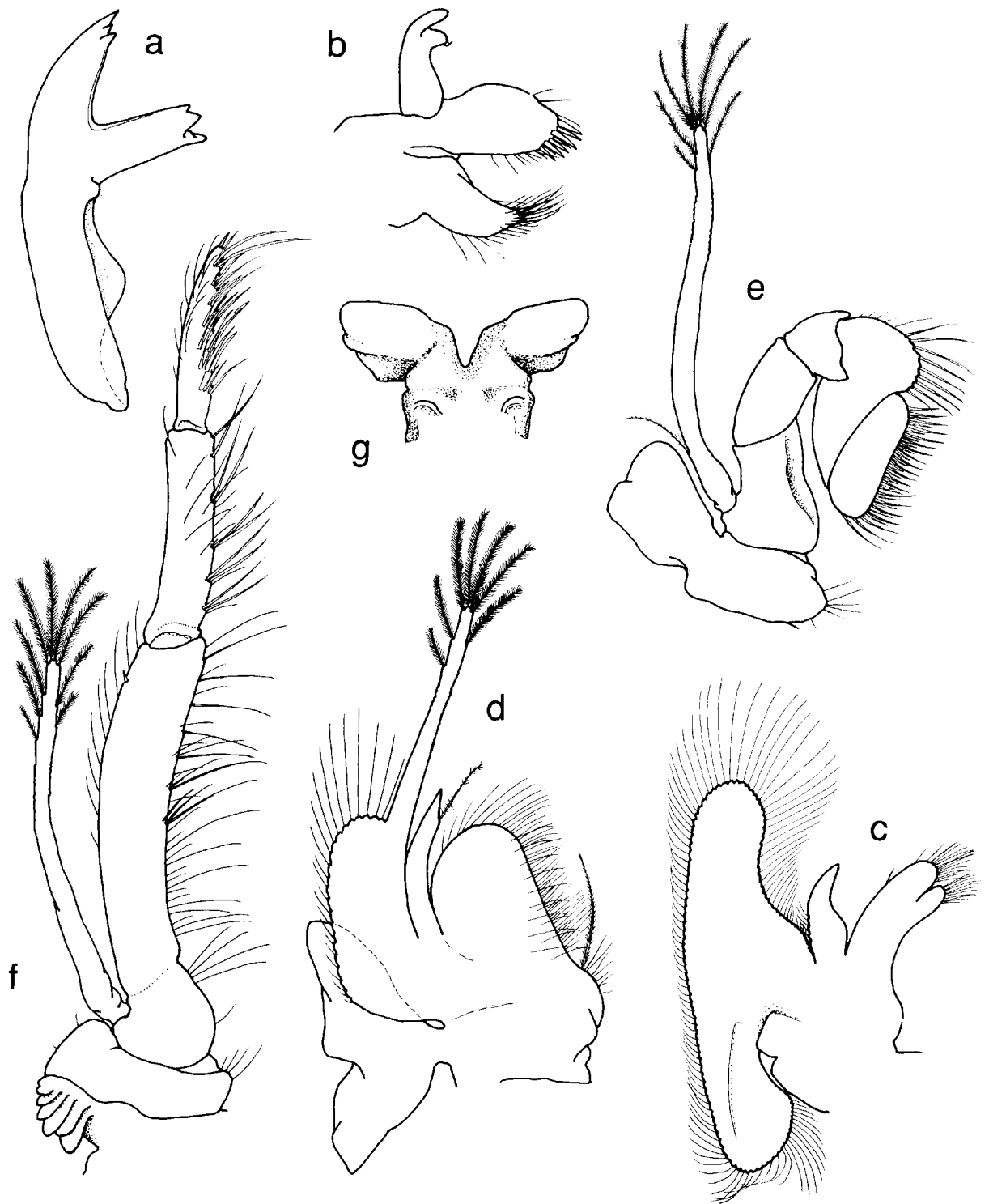


FIG. 17. — *Periclimenes brevirostris* sp. nov., holotype, ♀ : a, mandible; b, maxillula; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped; g, paragnaths.

distoventral angle rounded, unarmed, ventral margin feebly tuberculate; ischium subequal to merus length, about 5.0 times longer than distal width, feebly tapered proximally; basis and coxa normal, without special features. Minor (right) second pereiopod reaching to about end of intermediate segment of antennular peduncle; chela about 0.9 of carapace length, 0.66 of major chela length, subequal to major palm length, smooth, subcylindrical,

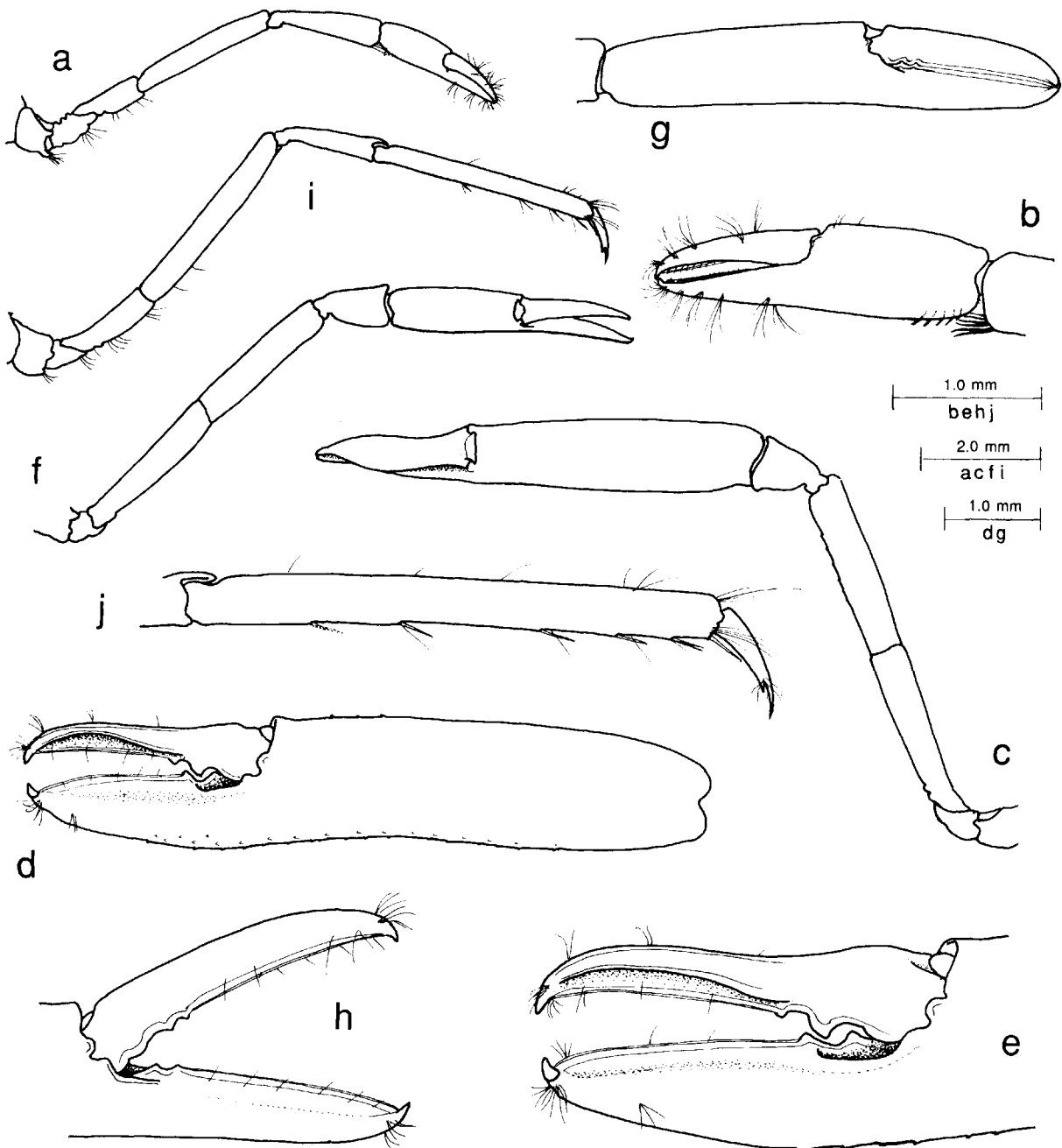


FIG. 18. — *Periclimenes brevirostris* sp. nov., holotype, ♀ : a, first pereiopod; b, same, chela; c, major second pereiopod, lateral; d, same, chela, medial; e, same, fingers; f, minor second pereiopod, lateral; g, same, chela, medial; h, same, fingers; i, third pereiopod; j, same, propod and dactyl.

slightly compressed, 3.4 times longer than distal depth, slightly tapered proximally, fingers about 0.7 of palm length, simple, slender, tapering, with small acute hooked tips, dactyl 5.8 times longer than central depth, cutting edge sharp, entire, lateral, over distal 0.75, with two small acute teeth distally on proximal fourth, fixed finger similar, with two small acute teeth at distal margin of proximal fifth of cutting edge; carpus about 1.6 of palm length, 1.8 times longer than distal width, proximally tapered; merus about 1.2 times palm length, 4.8 times longer than central width, subuniform, without ventral tubercles; ischium 1.1 times merus length, 5.5 times longer than distal width, feebly tapered proximally; basis and coxa normal, without special features.

Ambulatory pereiopods slender, third pereiopod exceeding scaphocerite by dactyl and 0.6 of propod; dactyl slender, compressed, about 0.22 of propod length, with unguis distinct, conical, feebly curved, 4.0 times longer than basal width, corpus 2.2 times unguis length, 2.6 times longer than proximal depth, with stout acute distoventral accessory tooth, about 0.3 of unguis length, proximal ventral border feebly concave, unarmed, with distomedial and distolateral pairs of sensory setae; propod about 0.7 of carapace length, 10.5 times longer than deep, subuniform, sparsely setose, with single long slender distoventral spine, about 0.33 of dactylar length, subterminal pair of slightly shorter ventral spines, four similar isolated ventral spines; carpus about 0.45 of propod length, 4.2 times longer than distal width, with distodorsal lobe; merus about 0.9 of propod length, 8.0 times longer than central width, uniform, unarmed; ischium about 0.5 of merus length; basis and coxa normal. Fourth and fifth pereiopods similar.

Uropods distinctly exceeding telson; protopodite with distolateral lobe rounded; exopod broad, about 2.8 times longer than wide, lateral border feebly convex, non-setose, with small acute distal tooth, at 0.85 of length, with longer mobile spine medially, diaeresis distinct; endopod subequal to exopod length, 3.5 times longer than wide.

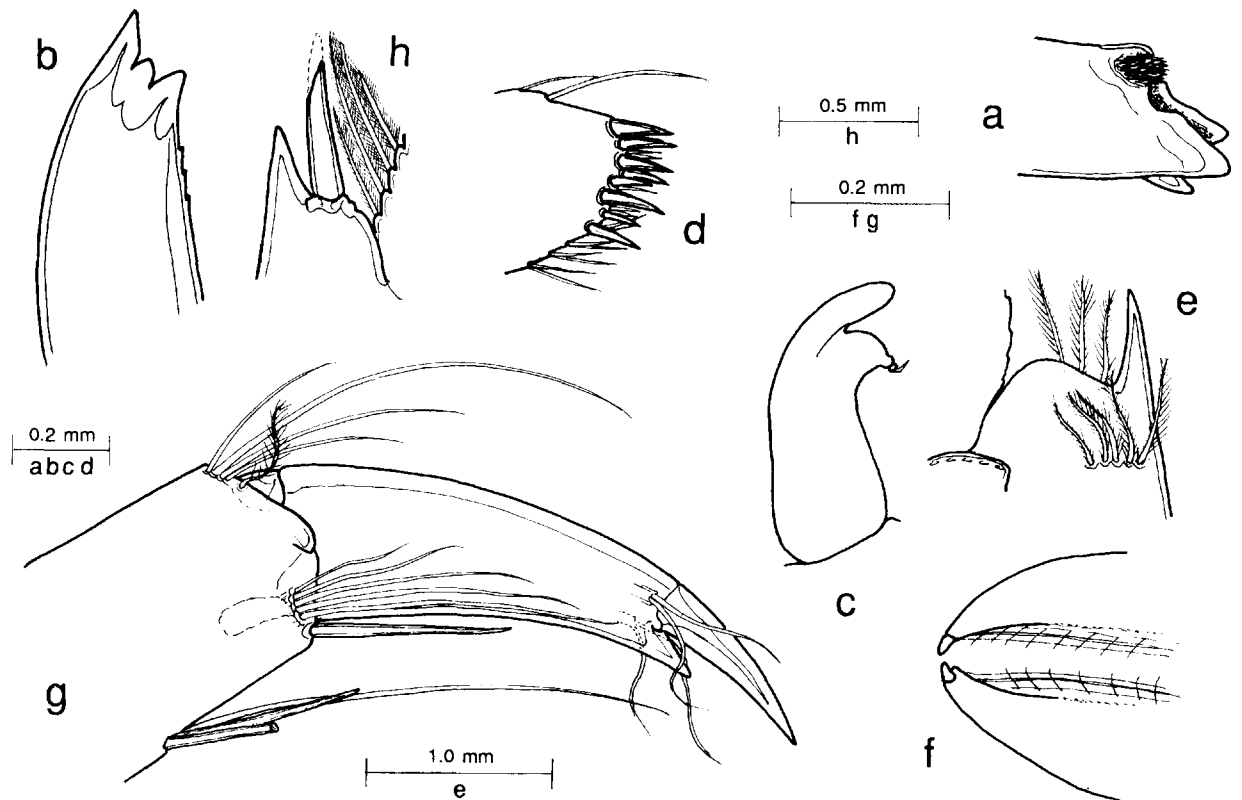


FIG. 19. — *Periclimenes brevisrostris* sp. nov., holotype ♀: a, molar process of mandible; b, incisor process; c, palp of maxillula; d, same, distal upper lacinia; e, antennule, proximal segment of peduncle, distolateral angle; f, first pereiopod chela, tips of fingers; g, third pereiopod, distal propod and dactyl; h, uropod, exopod, distolateral angle.

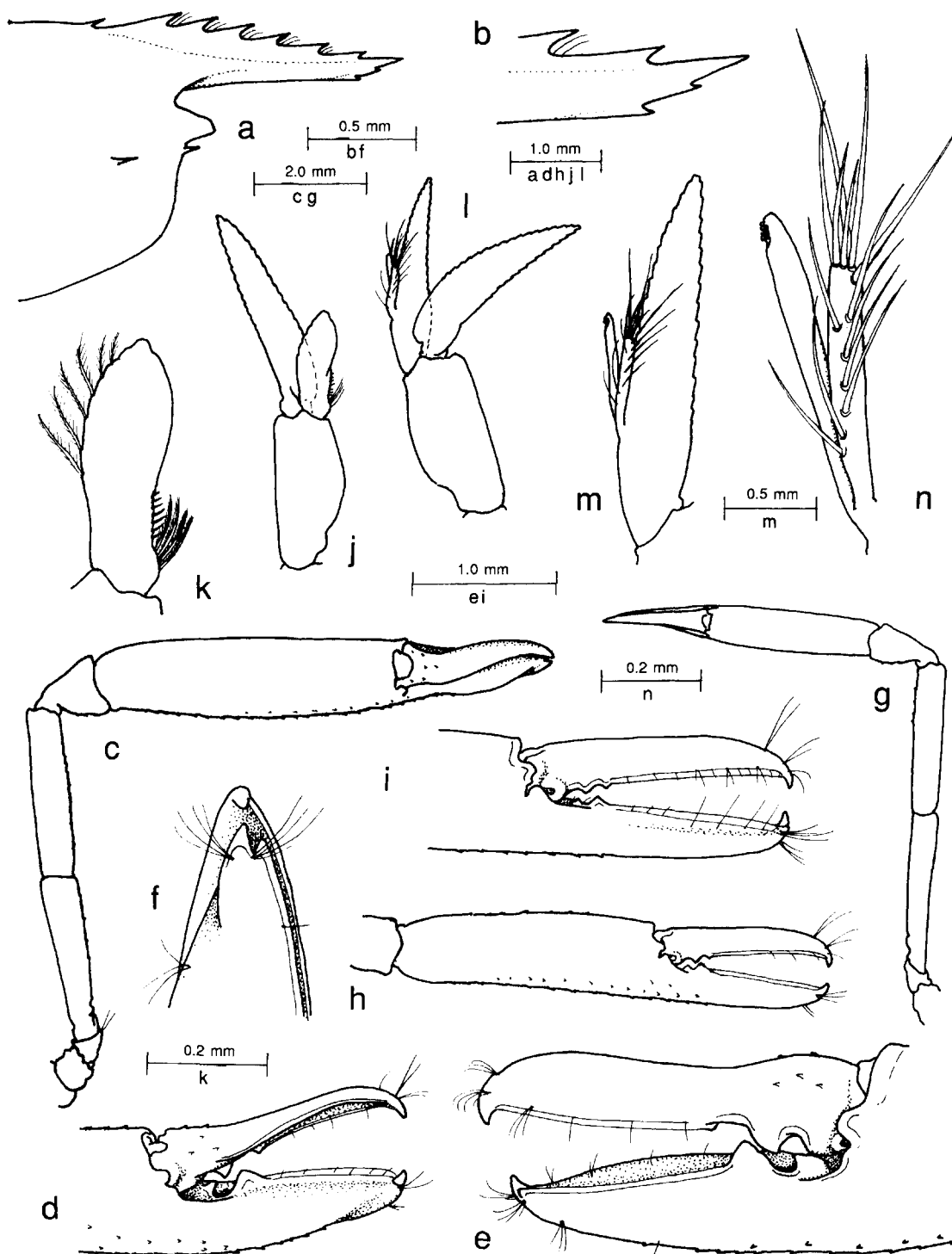


FIG. 20. — *Periclimenes brevirostris* sp. nov., paratype, ♂, Norfolk Ridge, 200 m : a, anterior carapace and rostrum; b, tip of rostrum; c, major second pereiopod; d, same, fingers, medial; e, same, lateral; f, same, distal ventral; g, minor second pereiopod; h, same, chela; i, same, fingers; j, first pleopod; k, same, endopod; l, second pleopod; m, same, endopod; n, same, appendix masculina and appendix interna.

Male paratype. Generally similar to female. Rostrum with six acute dorsal teeth, less distinctly upcurved, with two small acute distal ventral teeth, distal tooth only situated beyond level of distal dorsal tooth. Second pereopods with small acute tubercles, most marked ventrally, extending onto proximal part of fixed finger and proximal dactylus; dactyl deeply scaphoid with sharp lateral cutting edge distally, proximal third with large recurved acute tooth opposing into fossa on fixed finger, proximal end of sharp cutting edge with small blunt tooth; fixed finger swollen, tip bilobed, distal cutting edge sharp, lateral, proximally with large acute tooth distally, with smaller irregular tooth proximally, separated by fossa for dactylar tooth; carpus, merus, ischium as in female, ventral borders distinctly tuberculate; minor second pereopod with chela subequal to carapace length, about 0.6 of major chela length, with numerous small acute tubercles, otherwise as in female. First pleopod with basipodite about 2.2 times longer than broad; endopod about 0.6 of basipodite length, 4.0 times longer than proximal width, moderately expanded distally, proximal fifth of medial margin with four stout densely plumose setae, second fifth with seven short simple spines, distal 0.6 glabrous, distolateral margin with six short feebly plumose setae; exopod about 2.0 times endopod length, 5.5 times longer than proximal width; second pleopod with basipodite 1.1 times length of first pleopod basipodite, 2.2 times longer than wide; endopod about 1.2 times basipodite length, 5.2 times longer than proximal width, with appendices at 0.3 of medial margin length, appendix masculina with corpus about 2.0 times longer than wide, reaching to about 0.55 of endopod length, with longitudinal ventral row of seven slender simple spines, of increasing length distally, with five similar distal spines, three shorter, two long, subequal to length of corpus.

MEASUREMENTS (mm). — *Holotype female* : Carapace length, 5.4; carapace and rostrum, 8.2; total body length, 21.9; major second pereopod chela, 7.2; minor second pereopod chela, 4.6.

Paratype male : carapace length, 5.0; carapace and rostrum, 8.0; total body length (approx.), 20.5; major second pereopod chela, 8.0; minor second pereopod chela, 4.8.

COLOURATION AND HOST. — No data.

ETYMOLOGY. — *Brevis* (Latin), short; *rostrum* (Latin), a beak, with reference to the relatively short rostrum.

SYSTEMATIC POSITION. — The presence of four pairs of dorsal telson spines in *P. brevirostris* relates this species to the group of species, centred on *P. alcocki* Kemp, 1922, which possess more than the two pairs of dorsal telson spines usually found in *Periclimenes* species and most other pontoniine genera. The other species of this group previously described are *P. poupini* Bruce, together with other species described in this report.

P. brevirostris differs from these in the following combination of characters : shorter rostrum, not reaching end of antennal peduncle, upturned in female, with dentition of 1 + 5/2, large well pigmented cornea, diameter about 0.18 of carapace length, ambulatory dactyl with accessory tooth about 0.3 of unguis length.

REMARKS. — Although the single female specimen is not ovigerous, it is clearly adult as the intraovarian ova are clearly discernible through the dorsal carapace.

On first examination, the male and female specimens were considered to represent separate species, a situation that may eventually prove to be the case, when further material is available, especially in view of the bathymetric separation of some 300 m. The larger chela of the male are much more strongly tuberculate than those of the female, a feature that is presently attributed to sexual dimorphism, and the rostrum appears more distinctly upcurved in the female than in the male specimen. No differences can be detected in the dactyls or propods of the ambulatory pereopods.

Periclimenes forcipulatus sp. nov.

Figs 21-25

MATERIAL EXAMINED. — **Loyalty Islands.** BIOCAL : stn DW 83, 20°35.0'S, 166°54.0'E, 460 m, 6 September 1985 : 1 ♂ holotype (MNHN-Na 12051), 1 ovig. ♀ allotype, 1 juvenile (MNHN-Na 12052); 1 ♂ paratype (NTM Cr. 007919).

DESCRIPTION. — Medium sized pontoniine shrimp of slender, subcylindrical body form.

Carapace smooth, glabrous; rostrum well developed, slender, straight, horizontal, reaching to or slightly exceeding end of antennular peduncle, equal to about 0.75 of carapace length, dorsal carina feebly developed, with 5-6 acute dorsal teeth, with first tooth on anterior carapace, second tooth over or slightly anterior to posterior orbital margin, distal tooth preterminal, small in holotype and ovigerous female; lateral carina obsolete; ventral carina feebly developed, with two acute ventral teeth in males, three in female, all on distal two thirds, interspaces sparsely setose; supraorbital and epigastric teeth absent, small epigastric tubercle present in males; orbit feebly developed, inferior orbital angle bluntly produced, antennal spine slender, acute, horizontal, marginal, exceeding inferior orbital angle, hepatic spine larger than antennal, at slightly lower level, at about 0.15 of carapace length; anterolateral angle of branchiostegite not produced, bluntly obtuse.

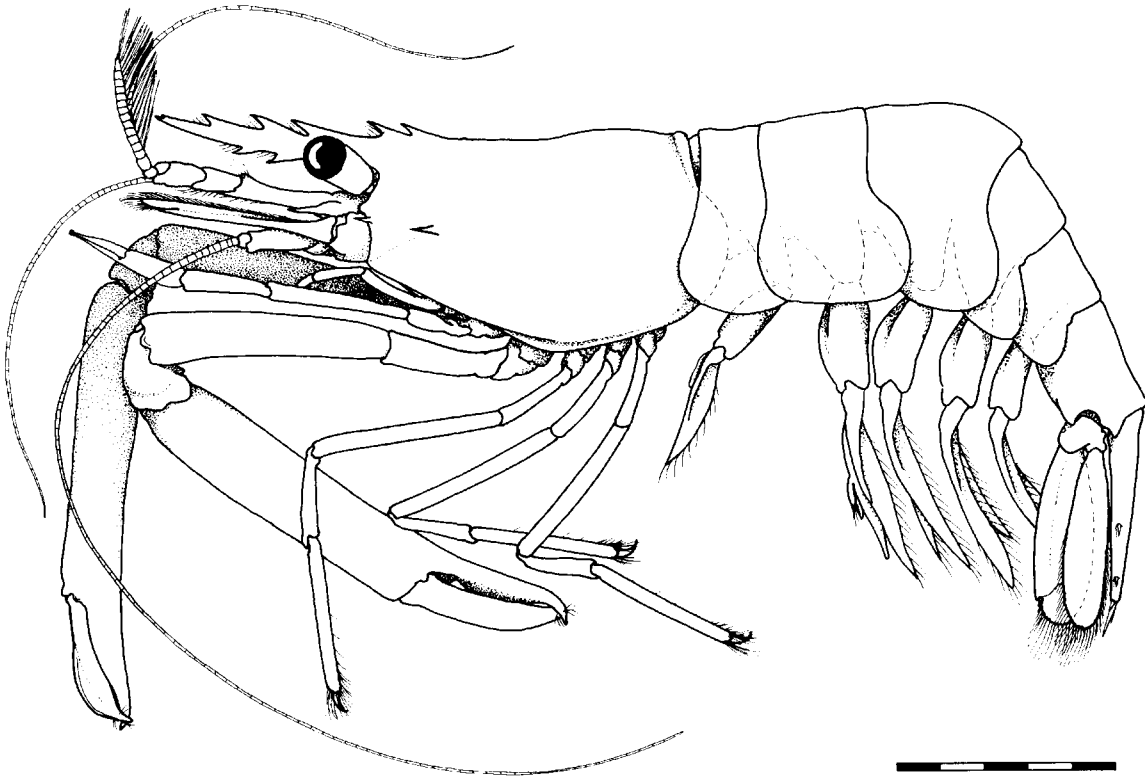


FIG. 21. — *Periclimenes forcipulatus* sp. nov., holotype, ♂, BIOCAL, stn DW 83, Loyalty Islands, 460 m. Scale bar in millimeters.

Abdomen smooth, glabrous, third abdominal segment not posteriorly produced, non-carinate; pleura of first segments broadly rounded, fourth and fifth posteriorly produced, rounded; fifth segment about 0.7 of sixth segment length, sixth segment about 1.4 times longer than deep, compressed, uniform, posteroventral angle small, blunt, posterolateral angle, larger, acute. Telson about 1.7 times sixth segment length, 3.5 times longer than anterior width, lateral margins sublinear, posteriorly convergent, with two pairs of small submarginal dorsal spines at about 0.6 and 0.85 of telson length, posterior margin angulate, with small blunt median process, about 0.4 of anterior margin width, with three pairs of posterior spines, lateral spines small, slender, smaller than dorsal spines, submedian spines well developed, about 0.12 of telson length, 6.0 times longer than basal width, 3.5 times longer than lateral spines, submedian spines slender, setulose, 0.5 of submedian spine length.

Eye with well developed globular, well pigmented cornea, without accessory pigment spot, transversely orientated on stalk, corneal diameter about 0.14 of carapace length, stalk about 1.3 times longer than proximal width, subuniform, slightly compressed.

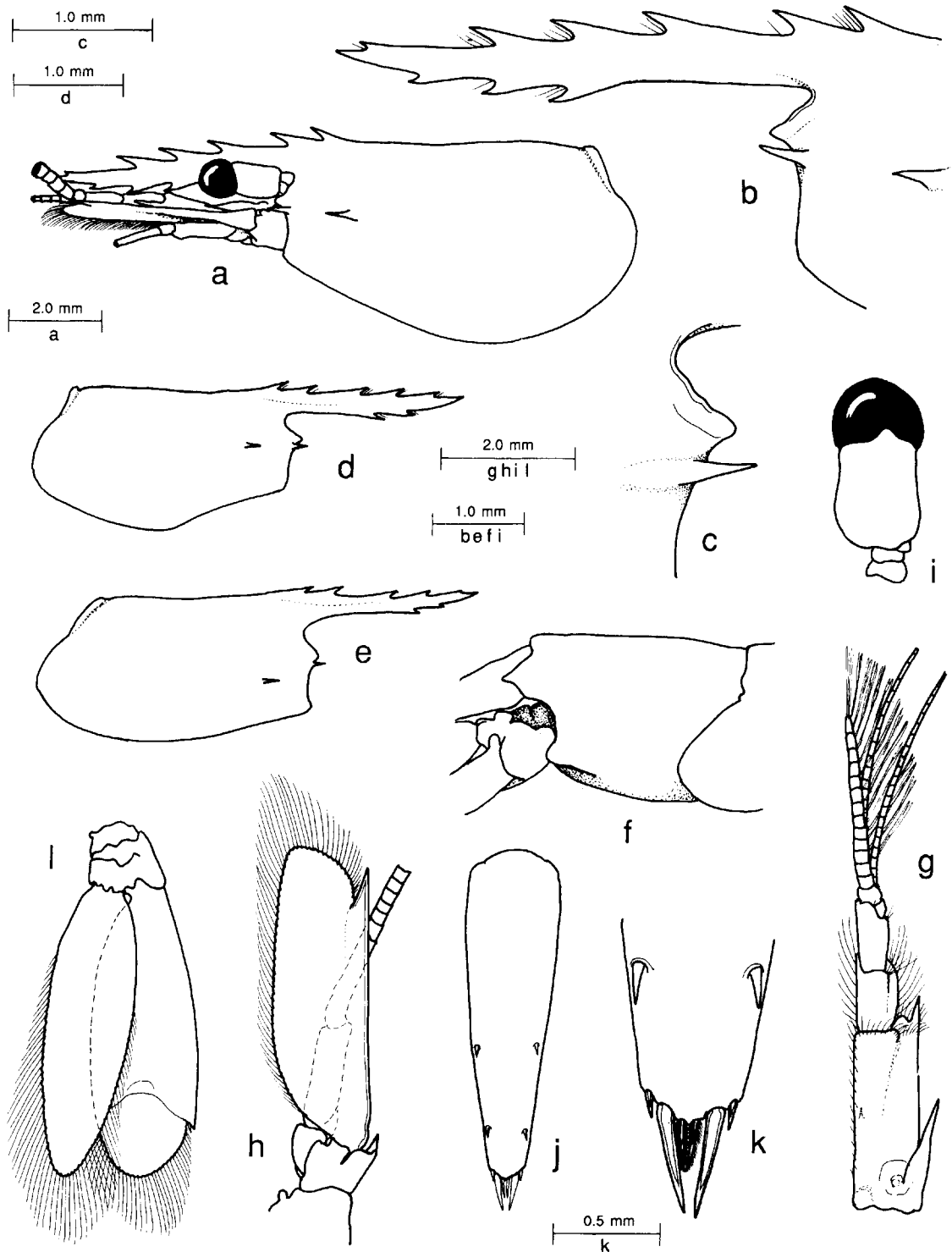


FIG. 22. — *Periclimenes forcipulatus* sp. nov. : a, carapace, rostrum, eyes and antennal peduncle; b, anterior carapace and rostrum; c, same, inferior orbital angle; d-e, carapace and rostrum; f, sixth abdominal segment; g, antennule; h, antenna; i, eye; j, telson; k, same, posterior spines; l, uropod.

a-c, f-l : ovig. ♀; d : ♂; e : juvenile.

Antennular peduncle reaching to or slightly less than tip of rostrum or scaphocerite; proximal segment slender, about 2.7 times longer than broad, medial margin straight, sparsely setose, with acute tooth ventrally at 0.5 of length, lateral margin straight, parallel to medial margin, with small distolateral lobe, with large acute lateral tooth reaching to about middle of intermediate segment, stylocerite slender, acute, reaching to about 0.5 of segment length, statocyst normal, with granular statolith; intermediate segment slender, about 0.3 of proximal segment length, 1.3 times longer than wide, with narrow setose lateral flange, obliquely articulated with distal segment; distal segment about 0.4 of proximal segment length, 1.2 times longer than intermediate segment, 2.1 times longer than wide; upper flagellum biramous with five proximal segments fused, shorter free ramus with eight segments, longer ramus slender, filiform; lower flagellum, slender, filiform, about 1.5 times carapace length; with about 14 groups of aesthetascs.

Antenna with basicerite robust, with strong acute distolateral tooth, carpocerite subcylindrical, about 3.0 times longer than wide, reaching to about 0.4 of scaphocerite length, flagellum well developed, about 3.5 times carapace length; scaphocerite reaching to about tip of rostrum, or slightly beyond, exceeding antennular peduncle, broad, about 3.2 times longer than maximal width, at about 0.4 of length, medial margin feebly convergent distally, lateral margin straight, with strong distolateral tooth, slightly exceeded by broad, bluntly angulate distal margin of lamella.

Mandible (right) normal, corpus robust, without palp; molar process stout, obliquely truncate distally, with four blunt teeth, anterior and posterior groups of short setae; incisor process normal, distally truncate with three acute teeth, central tooth smallest, medial margin entire. Maxillula with normal bilobed palp, upper lobe short, stout, lower lobe small, ventrally tuberculate, with short simple seta; upper lacinia slender, obliquely truncate distally, about 7-8 simple distal spines, numerous short setae; lower lacinia short, stout, tapering distally, with numerous long finely serrulate spiniform setae. Maxilla with short slender simple palp, with two simple subterminal distal setae; basal endite deeply bilobed, upper lobe slightly stouter than lower, with about 14, 8 short slender simple distal setae respectively, coxal endite obsolete, medial margin convex; scaphognathite about 2.7 times longer than wide, posterior lobe 1.9 times longer than wide, anterior lobe 1.3 times longer than broad, feebly emarginate medially. First maxilliped with slender palp extending well beyond anterior margin of basal endite, with papillose terminal seta; basal endite narrow, distally rounded, with straight medial margin with numerous slender simple setae, distinctly demarcated by small notch from coxal endite, coxal endite distinct, distal medial margin straight, sparsely setose; exopod with slender flagellum with five long plumose distal setae, caridean lobe large, broad; epipod triangular, feebly bilobed. Second maxilliped with normal endopod; dactylar segment broad, about 2.5 times longer than wide, medial margin feebly concave, with numerous stout densely serrulate spines, propodal segment not strongly produced distomedially, with six long slender spines; carpus normal, ventromedial angle subacute; ischiomerus and basis normal, basis distomedially feebly excavate; exopod with slender flagellum with five long plumose setae distally; coxa with small setose medial process, simple subrectangular epipod laterally, without podobranch. Third maxilliped with endopod slender, reaching to about 0.6 of carpocerite length; ischiomerus distinctly separated from basis, bowed, about 6.0 times longer than proximal width, slightly tapered proximally, sparsely setose laterally, without distolateral spines, with numerous long slender, very finely serrulate setae medially; penultimate segment about 0.66 of ischiomerus length, about 4.5 times longer than wide, uniform, sparsely setose laterally, with about six small groups of long finely serrulate spines medially; terminal segment about 0.5 of ischiomerus length, 4.0 times longer than proximal width, tapering distally, with about seven transverse groups of short serrulate setae medially, with longer spiniform setae distally; basis about as long as broad, sparsely setose medially; exopod with slender flagellum with four long plumose distal setae; coxa medially produced, sparsely setose, with large oval lateral plate; arthrobranch small, with four lamellae. Paragnaths with alae well developed, corpus short, stout, without ventral carinae.

First pereopod well developed, exceeding scaphocerite by about half chela length; chela with palm smooth, subcylindrical, feebly compressed, about 3.1 times longer than proximal depth, slightly tapering distally, with two transverse rows of short serrulate setae proximoventrally; fingers long, tapering distally, about 0.8 of palm length, very slender distally, with slightly swollen bidentate tips, short, sharp distolateral cutting edge with 3-4 small acute distally directed denticles, (possibly with double row); carpus short, stout, about 0.6 of chela length, 3.3 times longer than distal width, with transverse row of serrulate distoventral spines, unarmed, tapering proximally; merus subequal to chela length, slender, about 7.5 times longer than wide, uniform, unarmed; freely articulated

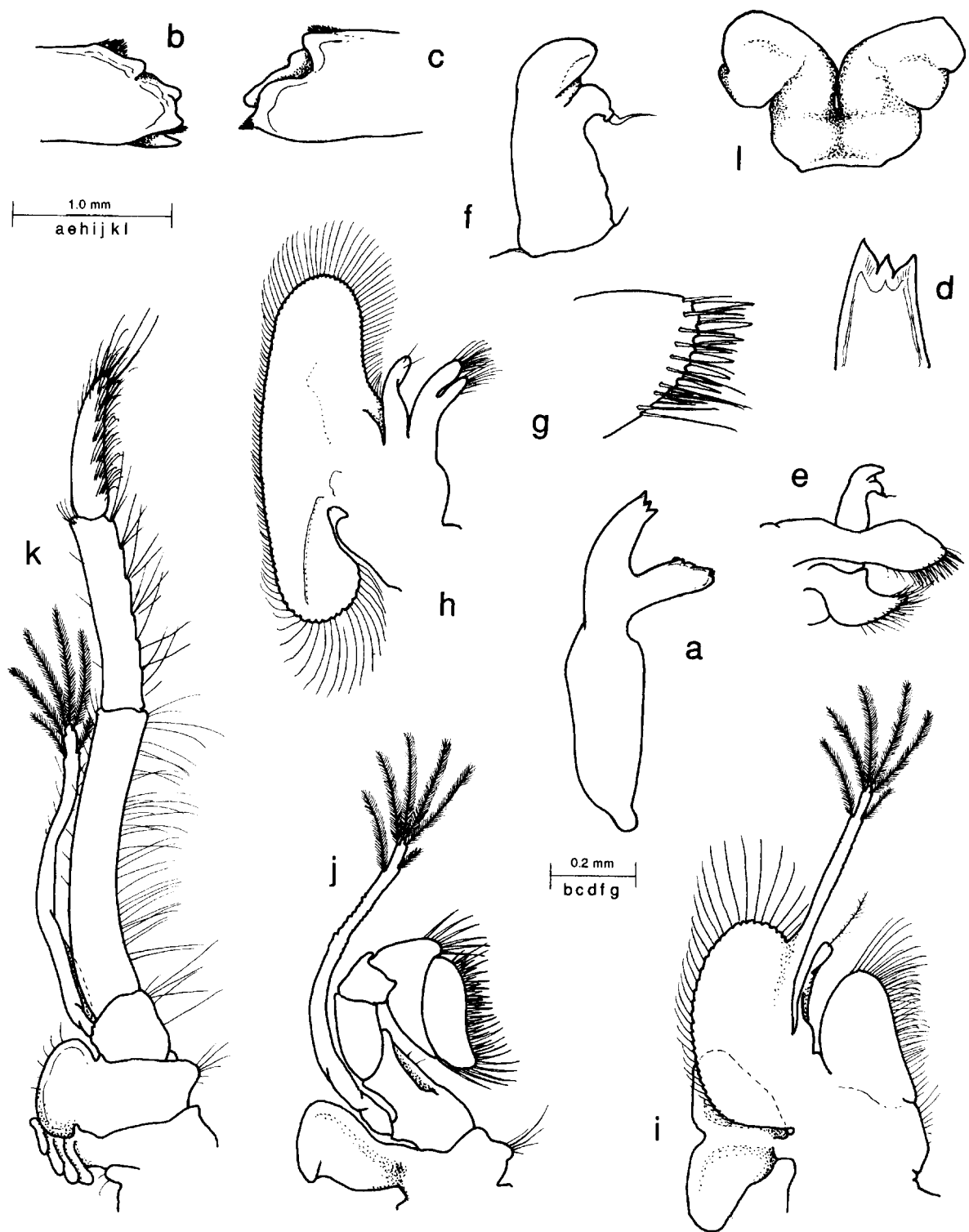


FIG. 23. — *Periclimenes forcipulatus* sp. nov., ovig. ♀ : a, mandible; b-c, same, molar process; d, same, incisor process; e, maxillula; f, same, palp; g, same, distal upper lacinia; h, maxilla; i, first maxilliped; j, second maxilliped; k, third maxilliped; l, paragnaths.

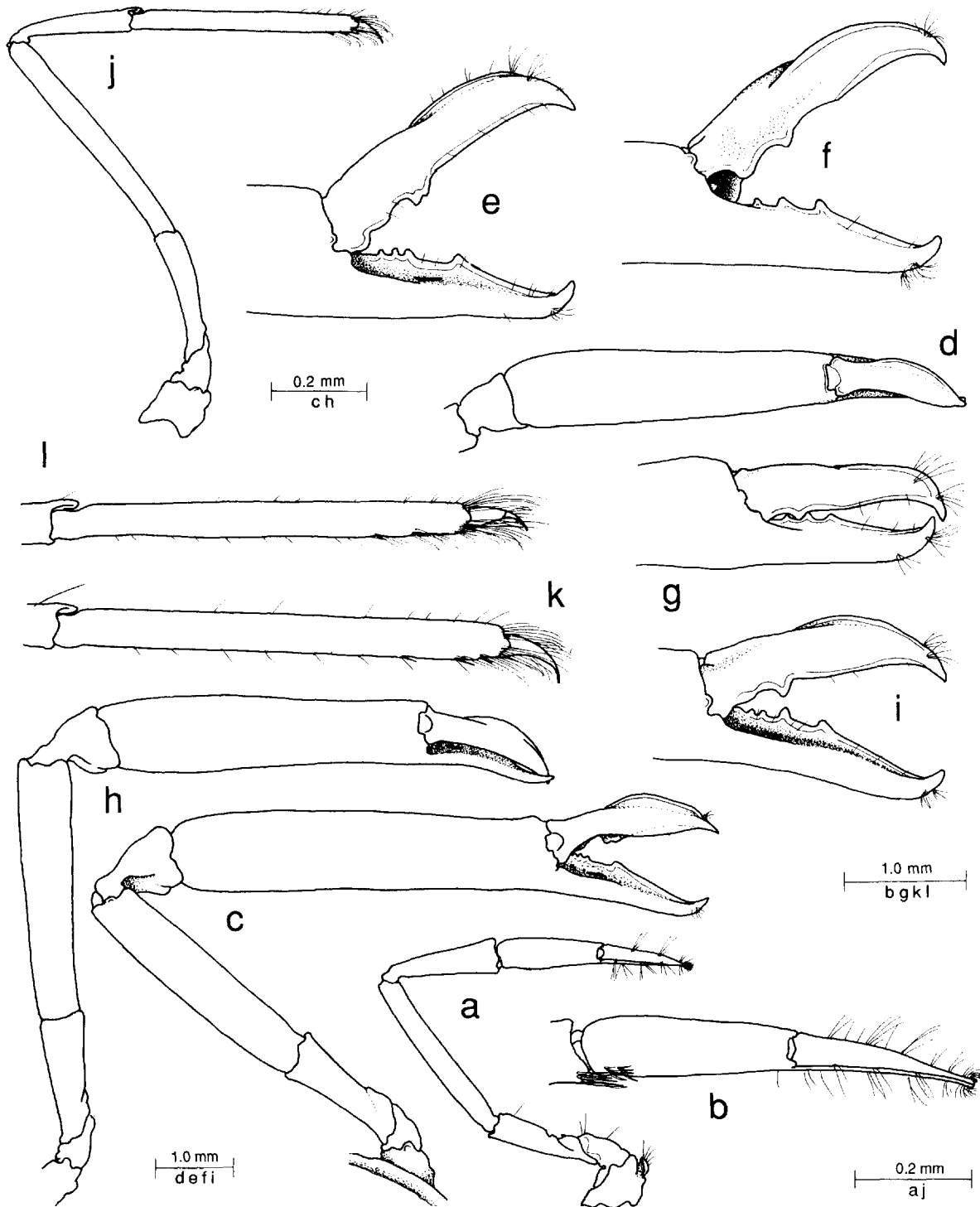


FIG. 24. — *Periclimenes forcipulatus* sp. nov. : a, first pereiopod; b, same, chela, dorsal; c, major second pereiopod; d, chela, dorsal; e-f, same, fingers; g, second pereiopod, fingers; h, minor second pereiopod; i, same, fingers; j, third pereiopod; k, same, propod and dactyl; l, fifth pereiopod, propod and dactyl.

a-c, e, j-l: ovig. ♀; d, g: paratype, ♂; f, h-i: holotype, ♂.

with ischium; ischium about 0.66 of chela length, subequal to carpus length, about 4.3 times longer than distal width, tapering proximally, obliquely articulated with basis; basis about 0.3 of chela length, sparsely setose medially; coxa normal, with small setose distoventral lobe.

Second pereopods very well developed, subequal, similar. Male major pereopod with chela about 1.6 times carapace length; palm smooth, oval in section, about 4.8 times longer than proximal width, feebly tapering distally; dactylus about 0.4 of palm length, 4.0 times longer than proximal depth, with stout, hooked tip, lateral margin with well developed flange, cutting edge with distal half distinct, blunt, proximal half with single large acute tooth, fitting into fossa on dactylus when closed, sometimes feebly bidentate; fixed finger similar, cutting surface deeply grooved longitudinally, with fossa for dactylar tooth, cutting edge lateral, distal half entire, with three small acute teeth proximally; carpus 0.25 of palm length, 1.5 times longer than distal width, tapered proximally, distally excavate, unarmed; merus about 0.66 of palm length, 5.0 times longer than central width, uniform, smooth, unarmed; ischium about 0.5 of merus length, 0.33 of palm length, 2.5 times longer than distal width, with distinct distoventral tubercle, tapering feebly proximally; basis and coxa robust, without special features. Minor second pereopod similar, about 1.45 times carapace length, 0.93 of major chela length; dactylus as in major chela, fixed finger with two well developed acute teeth in proximal half of cutting edge, separated by small diastema, with two small blunt teeth, proximally; carpus as in major pereopod; merus subequal to major pereopod merus, about 0.75 of palm length; basis and coxa similar. Ovigerous female major second pereopod similar to male; dactyl with tooth on proximal cutting edge bidentate; fixed finger with two larger acute teeth on distal half of proximal cutting edge, separated by a small diastema, with two small blunt teeth proximally. Paratype male with three acute teeth on proximal half of fixed finger cutting edge, with largest tooth centrally.

Ambulatory pereopods slender, with third exceeding scaphocerite by dactyl and distal third of propod; third pereopod with dactyl simple, slender, about 0.15 of propod length, compressed, unguis distinctly demarcated, about 4.0 times longer than basal width, curved, very slender distally, corpus about 1.8 times longer than basal width, ventral margin sharp, feebly concave, without distoventral tooth, corpus without distolateral setae(?); propod about 0.5 of carapace length, feebly compressed, about 12.0 times longer than deep, uniform, sparsely setose, with slender, simple distoventral spine, three similar distal ventral spines, distoventral propod with transverse rows of long slender simple setae; carpus about 0.6 of propod length, 5.3 times longer than distal width, with strong distodorsal lobe, unarmed; merus 1.1 times propod length, 10.0 times longer than central width, uniform, unarmed; ischium, basis and coxa normal. Fourth and fifth pereopods similar, the fifth pereopod with the propod slightly longer and more slender than the third.

Male first pleopod with basipodite 2.0 times longer than broad; endopod about 0.6 of basipodite length, 3.0 times longer than central width, slightly expanded, broadly rounded distally, without accessory lobule, proximal medial margin with three short densely plumose setae, central region with four short slender simple spines, distal margin glabrous, distolateral margin with short feebly plumose setae; endopod slender, 4.5 times longer than proximal width, 2.3 times endopod length. Second pleopod with basipodite similar to first, larger, more robust; endopod about 5.5 times longer than proximal width, 1.3 times longer than first pleopod exopod, with appendices at about 0.28 of medial margin length; appendix masculina with corpus subcylindrical, about 0.25 of endopod length, 5.5 times longer than central width; with four long, one shorter, simple terminal setae, one short distoventral seta; appendix interna slender, about 12.0 times longer than central width, slightly swollen distally, with few cincinnuli, about 1.3 times appendix masculina length.

Uropods reaching to about tip of telson; protopodite with broadly rounded distolateral lobe; endopod about 2.8 times longer than broad, lateral margin convex, sparsely setose, with small acute distolateral tooth, with mobile spine medially, diaeresis distinct; endopod subequal to exopod length, 3.4 times longer than broad.

MEASUREMENTS (mm). — *Holotype male* : carapace length, 7.0; carapace and rostrum, 12.2; total body length (approx.), 28.5; major second pereopod chela, 10.8; minor second pereopod chela, 10.0.

Allotype female : carapace length, 6.6; paratype male, carapace length, 3.9; juvenile, carapace length, 2.3; length of ovum, 0.6.

COLOURATION. — No data.

HOST. — *Phoronema* sp. [Phoronematidae : Hexactinella].

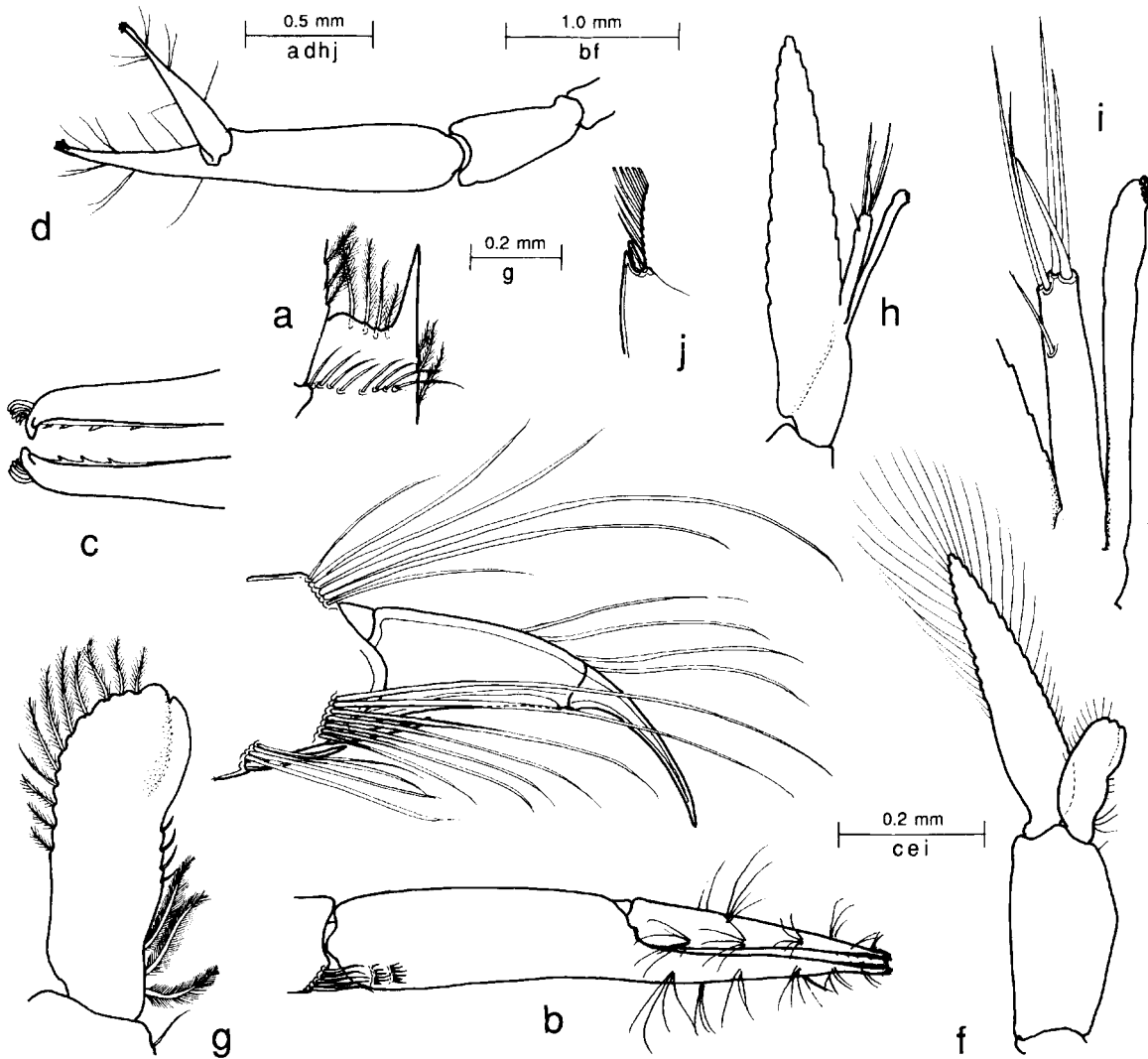


FIG. 25. — *Periclimenes forcipulatus* sp. nov. : a, antennular peduncle, proximal segment, distolateral tooth; b, first pereiopod, chela; c, same, tips of fingers; d, same, carpus and chela; e, third pereiopod, distal propod and dactyl; f, first pleopod; g, same, endopod; h, second pleopod, endopod; i, same, appendix masculina and appendix interna; j, uropod, exopod, distolateral angle.

a-c, e, j : ovig. ♀; d : juvenile; f-i : paratype, ♂.

ASSOCIATED FAUNA. — The specimens were found in association with the type specimens of *Mesopontonia monodactylus* sp. nov.

ETYMOLOGY. — *Forcipula* (Latin), forceps, diminutive, with reference to the slender fingers of the first pereiopods.

SYSTEMATIC POSITION. — *Periclimenes forcipulatus* appears to be an aberrant member of the small group of deep-water *Periclimenes* species related to *P. latipollex* Kemp, which is characterized by a distinctive lateral flange on the dactyl of at least the major second pereiopod. It may be readily distinguished from these by the lack of an accessory tooth on the dactyls of the ambulatory pereiopods. In this feature it resembles only *P. compressus* Borradaile, known only from the holotype specimen from 265 m in the Central Indian Ocean, off Saya de Malha (BORRADAILE, 1915). *P. forcipulatus* shares the following features with *P. compressus* : rostrum shorter than

carapace length, lamina shallow, straight, not arched, with five dorsal and three ventral teeth, carapace with antennal and epigastric spines, hepatic and antennal spines on similar level; third abdominal segment without posterodorsal carina; first pereiopods with carpus shorter than chela, chela with slender simple fingers; second pereiopods with dorsal flange on dactyl; ambulatory dactyls simple, not biunguiculate. *P. forcipulatus* differs from *P. compressus* in that the fingers of the chela of the first pereiopods are almost subequal to the palm length (0.88 as opposed to 0.79) with the cutting edges bearing minute acute teeth distally, and the ambulatory propods with slender distoventral and distal ventral spines, not present in the latter species.

REMARKS. — The first pereiopods of *P. forcipulatus* are characteristic but the unusually short carpus and elongate chela combine to provide the usual length arrangement whereby the tips of the fingers of the first pereiopod lie, when the carpomeral joint is fully flexed, in the immediate vicinity of the ventral surface of the coxa of the same appendage. In general, in palaemonid shrimps, the length of chela and carpus is subequal to the length of merus, ischium and basis, however much these may independently vary. *P. forcipulatus* appears to provide no exception, despite the unusual proportions of the segments of its first pereiopod. It may also be noted that, in the juvenile specimen, the carpus is relatively much shorter than in the adult, i.e. about 0.5 of the palm length, and the fingers are only about 0.7 of the palm length. In the juvenile specimen, the rostrum only reaches to about the middle of the distal segment of the antennular peduncle and the first dorsal tooth is situated in a position anterior to the posterior margin of the orbit.

Periclimenes leptodactylus sp. nov.

Figs 26-30

MATERIAL EXAMINED. — **Loyalty Islands.** CALSUB : dive 16, 20°37.8'S, 167°02.7'E, Lifou/Uvéea, 825-370 m, 7 March 1989 : 1 ♂, holotype (MNHN-Na 12028).

DESCRIPTION. — Very small pontonine shrimp of subcylindrical body form, lacking both second pereiopods.

Carapace smooth, glabrous; rostrum well developed, moderately deep, straight, slightly depressed, compressed, reaching to about end of antennular peduncle, dorsal carina well developed, extending posteriorly onto anterior sixth of carapace, deepest posteriorly, dorsal margin convex, with eight small low subacute teeth, subequally spaced, interspaces feebly setose, posterior tooth well in advance of posterior orbital margin; lateral carinae distinct, moderately expanded posteriorly; ventral margin feebly convex, carina distinct distally, with two very small acute teeth distally, ventral to 7-8th dorsal teeth; supraorbital and epigastric teeth absent; orbit feebly developed, inferior orbital angle produced, acute in lateral view, antennal spine small, acute, marginal, horizontal, hepatic spine larger than antennal, at approximately similar horizontal level, at about 0.16 of carapace length; anterolateral margin of branchiostegite obtuse, bluntly rounded.

Abdomen smooth, glabrous; third abdominal segment not posterodorsally produced, non-carinate; pleura of first three segments broadly rounded, fourth and fifth posteriorly produced, rounded; fifth segment about 0.5 of sixth segment length, sixth segment compressed, about 1.8 times longer than deep, slightly tapered posteriorly, postero-ventral angle small, blunt, posterolateral angle larger, acute. Telson about 1.45 times sixth segment length, 3.3 times longer than anterior width, lateral margins subparallel anteriorly, posteriorly convergent, with four pairs of small marginal spines, about 0.015 of telson length, posterior margin rounded, without median point, about 0.35 of anterior width, with three pairs of posterior spines, lateral spines small, subequal to dorsal spines, slightly dorsally situated, submedian spines robust, about 0.12 of telson length, 6.0 times longer than basal width, 3.3 times longer than lateral spines, submedian spines about 0.4 of intermediate spine length, robust, sparsely setulose.

Eye with large, well developed globular cornea, slightly oblique, without accessory pigment spot, corneal diameter about 0.25 of carapace length, peduncle about 1.3 times longer than broad, uniform.

Antennular peduncle slightly exceeding tip of rostrum, far short of anterior margin of scaphocerite, proximal segment about 2.2 times longer than broad, medial margin straight, sparsely setose, with small acute ventral tooth at 0.5 of length, lateral margin straight, convergent distally, with small distolateral lobe with small acute lateral

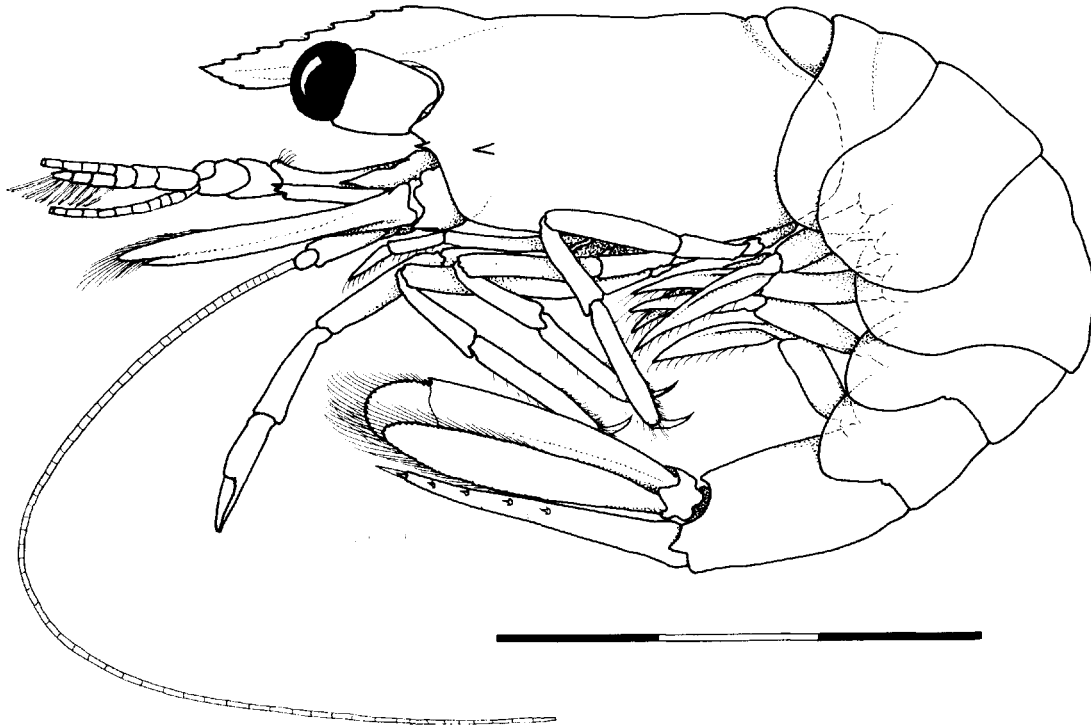


FIG. 26. — *Periclimenes leptodactylus* sp. nov., holotype, ♂, CALSUB, dive 16, Lifou-Uvéa, 825-370 m. Scale bar in millimeters.

tooth, not exceeding distal margin of lamella, stylocerite robust, distally acute, reaching to about 0.5 of segment length, statocyst normal, with granular statolith, intermediate segment short, about 0.16 of proximal segment length, 1.7 times wider than long, with well developed lateral flange, obliquely articulated with distal segment, distal segment about 1.8 times intermediate segment dorsal length, 0.25 of proximal segment length, 1.2 times longer than distal width, upper flagellum biramous, proximal three segments fused, stout, shorter free ramus with three segments, longer free ramus slender, incomplete, lower free flagellum slender, incomplete; with about eight groups of aesthetascs.

Antenna with basicerite robust, with small acute ventrolateral tooth, carpocerite subcylindrical, about 3.0 times longer than wide, reaching to about 0.3 of scaphocerite length, flagellum about 3.0 times carapace length; scaphocerite well developed, about 0.9 of carapace length, 2.4 times longer than wide, greatest width at 0.5 of length, medial and lateral margins convex, lateral margin with small acute distal tooth, far exceeded by rounded distal margin of lamella.

Epistome normal, unarmed. Fourth thoracic sternite broad, unarmed, without medial process.

Mandible (right, damaged in dissection), with normal corpus, without palp; molar process distally truncate, with five blunt teeth and group of stout spines; incisor process slender, tapering, distally oblique, with three acute teeth. Maxillula with feebly bilobed palp, upper lobe small, lower lobe angular, bearing small distal tubercle with short simple seta; upper lacinia normal, with about 9-10 stout simple spines distally; lower lacinia stout, tapering distally with numerous long spiniform setae, longer distal setae finely serrulate. Maxilla with simple tapering non-setose palp, with minute acute distal tubercle; basal endite deeply bilobed, lobes subequal, distal lobe slightly stouter, with eight distal finely serrulate setae, proximal with seven setae; scaphognathite broad, about 2.4 times longer than wide, posterior lobe about 1.5 times longer than wide, about 0.36 of scaphognathite length, anterior lobe broad, 1.1 times longer than wide, medial margin emarginate. First maxilliped with elongate palp extending well beyond distal margin of basal endite, distal portion constricted, non-setose; basal endite well developed,

broadly rounded, with straight medial margin, with numerous long finely serrulate spiniform setae, coxal endite distinctly separated by deep medial notch from basal endite, feebly bilobed, distal lobe with several long setulose setae (mainly broken), proximal lobe non-setose; exopod with slender flagellum with four long plumose terminal setae, caridean lobe narrow; epipod large, triangular, bilobed. Second maxilliped with normal endopod, dactylar segment broad, about 2.8 times longer than wide, with numerous stout, densely serrulate long and short spines medially; propodal segment not strongly produced distomedially, with 5-6 long finely serrated spines; carpus normal, with ventromedial angle produced; ischiomerus and basis normal, without special features; exopod with slender flagellum with four long plumose terminal setae; coxa not medially produced, with small rounded epipod laterally, without podobranch. Third maxilliped with endopod robust, reaching to about middle of carpocerite, ischiomerus feebly separated from basis, junction marked by small notch medially; ischiomerus portion about 4.2 times longer than broad, subuniform, compressed, lateral margin with three small simple spines distally, medial

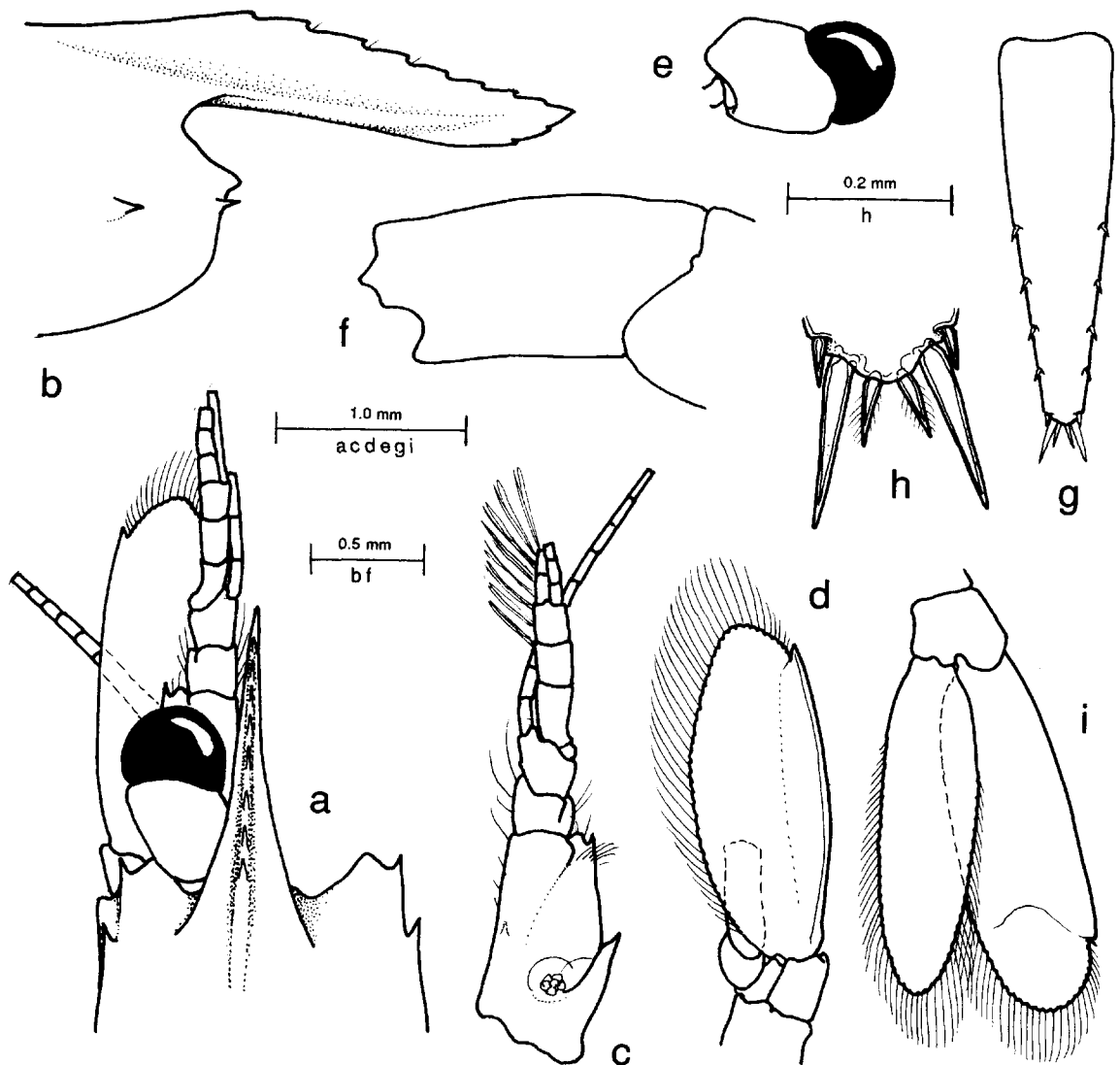


FIG. 27. — *Periclimenes leptodactylus* sp. nov., holotype, ♂ : a, anterior carapace, rostrum, left eye and antennal peduncles, dorsal; b, anterior carapace and rostrum, lateral; c, antenna; d, antenna; e, eye; f, sixth abdominal segment; g, telson; h, same, posterior spines; i, uropod.

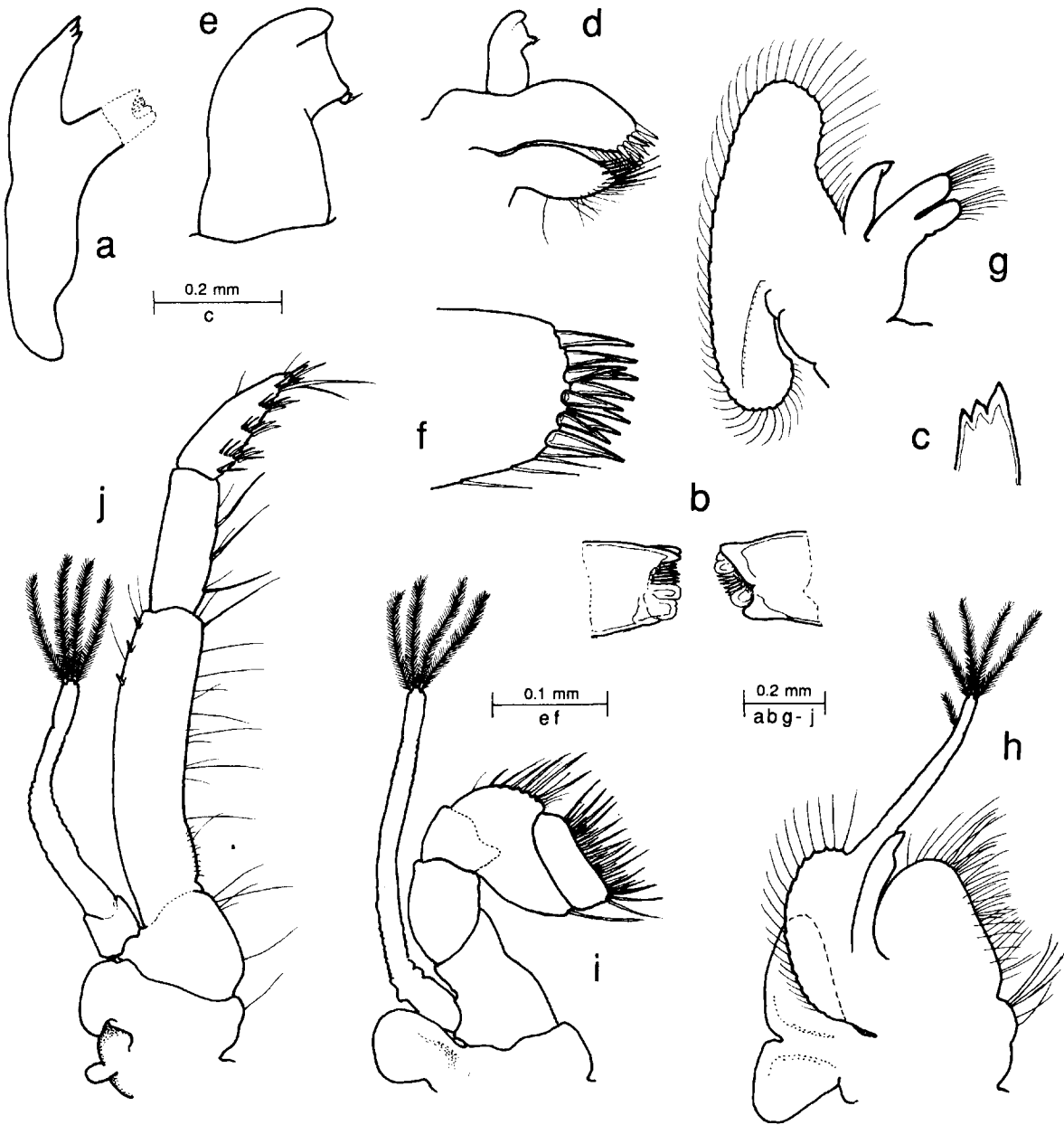


FIG. 28. — *Periclimenes leptodactylus* sp. nov., holotype, ♂ : a, mandible (right), molar process damaged; b, same, right molar process, dorsal and ventral aspects; c, same, incisor process; d, maxillula; e, same, palp; f, same, distal upper lacinia; g, maxilla; h, first maxilliped; i, second maxilliped; j, third maxilliped.

margin with sparse long very finely setulose setae and short simple setae, proximal medial border with submarginal row of ten short papillose setae; penultimate segment about 0.45 of ischiomer length, 2.6 times longer than wide, subcylindrical, with few long finely serrulate setae medially; terminal segment subequal to penultimate segment length, with short stout simple terminal spine, medial margin with 5-6 transverse rows of short finely serrulate spines; basal region medially straight, with sparse simple setae; exopod with slender flagellum, with four long plumose terminal setae; coxa not medially produced, with small rounded lateral plate; arthrobranch vestigial. Paragnaths not examined.

First pereiopod well developed, robust, reaching to slightly beyond scaphocerite, exceeding carapocerite by chela and carpus; chela with palm subcylindrical, slightly compressed, about 1.8 times longer than deep, with three rows of short serrulate setae proximoventrally; fingers about 0.8 of palm length, subspatulate, with entire lateral cutting edges, small hooked tips distally; carpus 0.85 of palm length, 2.9 times longer than distal width, tapering proximally, with transverse row of long serrulate setae distoventrally; merus 1.1 times chela length, 4.1 times longer than central width, uniform; ischium about 0.75 of chela length, 2.6 times longer than distal width, tapering proximally, obliquely articulated with basis; basis about 0.5 of chela length, ventral border straight, sparsely setose; coxa normal with very small distoventral setose process.

Second pereiopods lacking.

Ambulatory pereiopods robust, third pereiopod reaching to end of scaphocerite, exceeding carapocerite by propod and dactyl; third pereiopod with dactyl long, slender, about 0.33 of propod length, with unguis well demarcated, about 6.75 times longer than basal width, feebly curved, 0.68 of corpus length, corpus subcylindrical, 3.5 times longer than proximal width, ventral margin sharp, feebly concave, with pair of minute distoventral accessory teeth, with distal pairs sensory setae medially and laterally; propod about 0.5 of carapace length, compressed, 5.8 times longer than deep proximally, distal half tapering, distal width about 0.6 of central width, with single slender distoventral spine, six small slender spines along ventral border, with numerous slender flexible setae along distal half of ventral border; carpus about 0.5 of propod length, 3.0 times longer than distal width, with distinct distodorsal lobe; merus subequal to propod length, 5.0 times longer than width, distoventral angle unarmed; basis and coxa normal. Fourth and fifth pereiopods similar.

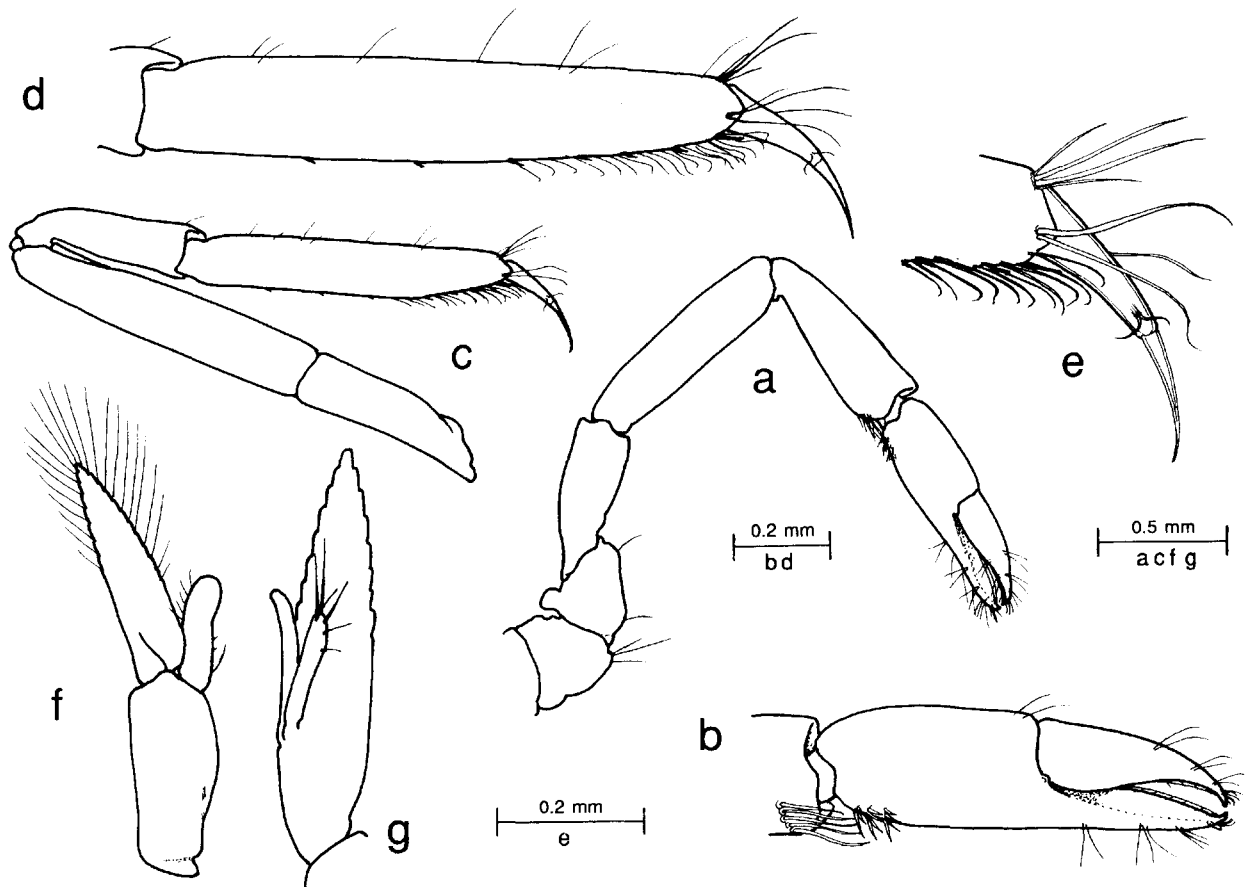


FIG. 29. — *Periclimenes leptodactylus* sp. nov., holotype, ♂ : a, first pereiopod; b, same, chela; c, third pereiopod; d, same, propod and dactyl; e, same, distal propod and dactyl; f, first pleopod; g, second pleopod, endopod.

First pleopod with basipodite 2.4 times longer than broad; endopod 0.6 of basipodite length, 3.6 times longer than basal width, subuniform, bluntly angled distally, without accessory lobule, proximal half of medial margin with single short plumose seta proximally, two small simple spinules distally, distal half of lateral margin with five plumose setae, exopod 4.0 times longer than proximal width, 2.0 times endopod length. Second pleopod with basipodite similar to first; appendix masculina with subcylindrical corpus, 5.0 times longer than central width, slightly swollen distally, with simple distoventral spines, four longer simple terminal spines; appendix interna distinctly exceeding appendix masculina, with few distal cincinnuli.

Uropods distinctly exceeding telson, protopodite with distolateral angle rounded; endopod about 3.0 times longer than wide, lateral margin feebly convex, non-setose, with distolateral angle obsolete, with small mobile spinule, diaeresis distinct; endopod 0.9 of exopod length, 3.5 times longer than wide.

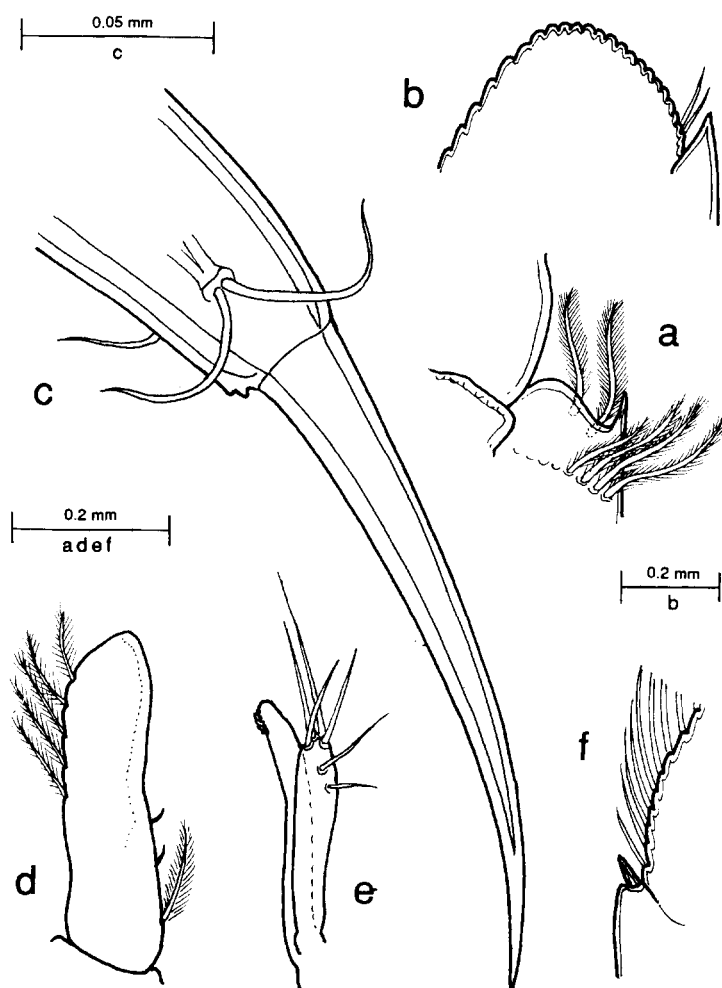


FIG. 30. — *Periclimenes leptodactylus* sp. nov., holotype, ♂ : a, antennule, proximal peduncular segment, distolateral angle; b, scaphocerite, distal; c, third pereiopod, dactyl, unguis, and distal corpus; d, first pleopod, endopod; e, second pleopod, endopod, appendix masculina and appendix interna; f, uropod, exopod, distolateral angle.

MEASUREMENTS (mm). — Carapace length, 2.0; carapace and rostrum, 3.5; total body length (approx.), 10.0.

COLOURATION AND HOST. — No data.

ETYMOLOGY. — ΛΕΠΤΟΣ (Greek), slender; ΔΑΚΤΥΛΟΣ (Greek), finger, with reference to the ambulatory dactyls.

SYSTEMATIC POSITION. — The presence of four pairs of dorsal telson spines in *P. leptodactylus* suggests a close relationship to the other deep-water species that are similarly equipped. From these species *P. leptodactylus* may be distinguished by the absence of an epigastric spine or tubercle and the long slender dactyl of the ambulatory pereiopods, in which it is about a quarter of the length of the propod. It also differs markedly in the dactyl itself, which, at first glance, may appear simple and not biunguiculate, but a minute accessory tooth is present and contrasts strongly with the well developed accessory teeth found in other related species.

REMARKS. — *P. leptodactylus* is remarkable for its small size, but its adult, or at least near adult, status is indicated by the well developed appendix masculina on the second pleopod. Some other particularly small species of the genus *Periclimenes* are known, such as *P. signatus* and *P. priodactylus*, with total body length of 11 and 4.75 mm respectively (KEMP, 1925; BRUCE, in press) and MANNING and CHACE (1990) have recently described a very small species of *Typton*, *T. ascensionis*, from Ascension Island, with a carapace length of only 1.0 mm. The hosts of neither of these species, both known only from the single holotype specimens, have yet been identified. Full assessment of the systematic relationships of *P. leptodactylus* is hampered by the lack of second pereiopods, but the form of the ambulatory dactyl and propod shows distinct differences from the other species with more than two pairs of dorsal telson spines, one of which, *P. poupini*, is known to be associated with a commensal anemone associated with a pagurid crab, *Trizopagurus* sp. (BRUCE, 1990d). The broad compressed propod, with the distal half tapering is a feature that is also found in several echinoderm-associated species of *Periclimenes*, particularly species found in association with echinoid hosts, such as *P. colemani*, *P. hirsutus* and *P. hertwigi*, associated with *Asthenosoma*, *Astropyga* and *Phormosoma* and *Areosoma* respectively (BRUCE, 1983), suggesting that *P. leptodactylus* may be involved in similar associations.

Periclimenes ordinarius sp. nov.

Figs 31-35

MATERIAL EXAMINED. — New Caledonia. MUSORSTOM 4 : stn DW 184, 18°04.0'S, 163°27.5'E, 260 m, 18 September 1985 : 1 adult ♀, holotype (MNHN-Na 12038).

DESCRIPTION. — Small sized pontonine shrimp of moderately robust, subcylindrical body form, lacking right second pereiopod.

Carapace smooth, glabrous; rostrum well developed, about 0.8 of carapace length, straight, slightly depressed, about 5.6 times longer than central depth, reaching to about end of antennular peduncle, dorsal carina well developed, margin feebly convex, with eleven small, low acute teeth, decreasing slightly in size distally, with second tooth situated over posterior orbital margin; lateral carinae feebly expanded posteriorly; ventral carina distinct, with two small acute teeth distally, small preterminal ventral tubercle, interdental spaces sparsely setose; supraorbital spines absent; small epigastric tubercle present, orbit feebly developed, inferior orbital angle strongly produced, acute in lateral view, antennal spine small, acute, marginal, hepatic spine large, robust, well below level of antennal spine, at about level of first dorsal rostral tooth; anterolateral margin of branchiostegite not produced, bluntly rounded.

Abdomen smooth, glabrous; third abdominal segment not posterodorsally produced, non-carinate, pleura of first three segments broadly rounded, fourth angularly posteriorly produced, fifth smaller, more rounded, depth sub-uniform, posteroventral angle small, subacute, posterolateral angle acute. Telson about 1.3 times sixth segment length, 3.3 times longer than anterior width, with lateral margins sublinear, posteriorly convergent, with two pairs of well developed submarginal spines, at 0.5 and 0.75 of telson length, posterior margin angular, about 0.4 of anterior width, without acute median point, with three pairs of posterior spines, lateral spines small, similar to dorsal spines, intermediate spines long, about 0.2 of telson length, 10.0 times longer than basal width, submedian spines slender, about 0.5 of intermediate spine length, without setules.

Eye with feebly pigmented ogival cornea, without accessory pigment spot, oblique, corneal width about 0.15 of carapace length, 1.2 times longer than wide; stalk about 1.2 times longer than broad, 1.2 times corneal length.

Antennular peduncle slightly exceeding tip of rostrum, far short of anterior margin of scaphocerite; proximal segment about 1.8 times longer than broad, medial margin straight, sparsely setose, with few plumose setae

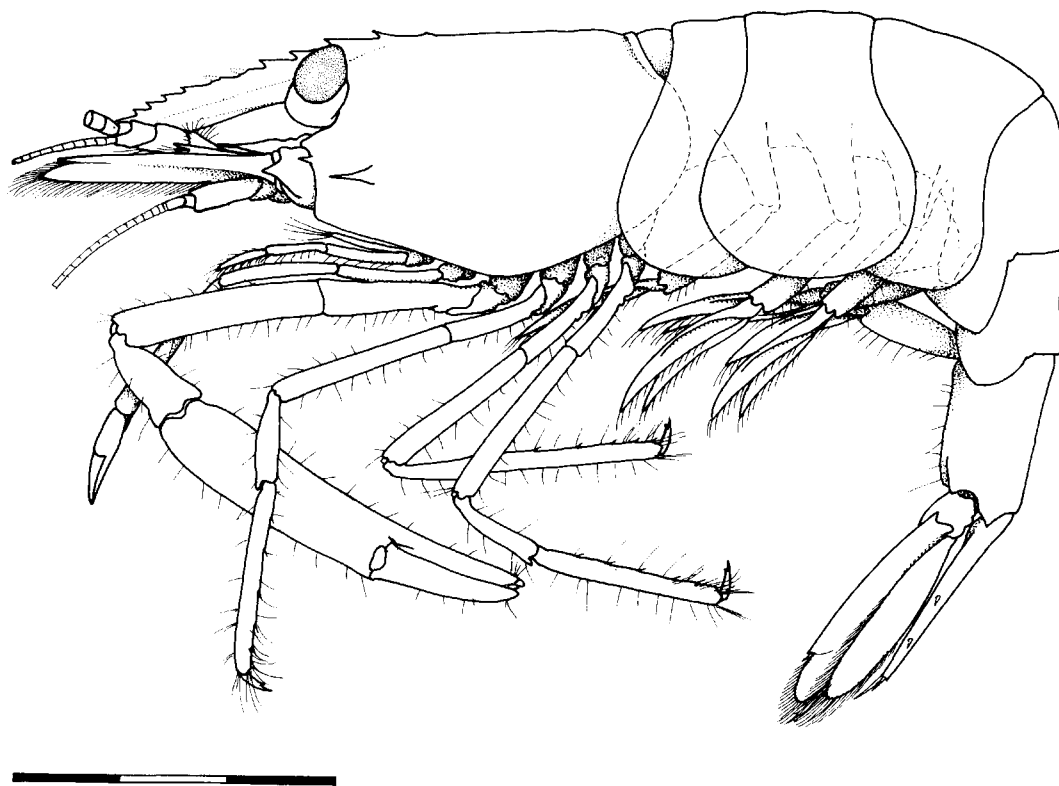


FIG. 31. — *Periclimenes ordinarius* sp. nov., holotype, ♀, MUSORSTOM 4, stn DW 184, New Caledonia, 260 m. Scale bar in millimeters.

distally, with small acute tooth ventrally at 0.4 of length, anterolateral margin feebly convex, with well developed angular distolateral lobe, with slender acute, lateral tooth, far exceeding lobe; stylocerite slender, acute, reaching to about 0.75 of segment length, statocyst normal with subcircular statolith; intermediate segment short, about 0.25 of proximal segment length, 1.1 times wider than long, with small setose lateral lamella, obliquely articulated with distal segment, distal segment 1.6 times longer than proximal width, about 0.4 of proximal segment length; upper flagellum biramous, proximal five segments fused, shorter free ramus with three segments, longer free ramus and lower flagellum incomplete, slender; with about 13 groups of aesthetascs.

Antenna with robust basicerite, with strong acute distolateral tooth, carpocerite short, stout, about 2.5 times longer than wide, reaching to about 0.4 of scaphocerite length, flagella lacking, scaphocerite far exceeding rostrum and antennular peduncle, about 0.8 of carapace length, about 3.0 times longer than wide, broad, maximum width at about 0.4 of length, feebly tapering distally, lateral margin sublinear, with acute distal tooth at 0.8 of length, anterior margin of lamella far exceeding lateral tooth, bluntly angular.

Epistome without horns, with pair of rounded bosses, linked by anterior ridge. First to third thoracic sternites broad, with low unarmed transverse ridges, fourth with transverse lateral ridges, separated by median gap, fifth with transverse ridge, posterior to coxae, with small median notch, posterior sternites unarmed.

Mandible with corpus normal, without palp; molar process (left) distally truncate, with five large blunt teeth, with posterior group of long spiniform setae; incisor process short, transversely truncate distally, with three acute teeth. Maxillula with feebly bilobed palp, upper lobe small, rounded, lower lobe small, with small ventral tubercle with short simple seta; upper lacinia normal, with double row of about nine short stout simple spines, with scattered setae distally; lower lacinia slender, tapering, with numerous long serrulate spiniform setae distally. Maxillula with short, blunt, non-setose palp; basal endite bilobed, lobes subequal, upper lobe with about 15 short, slender, simple setae, lower with twelve; coxal endite obsolete, medial border convex; scaphognathite normal,

about 2.6 times longer than wide, posterior lobe about 2.0 times longer than wide, anterior lobe 1.2 times longer than wide, broadly rounded distally, medially concave. First maxilliped with simple tapering palp, reaching to about level of distal border of basal endite, with preterminal papillose seta, basal endite broad, distal border broadly rounded, medial margin feebly concave, densely fringed with slender, feebly setulose setae, feebly separated from coxal endite; coxal endite convex, sparsely setose, with single long plumose seta distally; exopod with slender flagellum, with four long plumose terminal setae, caridean lobe well developed, broad; epipod irregular, feebly bilobed. Second maxilliped with normal endopod; dactylar segment about 2.7 times longer than wide, with

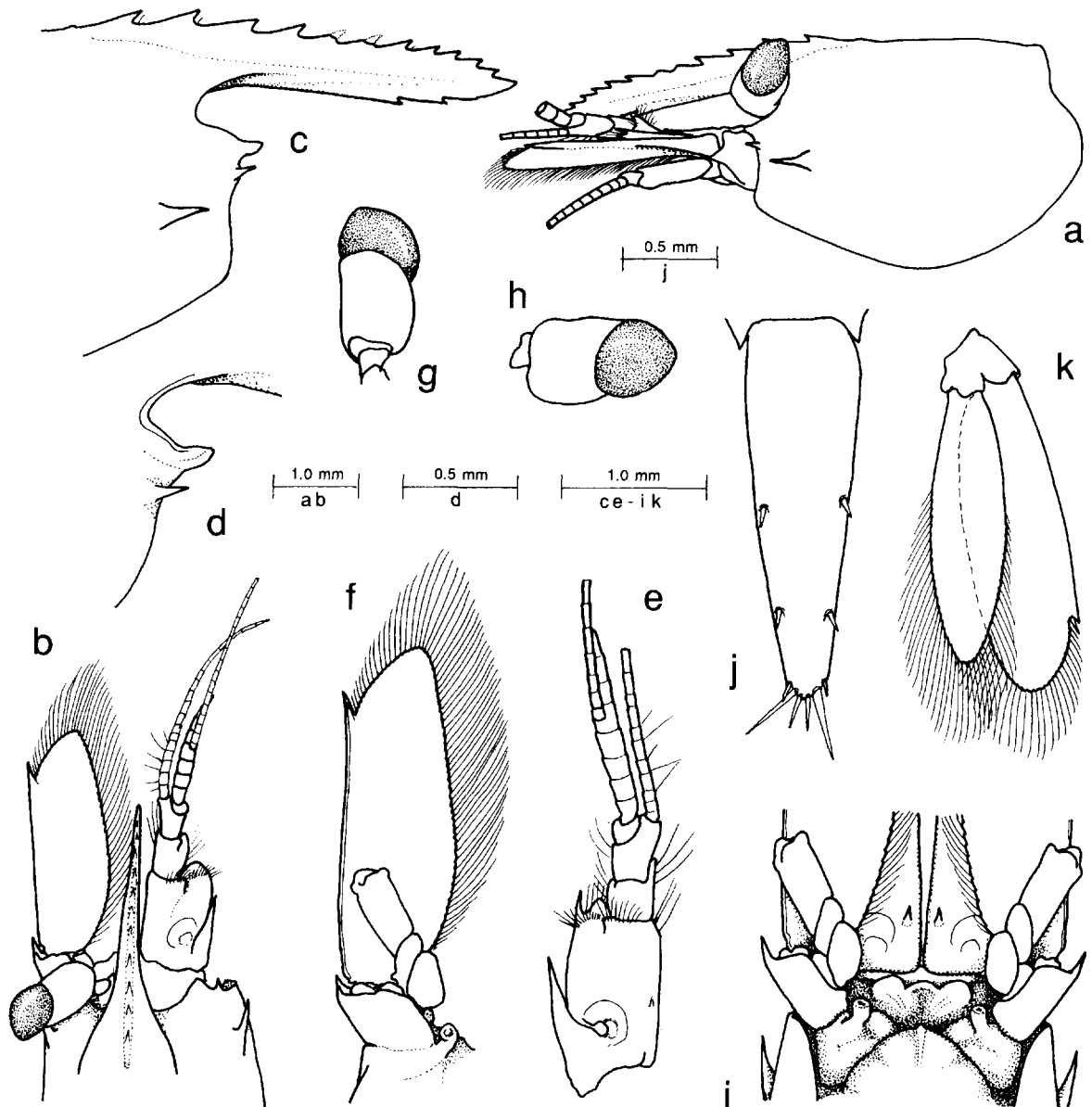


FIG. 32. — *Periclimenes ordinarius* sp. nov., holotype, ♀: a, carapace, rostrum, eye, antennal, peduncles, lateral; b, anterior carapace and rostrum, left eye and antenna, right antennula, dorsal; c, anterior carapace and rostrum, lateral; d, orbit and antennal spine; e, antennule; f, antenna, ventral; g, eye, posterior; h, same, dorsal; i, epistomal region; j, telson; k, uropod.

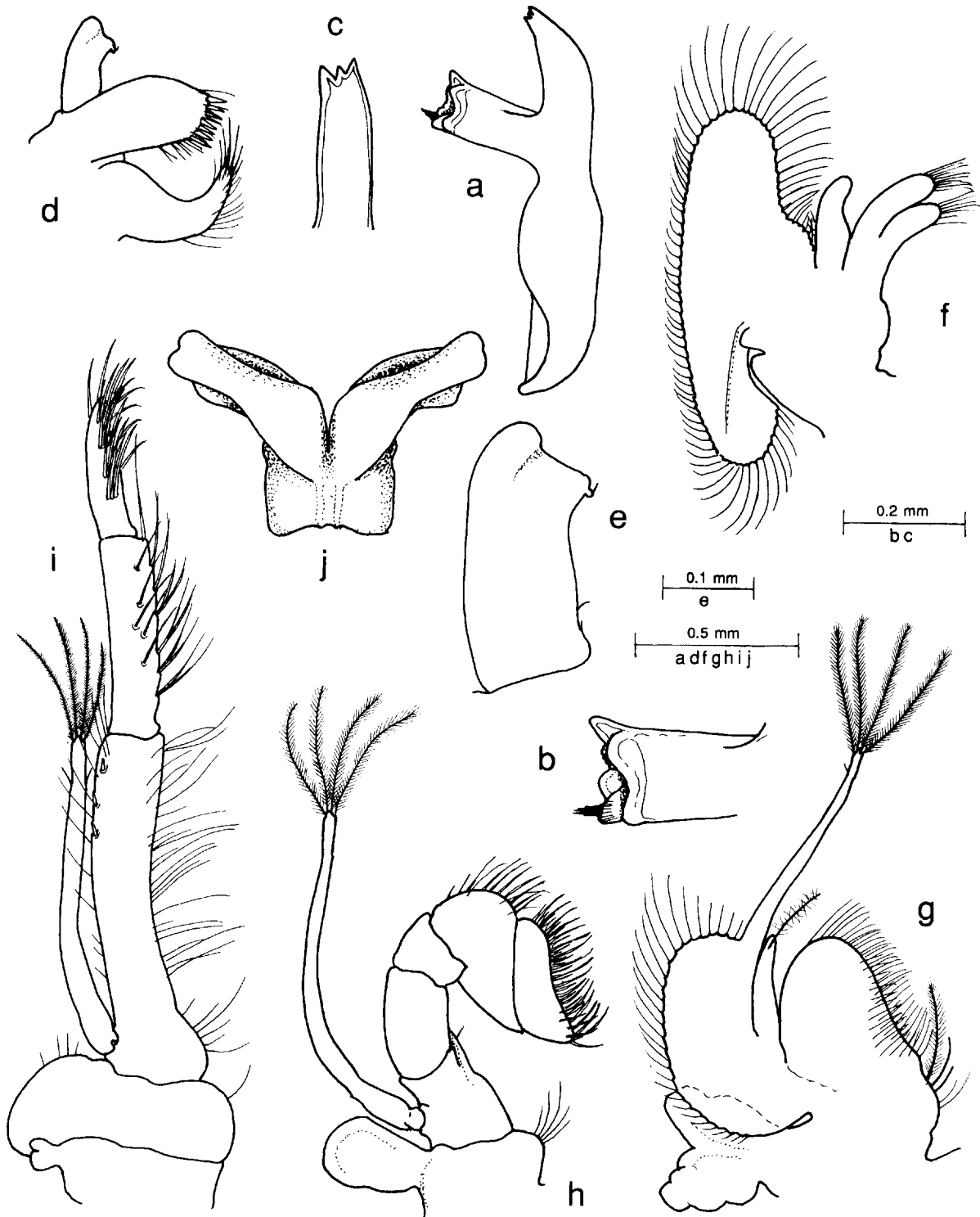


FIG. 33. — *Periclimenes ordinarius* sp. nov., holotype, ♀ : a, left mandible; b, same, molar process; c, same, incisor process; d, maxillilula; e, same, palp; f, maxilla; g, first maxilliped; h, second maxilliped; i, third maxilliped; j, paragnaths.

b, i : right side.

numerous short and long serrulate spines medially; propodal segment broad, distal margin convex, not medially produced, with 7-8 long slender spines; carpus normal, ventromedial angle produced; ischiomerus and basis normal, without special features; exopod with slender flagellum with four long plumose terminal setae; coxa stout, bluntly angular medially, with few simple setae, with small suboval epipod laterally, without podobranch. Third maxilliped with endopod slender, reaching to about distal end of carpocerite, ischiomerus and basis

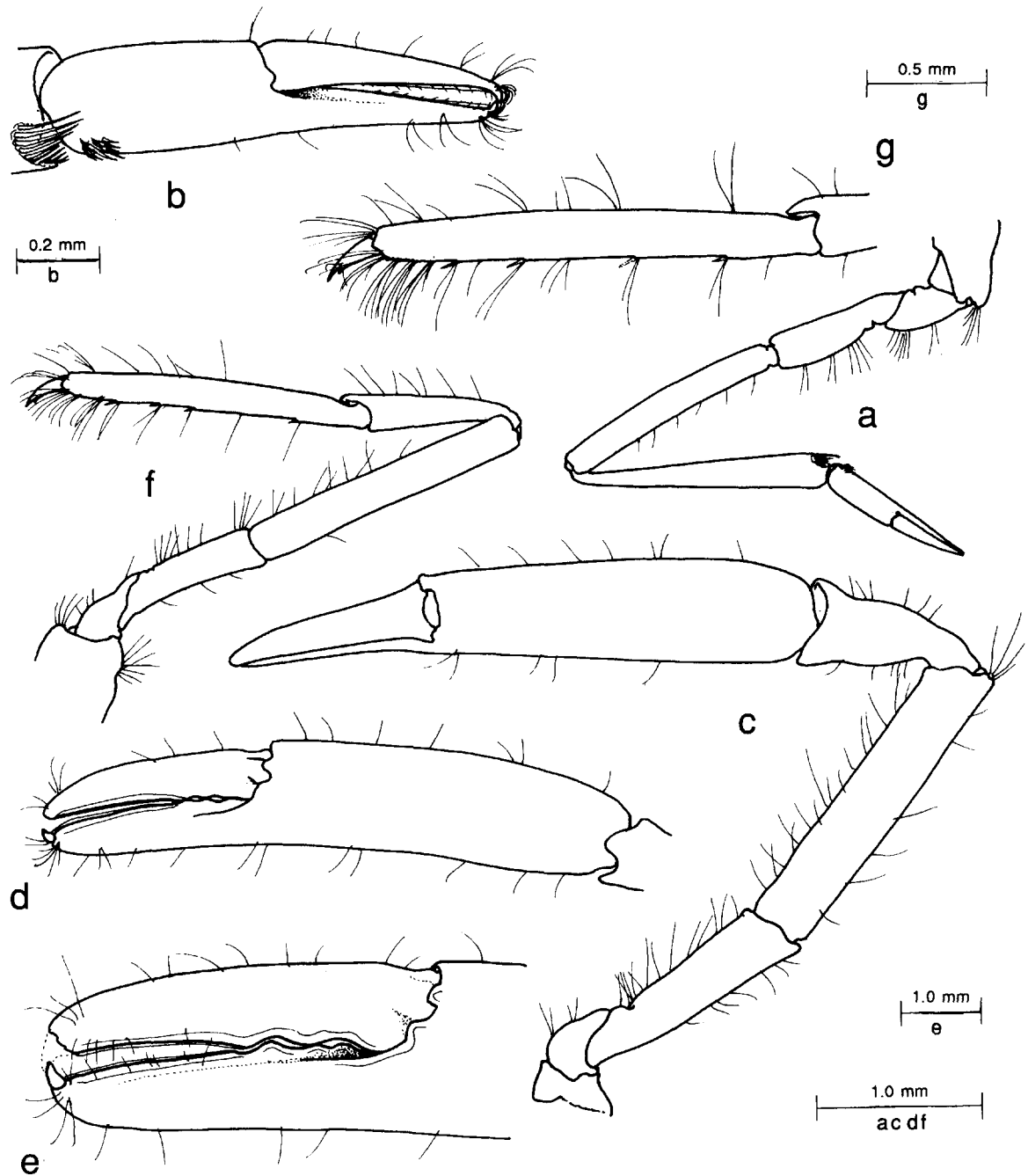


FIG. 34. — *Periclimenes ordinarius* sp. nov., holotype, ♀ : a, first pereiopod; b, same, chela; c, second pereiopod, left; d, same, chela; e, same, fingers; f, third pereiopod; g, same, propod and dactyl.

completely fused, junction marked by small medial indentation, combined segment about 6.0 times longer than central width, distally compressed, lateral margin with numerous long setae, with three short, stout, blunt, peg-like spines distally, medial margin sparsely setose, with slender simple setae, basal region convex, sparsely setose; penultimate segment about 0.6 of combined proximal segment length, subcylindrical, 4.0 times longer than central width, with ventromedial and ventrolateral long spiniform setae; terminal segment 0.66 of penultimate segment length, tapering distally, with four transverse groups of long serrulate setae ventrally; exopod with slender flagellum with four long plumose terminal setae; coxa broadly convex medially, sparsely setose, with large rounded lateral plate; arthrobranch rudimentary. Paragnaths with well developed alae, corpus short, broad, with feeble submedian carinae posteriorly.

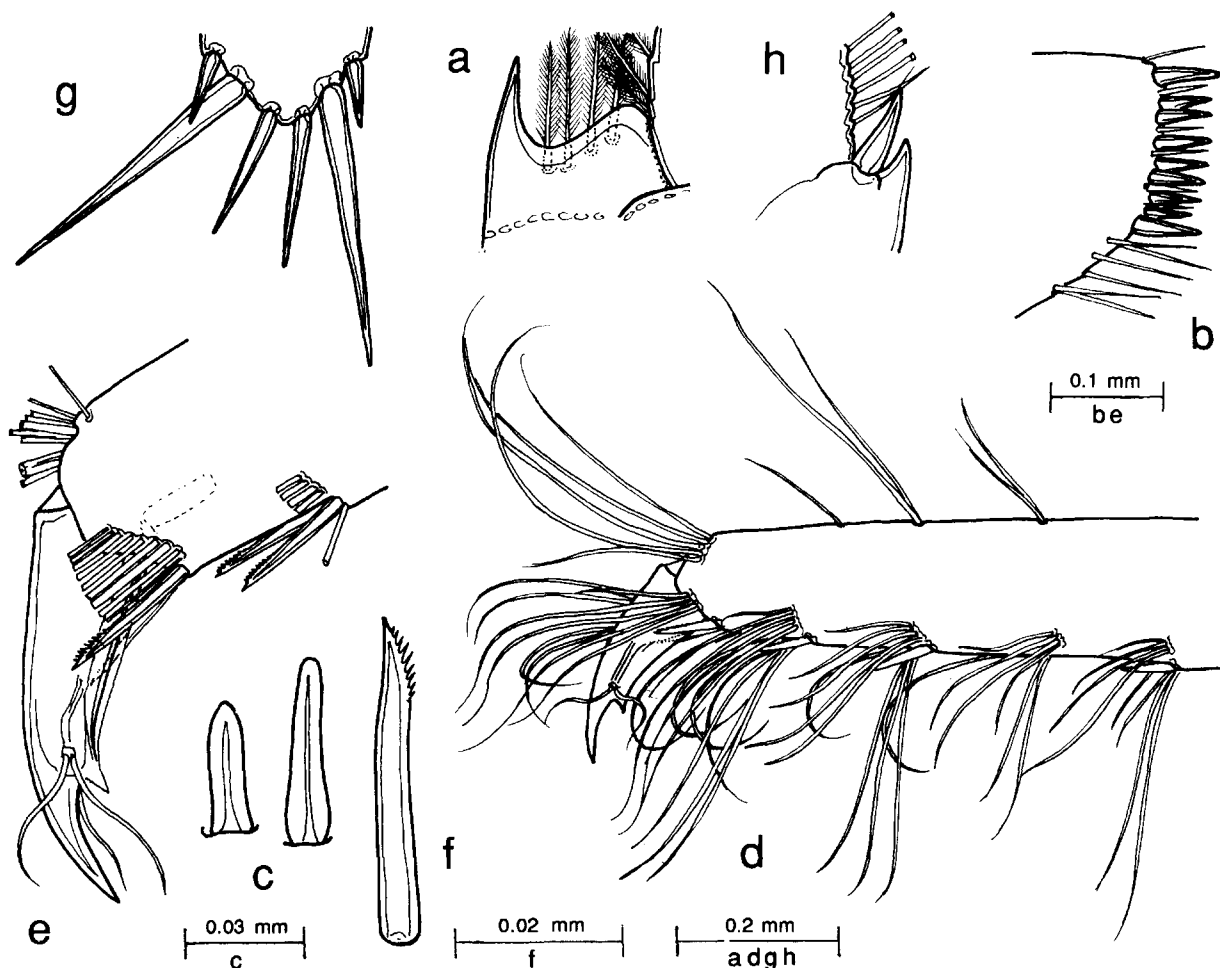


FIG. 35. — *Periclimenes ordinarius* sp. nov., holotype, ♀ : a, proximal segment of antennular peduncle, distolateral angle; b, maxillula, distal upper lacinia; c, third maxilliped, distolateral meral spines, proximal spine (right), distal spine (left); d, third pereiopod, distolateral propod and dactyl; e, same, setae omitted; f, same, distoventral propod spine; g, telson, posterior spines.

First pereiopod slender, reaching to distal end of carpoperite; chela with palm subcylindrical, feebly compressed, about 2.2 times longer than deep; with three transverse rows of short serrulate setae proximoventrally, fingers slender, subequal to palm length, tapering with small acute hooked tips, cutting edges sharp, entire, lateral, with sparse simple setae, dactylus about 4.5 times longer than proximal depth, fixed finger similar; carpus slender,

about 1.6 times chela length, 7.5 times longer than distal width, strongly tapered proximally, with semicircle of serrulate setae distoventrally; merus about 0.9 of carpus length, 1.5 times chela length, 7.5 times longer than central width, uniform; ischium about 0.9 of chela length, compressed, feebly carinate ventrally, sparsely setose; 3.5 times longer than distal depth, obliquely articulated with basis; basis about 0.5 of chela length, ventral border convex, sparsely setose; coxa normal, with very small setose distoventral process.

Left second pereiopod only preserved, exceeding scaphocerite by length of chela; chela with palm subcylindrical, smooth, slightly compressed, tapered distally, 3.5 times longer than central depth, with scattered long stiff simple setae; fingers about 0.6 of palm length, dactyl with tip missing, about 4.5 times longer than proximal depth, stout, without lateral flange, cutting edge distally sharp, entire, proximal half with two low blunt teeth; fixed finger similar, with stout hooked tip distally, cutting edge entire distally, with three low blunt teeth proximally, both fingers with numerous stiff setae, carpus about 0.45 of palm length, 2.0 times longer than distal width, moderately excavate distally, unarmed, tapered proximally, setose; merus about 0.85 of palm length, about 5.0 times longer than wide, uniform, unarmed, with numerous stiff setae, particularly ventrally, ischium about 0.65 palm length, 3.7 times longer than distal width, unarmed, tapering proximally, setose; basis and coxa robust, without special features.

Ambulatory pereiopods moderately slender, third pereiopod reaching to proximal carapocerite, dactyl short, slender, compressed, about 1.5 of propod length, with unguis not clearly demarcated, about 3.5 times longer than proximal depth, dorsal margin strongly convex, ventral margin sharp, with well developed acute accessory tooth at about 0.6 of ventral length, about 0.2 of length of terminal tooth, distolateral carpus with pair of long sensory setae laterally, single seta medially; propod about 0.65 of carapace length, 6.7 times of dactyl length, 9.0 times longer than central depth, tapered proximally and distally, distal width about 0.75 of central width, with four isolated ventral spines, numerous stiff setae (damaged distoventrally); carpus about 0.5 of propod length, 4.3 times longer than distal width, with distodorsal lobe, tapered proximally, with stiff setae dorsally, merus about 0.9 of propod length, 7.4 times longer than wide, uniform, unarmed, setose; ischium 0.55 of propod length, unarmed, setose; basis and coxa normal. Fourth and fifth pereiopods similar; fourth with distal and preterminal pairs of long ventral spines, with distodorsal border finely serrulate, with ventrolateral rows of long simple setae.

Uropod distinctly exceeding telson; prodopodite with small blunt distodorsal lobe; endopod about 3.0 times longer than broad, lateral margin feebly convex, non-setose, with small acute distal tooth, at about 0.8 exopod length, with larger mobile spine medially; diaeresis indistinct; endopod 0.7 of exopod length, 3.6 times longer than wide.

MEASUREMENTS (mm). — Carapace length, 2.7; carapace and rostrum, 4.65; total body length (approx.) 13.0; second pereiopod chela, 3.6.

COLOURATION AND HOST. — No data.

ETYMOLOGY. — *Ordinarius* (Latin), ordinary, usual, regular.

SYSTEMATIC POSITION. — *Periclimenes ordinarius* does not appear closely related to any of the previously described deep-water Indo-West Pacific species of *Periclimenes*, from which it may be immediately distinguished by the ogival shape of the cornea. Most species of *Periclimenes* have uniformly hemispherical or globular corneae, but several shallow water species associated with crinoids have the cornea modified and in extreme forms, such as *P. ceratophthalmus*, it may undergo considerable conoidal prolongation distally. Most of these crinoid associates have a reduced rostral dentition and are easily distinguishable from *P. ordinarius*, which appears more closely related to *P. commensalis* Borradaile, 1915, or *P. novaecaledoniae* Bruce, 1967b. It may be distinguished from the former by the absence of supraorbital spines, and from the latter, by the entire, non-serrate, distal cutting edges of the fingers of the second pereiopod.

REMARKS. — Although a minor feature, the character that first attracted attention when the specimen was being sorted, was the presence of numerous long slender simple, semi-rigid erect setae on the second and ambulatory pereiopods. Such setae were sparsely present in the other *Periclimenes* species represented in the collection.

The status of the single second pereopod is uncertain but the rather feeble development of the teeth on the cutting edge suggests that it is the minor chela of an unequal pair. The distoventral angle of the propod of the dissected third pereopod is damaged, but appears to have been similar to that of the fourth, as is also that of the opposite side. The dorsally serrulate, distal ventral propodal spines resemble those found in some other pontonine species found in association with echinoderms, such as *Diapontonia maranulus* and *Periclimenes milleri*, in the Atlantic Ocean (BRUCE, 1986, 1987) or *Periclimenes hertwigi* Balss (BRUCE, 1990b) in the Indo-West Pacific region.

Periclimenes pectinipes sp. nov.

Figs 36-40, 75

MATERIAL EXAMINED. — New Caledonia. SMIB 5 : stn DW 76, 23°41.2'S, 168°00.5'E, Norfolk Ridge, 280 m, 7 September 1989 : 1 ♂ holotype (MNHN-Na 12046).

DESCRIPTION. — Small sized pontonine shrimps of slender, subcylindrical body form.

Carapace smooth, glabrous; rostrum well developed, slender, extending well beyond antennular peduncles, slightly beyond scaphocerite, compressed, with obsolete lateral carinae, straight, directed slightly upwards distally, dorsal carina well developed posteriorly, with three large acute compressed teeth, posterior two situated on anterior carapace, with five further teeth, of decreasing size distally, with smallest distal tooth subapical, lower border with carina obsolete, with three acute teeth situated on distal half of rostrum; epigastric tooth very large, acute, stout, situated at about 0.5 of carapace length, supraorbital teeth absent; orbit feebly developed, inferior orbital angle produced, acute in lateral view, antennal spine well developed, acute, marginal, reaching to about level of tip of inferior orbital angle, hepatic spine robust, larger than antennal spine, at distinctly lower level, below level of first and second dorsal rostral teeth; anterolateral margin of branchiostegite not produced, bluntly rounded.

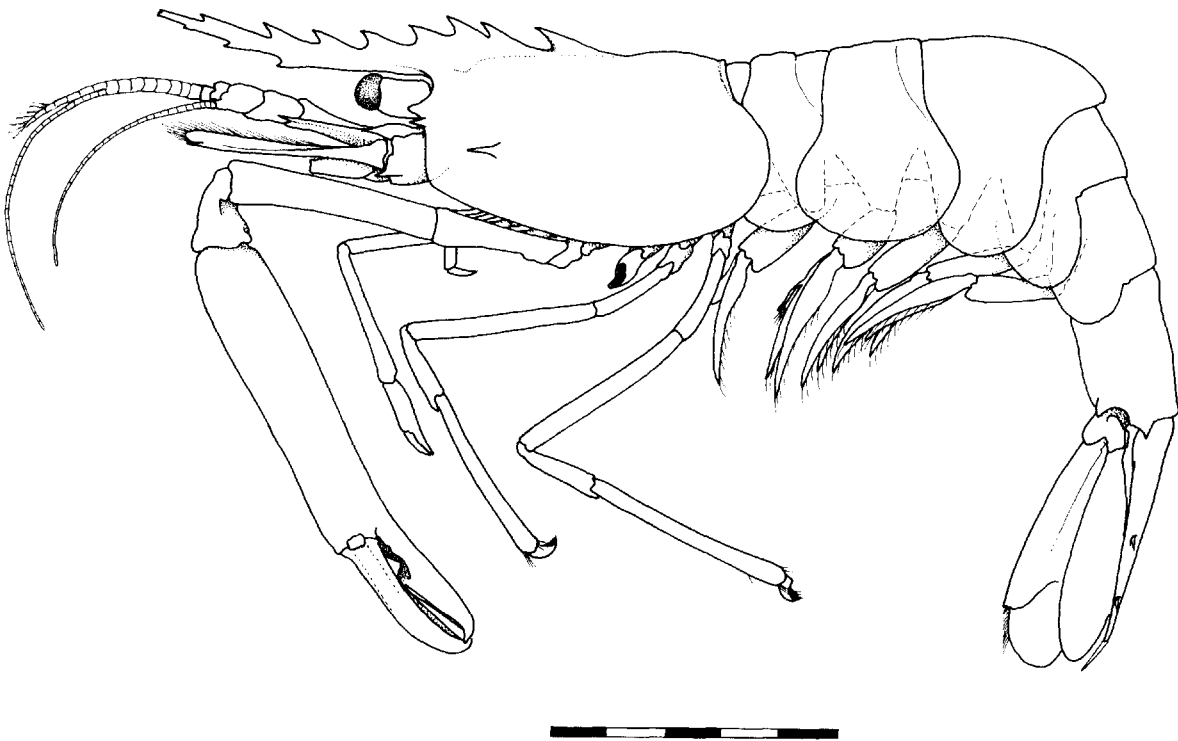


FIG. 36. — *Periclimenes pectinipes* sp. nov., holotype, ♂, SMIB 5, stn DW 76, Norfolk Ridge, 280 m. Scale bar in millimeters.

Abdomen smooth, glabrous; third abdominal segment feebly produced postero dorsally, non-carinate; pleura of first five segments all broadly rounded; fifth segment about 0.75 of sixth segment length, sixth segment compressed, about 1.5 times longer than deep, subuniform, posteroventral angle small, subacute, posterolateral angle larger, acute. Telson about 1.75 times sixth segment length, 3.7 times longer than anterior width, lateral margins almost straight, convergent to angular posterior margin, about 0.35 of anterior margin width, with two pairs of stout, submarginal dorsal spines, about 0.6 of telson length, at 0.5 and 0.8 of telson length, posterior margin with three pairs of spines, small acute median point, lateral spines distinctly smaller than dorsal spines, intermediate spines long, slender, about 2.2 times dorsal spine length, 0.13 of telson length, submedian spines slender, non-setulose, 0.5 of intermediate spine length.

Eye with cornea distorted, apparently globular, transverse, well pigmented, without accessory pigment spot, approximately 0.13 of carapace length, stalk about 1.2 times broader than long, feebly compressed, tapering slightly distally.

Antennule with peduncle distinctly shorter than scaphocerite, far exceeded by rostrum; proximal segment 2.0 times longer than wide, medial and lateral margins straight, subparallel, medial margin with small ventral tooth at about 0.45 of length, lateral margin strongly produced distolaterally, with rounded medial lobe with strong acute lateral tooth, far exceeding distal margin of lobe, reaching to about middle of intermediate peduncular segment; stylocerite slender, acute, about 0.55 of segment length, statocyst normal, with granular statolith; intermediate segment about 0.33 of proximal segment length, about as long dorsally as wide, with well developed lateral flange, obliquely articulated with distal segment, medial margin setose; distal segment about 1.3 times length of intermediate, 0.5 of proximal segment length, 1.3 times longer than wide; upper flagellum biramous, with ten proximal segments fused, shorter free ramus with eight segments, longer free ramus with seven; lower flagellum slender, subequal to carapace length; about seven groups of aesthetascs.

Antenna with basicerite robust, with strong distolateral tooth; carpocerite stout, about 3.0 times longer than broad, reaching to about 0.4 of scaphocerite length; antennal flagella lacking; scaphocerite well developed, extending slightly beyond antennular peduncle, about 2.6 times longer than wide, lateral margin straight, with strong distolateral tooth, slightly exceeded by anterior margin of lamella, lamella broad, feebly tapering distally, anterior margin bluntly angular.

Epistome normal, unarmed. Thoracic sternites narrow, fourth sternite without slender median process, with low transverse ridge with feeble submedian eminences, fifth sternite with pair of small subacute submedian teeth; posterior sternites unarmed.

Mandible (right) normal, without palp; corpus slender; molar process with five blunt teeth and several small groups of short setae; incisor process tapering with three teeth distally on right, four on left, central teeth smaller than outer teeth. Maxillula with strongly bilobed palp; upper lobe elongate, slender, non-setose, lower lobe short, stout, with distoventral tubercle, without seta (? lost in dissection), upper lacinia slender, with about ten slender simple distal spines, numerous short spiniform setae, lower lacinia slender, with numerous long spiniform setae. Maxilla with simple slender tapering, distally acute, non-setose palp; basal endite slender, simple, with about 15 slender simple distal setae; scaphognathite large, about 2.5 times longer than broad, posterior lobe well developed, broad, about 1.4 times longer than wide, anterior lobe about 1.3 times longer than broad, about 0.5 of scaphognathite length, medial margin notched, anterior portion broadly rounded. First maxilliped with slender tapering palp, extending well beyond distal margin of basal endite, with slender terminal seta and longer stout preterminal medial seta, basal endite broad, fused with coxal endite, anterior lobe slightly angular, medial margin straight, sparsely setose, with short slender simple setae; exopod with slender flagellum with four long plumose terminal setae, caridean lobe large, broad, epipod large, bilobed. Second maxilliped with normal endopod, dactylar segment about 3.5 times longer than broad, with numerous long serrulate spines medially, propodal segment with disto-medial margin enlarged, rounded, with about seven long slender spines, carpus with ventromedial margin angulate, ischiomerus normal, basis normal, feebly excavate medially; exopod with slender flagellum with four plumose long terminal setae; epipod simple, irregular, without podobranch. Third maxilliped extending distally to about 0.3 of carpocerite, ischiomerus completely fused to basis, combined segment about 11.0 times longer than central width, ischiomerus region centrally narrow, proximally and distally expanded, medial margin sparsely setose, lateral margin glabrous, basal region expanded, broadly convex medially, sparsely setose; penultimate segment about 0.6 of length of combined proximal segment, about 4.3 times longer than wide, uniform, with about six

pairs of long spines ventromedially; terminal segment about 0.5 of length of combined proximal segment, 5.0 times longer than proximal width, with about six groups of 2-3 spines ventromedially and short terminal spine; exopod with slender flagellum with four long plumose terminal setae; coxa with small medial protuberance, with single long simple seta, lateral plate well developed, rounded; arthrobranch small, with five lamellae. Paragnaths with alae feebly developed, corpus stout, about 1.5 times broader than long, with deep anteroventral medial fissure, posterolaterally with feeble oblique posteriorly convergent grooves.

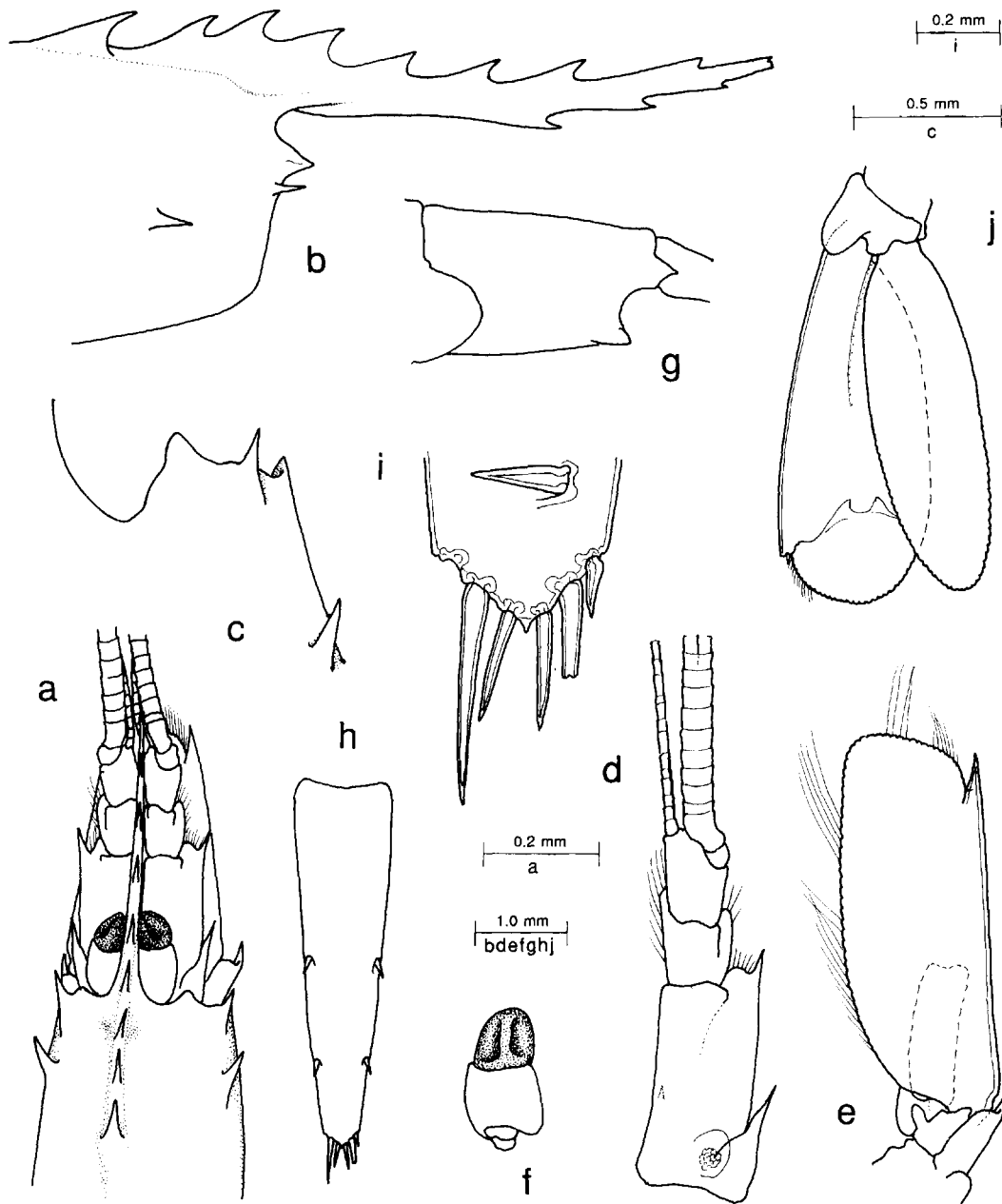


FIG. 37. — *Periclimenes pectinipes* sp. nov., holotype, ♂ : a, anterior carapace and rostrum, eyes and antennal peduncles, dorsal; b, anterior carapace and rostrum, lateral; c, orbital region, dorsal; d, antennular peduncle; e, antenna; f, eye, dorsal; g, sixth abdominal segment; h, telson; i, same, posterior spines, dorsal spine inset; j, uropod.

First pereiopod slender, extending beyond carpoperite by distal third of propod and chela, reaching to distal margin of scaphocerite; chela with palm subcylindrical, slightly compressed, about 2.9 times longer than deep with five transverse rows of short serrulate setae proximovenstrally, fingers simple, about 0.66 of palm length, dactyl about 4.0 times longer than proximal depth, tapering to feeble hooked tip, cutting edge sharp over distal 0.6 of ventral border, slightly laterally situated, fixed finger similar; carpus about 1.6 times palm length, about 10.0

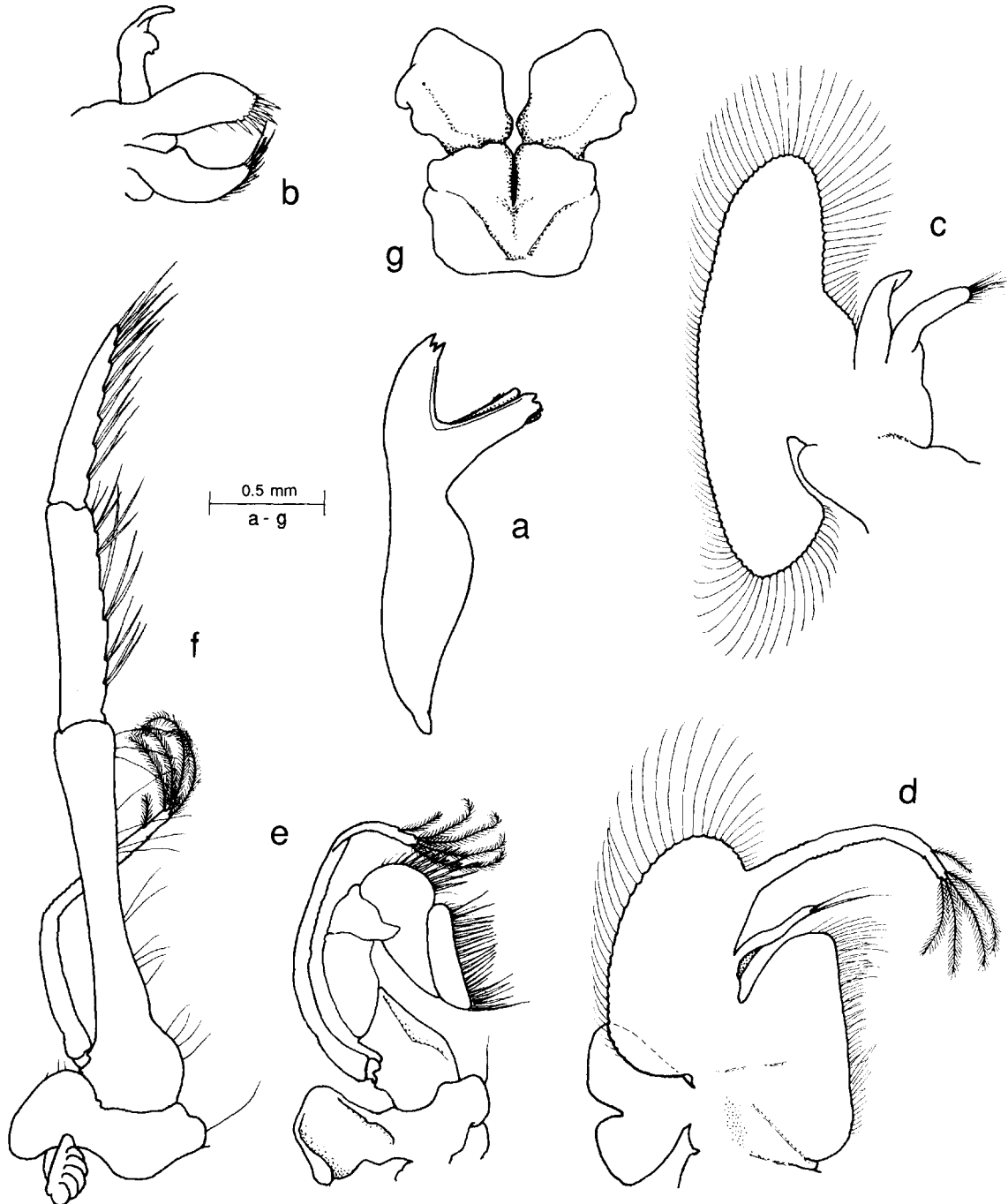


FIG. 38. — *Pericilimenes pectinipes* sp. nov., holotype, ♂ : a, mandible; b, maxillula; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped; g, paragnaths.

times longer than central width, expanded distally, with distoventral row of serrulate setae; merus subequal to carpus length, about 9.0 times longer than central width, slightly expanding distally, ischium about 0.36 of meral length, 2.6 times longer than deep; basis subequal to ischial length, sparsely setose ventrally; coxa normal, with small setose distoventral process.

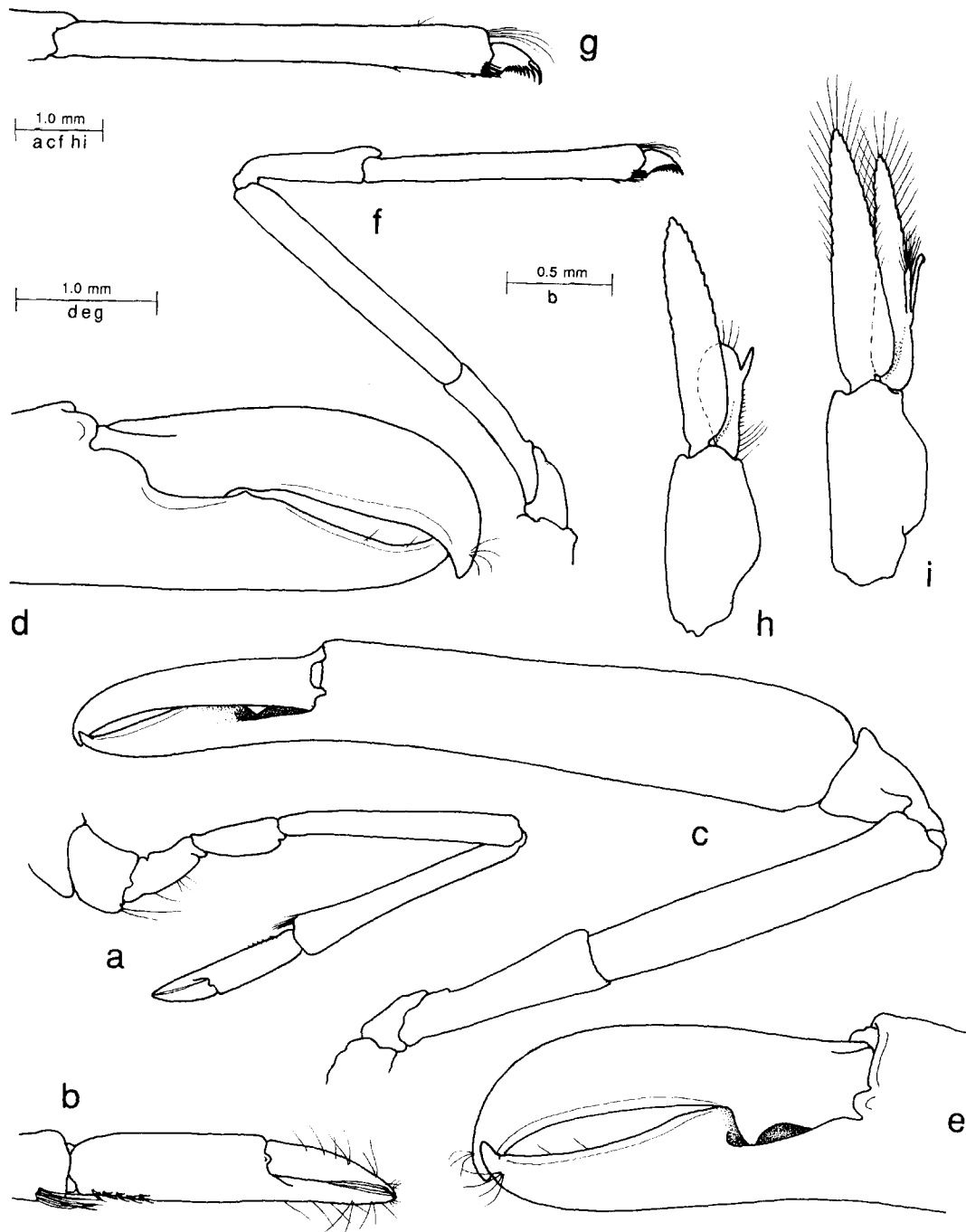


FIG. 39. — *Periclimenes pectinipes* sp. nov., holotype, ♂ : a, first pereopod; b, same, chela; c, left second pereopod; d, same, fingers, lateral; e, same, medial; f, third pereopod; g, same, propod and dactyl; h, first pleopod; i, second pleopod.

Left second pereiopod only preserved, apparently major pereiopod, extending beyond scaphocerite by chela and half length of carpus; chela about 1.6 times carapace length, with palm subcylindrical, smooth, about 5.0 times longer than central width, slightly swollen proximally; fingers about 0.45 of palm length, dactyl about 4.2 times greater depth, at about 0.6 of length, with stout blunt hooked tip distally, large acute, slightly recurved tooth proximally, fitting into deep opposing fossa on fixed finger, distal cutting edge concave, blunt; fixed finger about 2.6 times longer than proximal depth, with feeble hooked distal tooth, small acute tooth at about 0.4 of cutting edge length, distal cutting edge concave, blunt; carpus stout, short, about 0.23 of palm length; 1.3 times longer than distal width, tapering proximally, expanded distally, feebly excavate distally, unarmed; merus about 0.66 of palm length, 6.0 times longer than central depth, subuniform, smooth, distoventral angle rounded, unarmed; ischium about 0.58 of meral length, 3.2 times longer than distal width, wider than proximal merus, tapering proximally; basis and coxa normal, without special features.

Ambulatory pereiopods slender, third pereiopod (missing on the left side) exceeds scaphocerite by chela and distal third of propod; dactyl short, strongly compressed; unguis distinct from corpus, slender, about 6.0 times longer than basal width, curved, simple, about 0.5 of length of dorsal margin of corpus, corpus about 1.6 times longer than maximum depth, dorsal border strongly convex, ventral border with distal half bearing series of nine long slender non-articulated teeth, of decreasing size proximally, proximal half of ventral border with unarmed

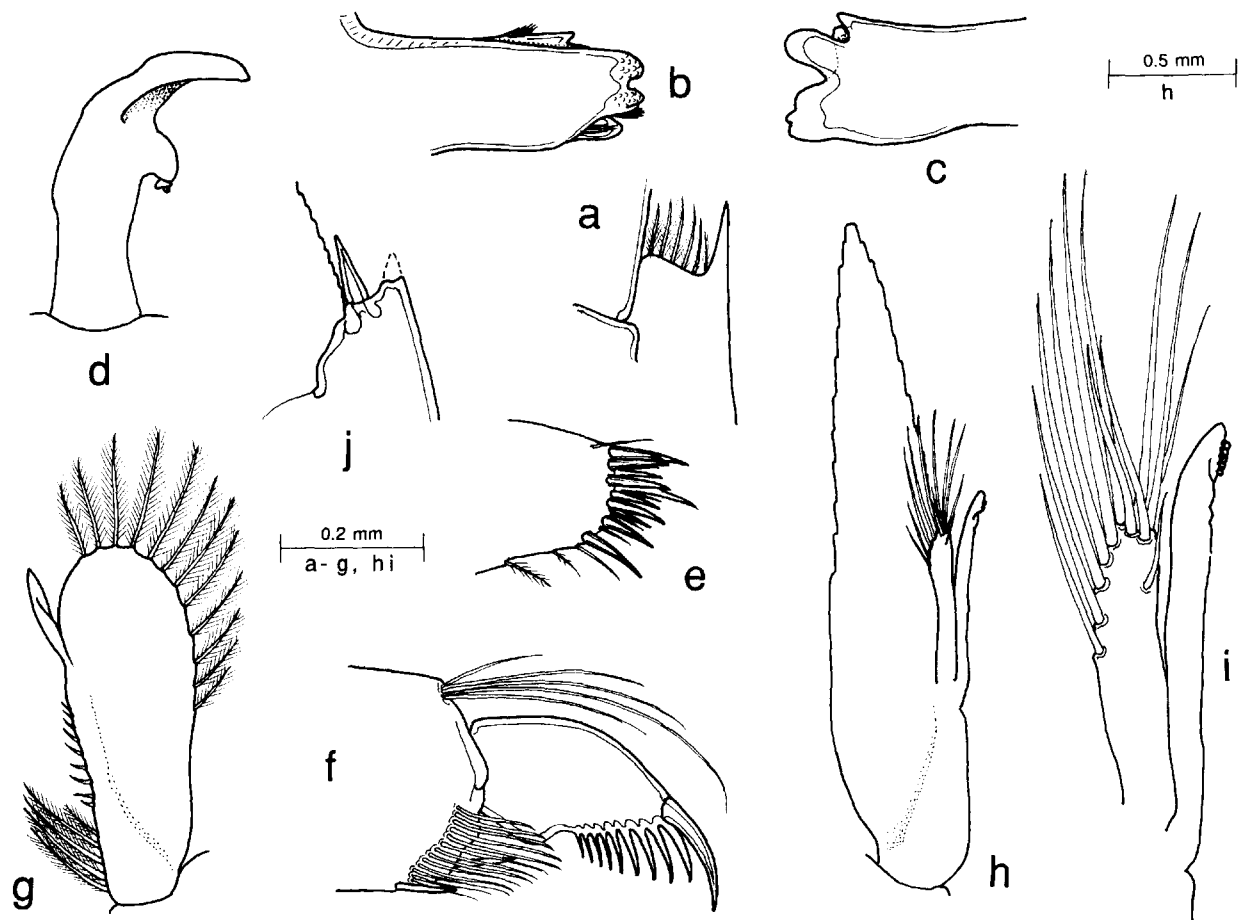


FIG. 40. — *Periclimenes pectinipes* sp. nov., holotype, ♂ : a, proximal segment of antennular peduncle, distolateral angle; b-c, molar process of mandible, dorsal and ventral; d, maxillula, palp; e, same, distal upper lacinia; f, third pereiopod, dactyl and distal propod; g, first pleopod, endopod; h, second pleopod, endopod; i, same, appendix masculina and appendix interna.

blunt angular non-setose process, base of dactyl about half width of distal propod; propod about 0.6 of carapace length, about 12.0 times longer than central depth, mainly subcylindrical, expanded and compressed distally, distal ventral margin with single slender terminal spine, with two separate single spines distally, with distal ventrolateral transverse rows of setae; carpus about 0.45 of propod length 4.5 times longer than central width, with well developed distodorsal lobe; merus subequal to propod length, 9.0 times longer than central width, uniform, unarmed; ischium about 0.5 of merus length; basis and coxa normal. Fourth and fifth pereopods similar to third.

First pleopod of male with basis about 2.0 times longer than broad; endopod about 0.6 of basipodite length, 2.7 times longer than central width, tapering proximally, medial margin with slender elongate accessory lobe, at 0.6 of length, extending to level of distal margin of endopod, proximal medial border with four plumose setae proximally and series of nine small simple spinules distally, distolateral margin with twelve plumose setae; exopod about 2.0 times endopod length, 5.0 times larger than central width. Second pleopod with basipodite 1.1 times length of first pleopod basipodite, 2.0 times longer than central width; endopod about 5.5 times longer than proximal width, with appendices at 0.33 of medial margin length; appendix masculina with corpus moderately stout, subcylindrical, about 4.5 times longer than wide, reaching to about 0.5 of endopod length, with six distal ventromedial spines of increasing length distally, longest spine exceeding corpus length, three shorter distoventral and three long simple terminal spines; appendix interna about 1.5 times appendix masculina length, about 11.0 times longer than central width, with few distal cincinnuli.

Uropod distinctly exceeding telson; protopodite with distolateral lobe rounded; exopod distally broad, about 2.4 times longer than distal width, lateral margin feebly convex, non-setose, with small distolateral tooth (damaged), with larger mobile spine medially, diaeresis distinct; endopod subequal to exopod length, 3.2 times longer than wide.

HOST. — ? *Gymnocrinus richeri* Bourseau, Ameziane-Cominardi & Roux, 1987 [Hemicrinidae : Crinoidea]. See Remarks.

MEASUREMENTS (mm). — Carapace length, 5.1; rostrum and carapace, 10.0; total body length (approx.), 25.0; second pereopod chela, 8.5.

COLOURATION. — Generally translucent, with superimposed pattern of red and white. Frontal region, antennular peduncle, scaphocerite and basicerite deep red, rostrum largely transparent, epigastric tooth and rostral teeth white, (except first ventral rostral tooth, red), rostral tip white, with patch of red at about 0.6 of rostral length; rest of carapace pinkish red, darker over branchiostegite; abdomen mainly translucent except for deep red transverse bar across posterodorsal third segment, sixth segment and caudal fan deep red; antennal flagella colourless proximally, white distally; pereopods largely transparent, bases of first to third pereopods deep red; second pereopod chela with distal half of fingers, proximal and distal palm red, central palm, proximal fingers and finger tips white; carpus, distal merus and distal ischium white; ambulatory pereopods with distal merus and carpus white, proximal propod red; pleura transparent, ventral abdomen and pleopods deep red; cornea black. (From colour transparency by J.-C. MENU).

ENTOMOLOGY. — *Pectin* (Latin), a comb; *pes* (Latin), a foot, with reference to the ambulatory dactyls.

SYSTEMATIC POSITION. — The dactyl of the ambulatory pereopods of *P. pectinipes* is without parallel in the genus *Periclimenes*, or indeed, in any other pontoniine or palaemonid genus and isolates this species from all other presently known taxa. The dactyl, in its general features appears to show some convergence with some algal inhabiting hippolytid shrimps, but the depth of capture eliminates any similar associations from consideration. In other respects *P. pectinipes* is a typical deep-water species of the genus and closely resembles *P. laccadivensis* (Alcock & Anderson, 1894) from 628-1285 m. The simple basal endite of the maxilla in *P. pectinipes* may also be a characteristic feature, may also possibly be an individual abnormality. The mouthparts of *P. laccadivensis* have not been described in detail and the condition of the maxilla is unknown.

REMARKS. — Other features of interest in *P. pectinipes*, are the elongate upper lobe of the palp of the maxilla and the basal endite of the maxilla, which appears to be unusual in *Periclimenes* species, as does the elongate

accessory lobe on the endopod of the male first pleopod. The rather characteristic transverse row of setae on the distal ventrolateral margin of the ambulatory propods suggests a small brush, the function of which may be to clean the characteristic comb of teeth on the dactyl. Also noteworthy is the slightly posterodorsally produced third abdominal segment, which is emphasized in the live animal by a conspicuous transverse band of red. In many of the shallow water species of *Periclimenes*, particularly those in which this feature is strongly developed, it is provided with elaborate colour features (BRUCE, 1990c). The rostrum also appears to be naturally devoid of setae, there being no traces of setal articulations in the interdental spaces.

The SMIB expeditions were particularly noteworthy for the capture of abundant specimens of the unusual stalked crinoid *Gymnocrinus richeri* Boursault *et al.* [Hemicrinidae], a family previously considered extinct since the Jurassic, and it is tempting to think that this unusual species of *Periclimenes*, with its characteristic ambulatory dactylus, may have been associated with this equally unusual host. Stn DW 76 was particularly noted for the quantities of echinoderms caught and is the type locality for *G. richeri*, at which 42 specimens were obtained (BOURSEAU *et al.*, 1987).

Periclimenes platyrhynchus sp. nov.

Figs 41-44

MATERIAL EXAMINED. — New Caledonia. MUSORSTOM 4 : stn DW 184, 19°04.0'S, 163°27.0'E, 260 m, 18 September 1985 : 1 ovig. ♂, holotype (MNHN Na-11908).

DESCRIPTION. — Medium sized pontonine shrimp of robust, subcylindrical body form, in good condition, lacking only left fourth and fifth pereiopods and parts of antennal flagella.

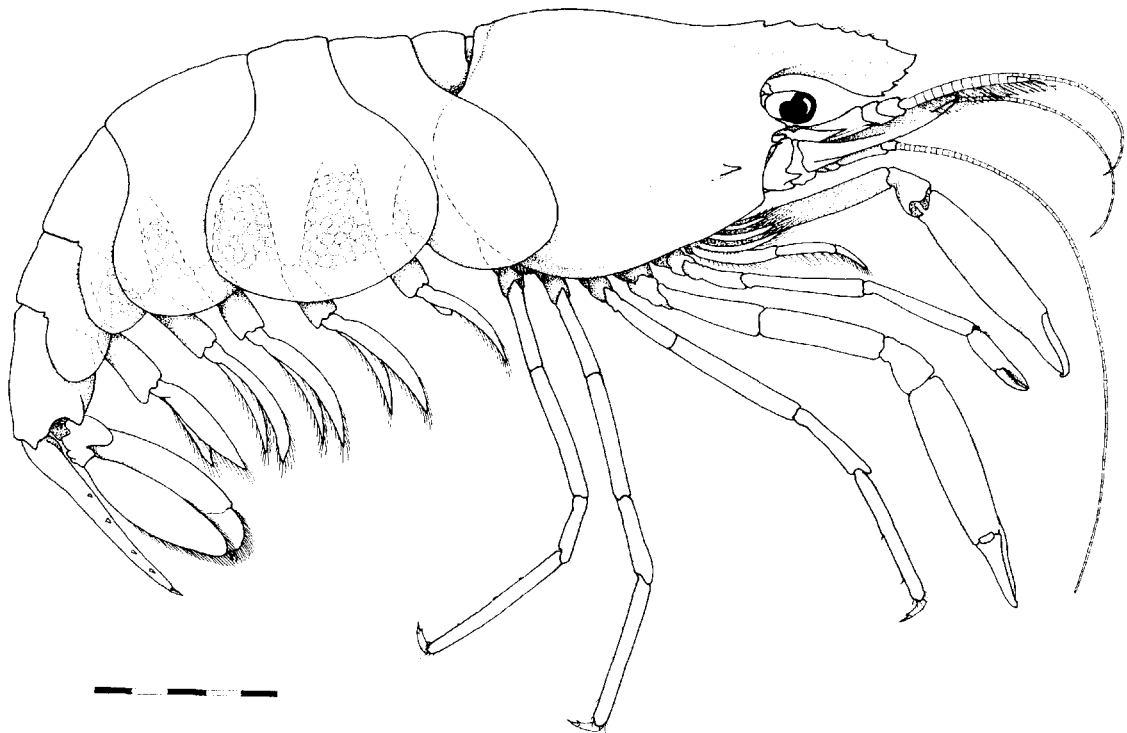


FIG. 41. — *Periclimenes platyrhynchus* sp. nov., holotype, ♀, MUSORSTOM 4, stn DW 184, New Caledonia, 260 m. Scale bar in millimeters.

Carapace smooth, glabrous; rostrum well developed, slightly exceeding antennular peduncle with markedly deep lamina, horizontal, slightly upturned distally, dorsal carina deep, extending over anterior fifth of carapace, dorsal border convex, with seven small feebly acute teeth, damaged, except for first and last, near evenly spaced, with most distal tooth slightly removed from feebly upturned apex, lateral carinae well developed, not broadly expanded, ventral carina well developed, deep, margin strongly convex, with three small subequal acute teeth distally; supra-orbital and epigastric teeth absent, without epigastric tubercle; orbit feebly developed, inferior orbital angle strongly produced, blunt, without ventral carina, rounded in lateral view, antennal spine acute, marginal, horizontal, hepatic spine acute, robust, larger than antennal spine, at distinctly lower level, at about 0.1 of carapace length; anterolateral angle of branchiostegite obtuse, blunt.

Abdomen smooth, glabrous; third segment not posterodorsally produced, non-carinate; pleura of first three segments broadly rounded, fourth and fifth posteriorly produced, rounded; fifth segment about 0.85 of sixth segment length, sixth segment compressed, about 1.5 times longer than deep, feebly tapered posteriorly, posteroventral angle small, blunt, posterolateral angle larger, acute. Telson about 1.7 times sixth segment length, 3.0 times longer than anterior width, lateral margins sublinear, feebly convergent posteriorly, with four pairs of very small dorsolateral spines, at about 0.45, 0.6, 0.8 and 0.9 of telson length, posterior margin feebly angulate, about 0.3 of anterior width, with small median point, with three pairs of subventral spines, lateral spines very small, smaller than dorsal spines, intermediate spines short, stout, about 0.07 of telson length, about 3.5 times longer than basal width, 3.0 times longer than lateral spines, submedian spines slender, about 0.55 of intermediate spine length, feebly setulose.

Eye with small, well pigmented globular cornea, slightly oblique, without accessory pigment spot, corneal diameter about 0.1 of carapace length, stalk moderately compressed, about as wide as long, swollen medially, feebly tapered distally.

Antennular peduncle slightly shorter than rostrum, far shorter than distal margin of scaphocerite; proximal segment about 1.6 times longer than wide, medial margin straight, non-setose, with stout acute tooth ventrally at about 0.5 of length, lateral margin straight, subparallel to medial margin, with large broad distolateral lobe, anterior margin near straight, with eight short plumose subventral setae, with small acute lateral tooth, reaching almost to level of proximal margin of intermediate segment, stylocerite slender, acute, reaching to about 0.75 of segment length, statocyst normal, with subcircular statolith; intermediate segment short, about 0.2 of proximal segment length, 1.5 times wider than dorsal segment; distal segment about 1.8 times intermediate segment length, 0.4 of proximal segment length, 1.4 times longer than distal width, upper flagellum, biramous, proximal 12 segments fused, medially robust, subcircular in section, laterally laminar, shorter ramus with two free segments, total ramus length about 0.45 of carapace length, with about 28 groups of aesthetascs, longer ramus slender, filiform, incomplete; lower flagellum, slender, filiform, incomplete.

Antenna with basicerite robust, with small acute ventrolateral tooth; carpoperite subcylindrical, slightly compressed, about 2.5 times longer than central width, reaching to about 0.5 of scaphocerite length, flagella well developed, incomplete; scaphocerite far exceeding apex of rostrum and antennular peduncle, about 0.6 of carapace length, 2.2 times longer than wide, greatest width at about 0.4 of length, distally broad, with rounded distal margin to lamina, lateral margin feebly convex, with stout distal tooth, distinctly exceeded by distal lamina.

Epistome normal, unarmed, with two lateral bosses, with smaller distomedian boss. First three thoracic sternites broad, with feeble transverse ridges, fourth, without median process, with triangular lateral plates, fifth narrow, with similar larger plates, sixth to eight broadening posteriorly, unarmed.

Mandible (left) with slender, normal corpus, without palp; molar process robust, distally truncate, with five stout blunt teeth, group of short setae posteriorly; incisor process slender, distally truncate, with four acute teeth, outer teeth larger than central pair. Maxillula with deeply bilobed palp, upper lobe large, elongate, lower lobe small, with short simple hooked seta distally; upper lacinia broad, proximally tapered distally, with about six short stout simple spines distally, numerous spiniform setae; lower lacinia stout, tapering distally, with numerous spiniform setae distally. Maxilla with non-setose tapering palp, distally subacute, with several short plumose setae proximolaterally; basal endite deeply bilobed, upper lobe slightly stouter than lower, with about 17, 10 short slender setae respectively, finely serrulate, coxal lobe obsolete, medial margin sinuous; scaphognathite normal, about 2.5 times longer than broad, posterior lobe about 1.25 times longer than broad, 0.33 of scaphognathite length, anterior lobe proximally broad, 1.2 times longer than wide, medial margin concave. First maxilliped with

elongate slender tapering palp, distally subacute, with short preterminal medial plumose seta, basal endite broad, broadly rounded distally, medial margin straight, with numerous long slender setae, coxal endite small, rounded, sparsely setose, separated from basal endite by distinct notch; exopod with slender flagellum with numerous

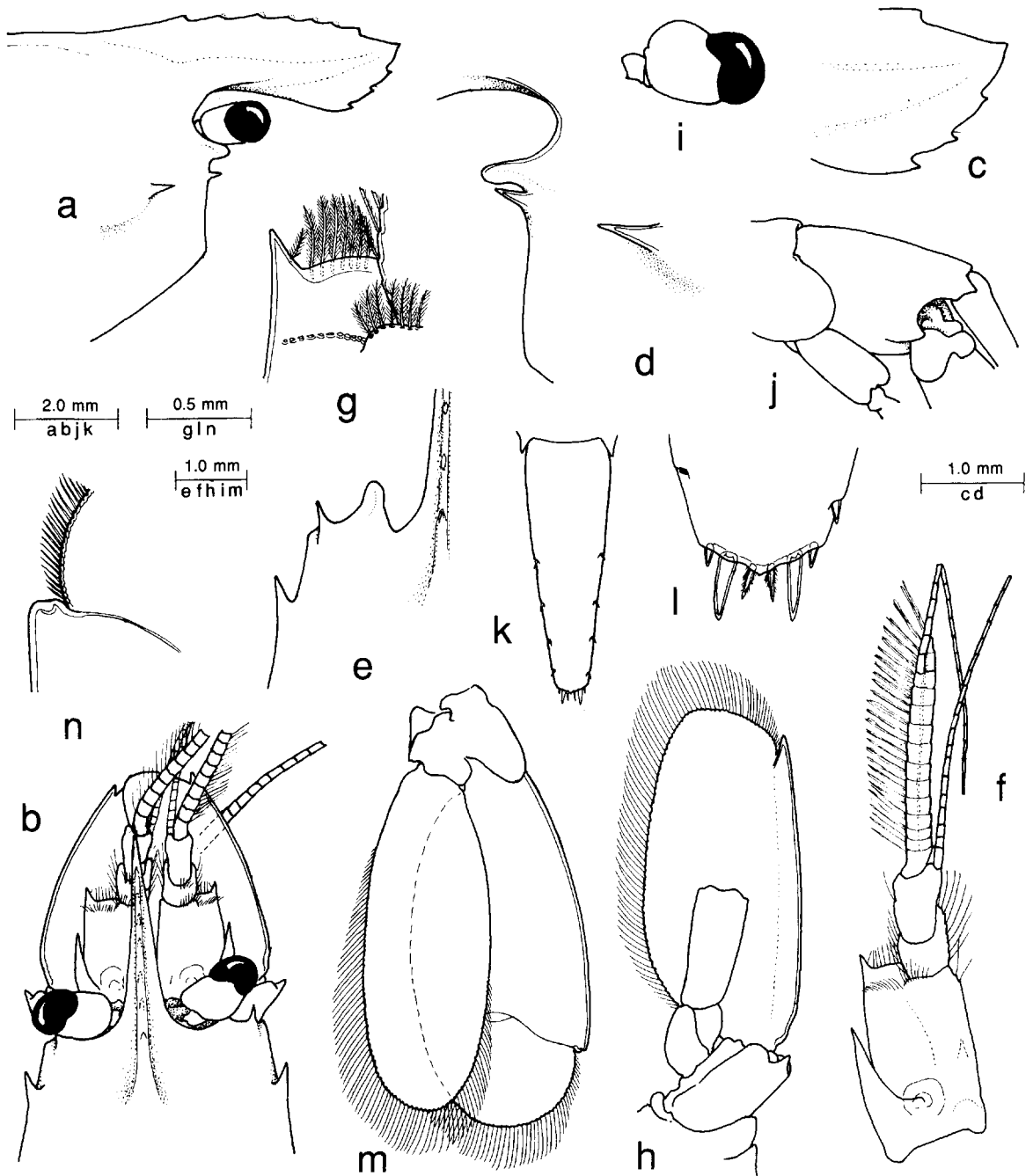


FIG. 42. — *Periclimenes platyrhynchus* sp. nov., holotype, ♀ : a, anterior carapace and rostrum; b, same, with antennal peduncles, dorsal; c, tip of rostrum; d, orbital region, left lateral; e, same, dorsal; f, antennule; g, same, distolateral angle of proximal segment of peduncle; h, antenna, ventral; i, eye, left dorsal; j, sixth abdominal segment; k, telson; l, same, posterior spines; m, uropod; n, same, exopod, distolateral angle.

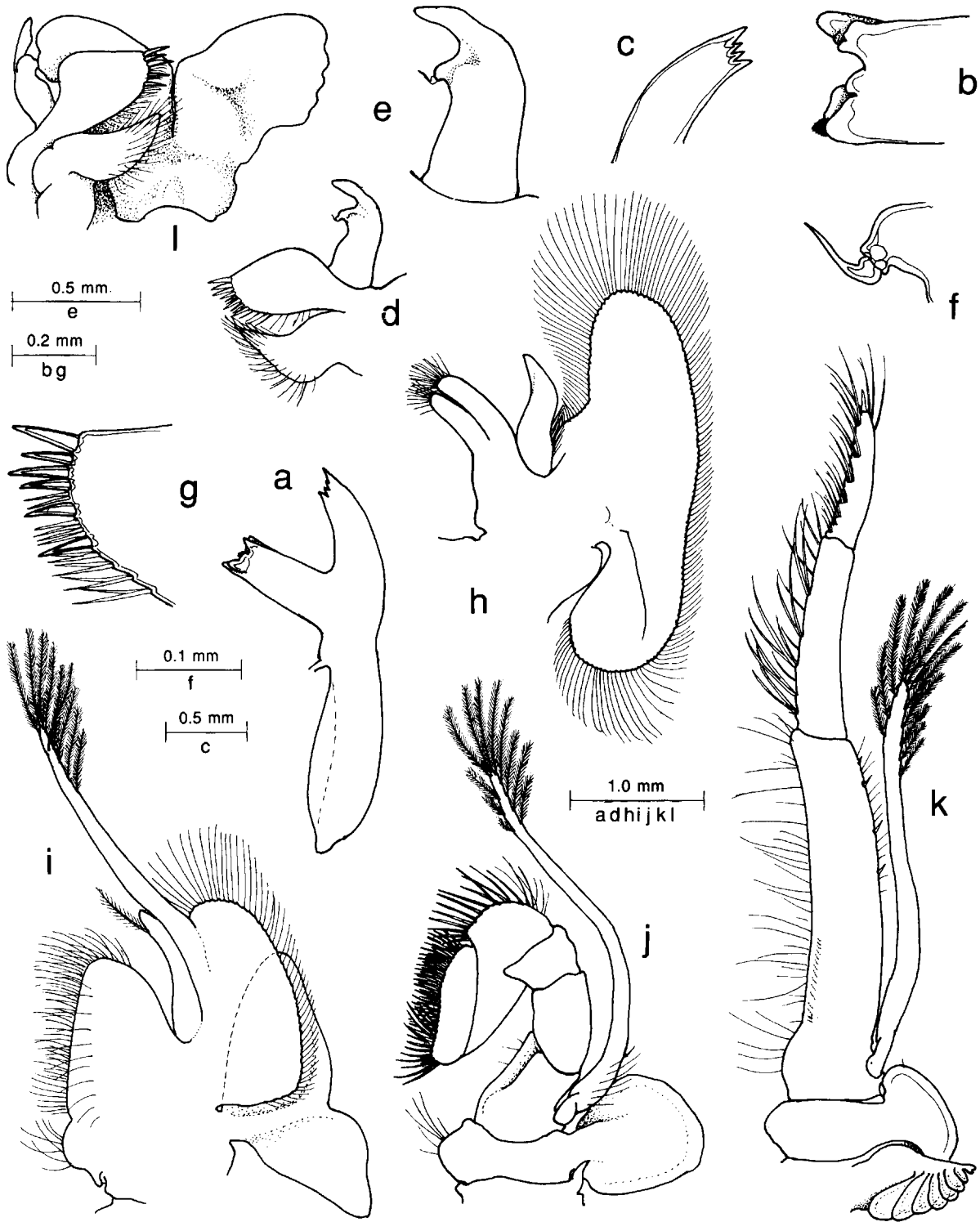


FIG. 43. — *Periclimenes platyrhynchus* sp. nov., holotype, ♀: a, mandible; b, same, molar process; c, same, incisor process; d, maxillula; e, same, palp; f, same, ventral lobe; g, same, distal upper lacinia; h, maxilla; i, first maxilliped; j, second maxilliped; k, third maxilliped; l, paragnaths, with left maxillula, ventral.