

Crustacea Isopoda : Bopyridae in the MUSORSTOM collections from the tropical Indo-Pacific

I. Subfamilies Pseudioninae (in part), Argeiinae, Orbioninae, Athelginae and Entophilinae

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ABSTRACT

MUSORSTOM collections from New Caledonia, the Strait of Makassar (Indonesia), the Philippines and near Madagascar contained many new records and some new species of pseudionines from non-anomuran hosts, a new genus and species of argeiine, orbionine parasites of penaeoid shrimps, a single athelgine from 2 hosts and the only entophiline known. Species of Pseudioninae reported are *Pseudione indica* Chopra, 1930 (new to the Pacific), infesting *Plesionika narval* (Fabricius) (new host record) in the Strait of Makassar; *Ionella maculata* sp. nov. infesting *Callianassa* sp. at New Caledonia; and *Gigantione elconaxii* sp. nov., infesting *Elconaxius* sp. at New Caledonia. In the Argeiinae is *Eragia profunda*, gen. nov., sp. nov., a parasite of *Prionocrangon* sp. nov. at New Caledonia. Species of Orbioninae reported (all new geographical and host records, except as noted) are *Orbione halipori* Nierstrasz & Brender à Brandis, 1923, from the Philippines, infesting *Haliporoides sibogae* (de Man) (not a new host record); *Orbione* cf. *kempi* Chopra, 1923, from New Caledonia, infesting *Sicyonia truncata* (Kubo); *Epipenaeon fissurae* Kensley, 1974, from the Strait of Makassar, infesting *Parapenaeus longipes* Alcock (not a new host record); *Parapenaeon japonica* (Thielemann, 1910) from near the Strait of Makassar (Indonesia), infesting *Metapenaeopsis sinica* Liu & Zhong; near Panay Island, Philippines, infesting *Metapenaeopsis velutinus* (Dana); NW of Madagascar (not a new locality), infesting *Metapenaeopsis hilarula* (de Man). *Parapenaeon brevicoxalis* Bourdon, 1981, from Chesterfield Islands, infesting *Hymenopenaeus halli* Bruce, 1966; *Parapenaeon expansa* Bourdon, 1979, from the Strait of Makassar, infesting *Metapenaeopsis sinica* Liu & Zhong, from the Seychelles, infesting *Metapenaeopsis faouzii* Ramadan, from Madagascar (not a new record), infesting *Metapenaeopsis mogiensis consobrina* (Nobili), and from New Caledonia, infesting *Metapenaeopsis gaillardi* Crosnier; and *Parapenaeon secunda* Nierstrasz & Brender à Brandis, 1923, near Manila, Philippines, infesting *Metapenaeopsis palmensis* (Haswell), and the Strait of Makassar, infesting *Metapenaeopsis sinica*

Liu & Zhong. In the Athelginae is *Pseudostegias setoensis* Shiino, 1933, from Chesterfield Islands, a new locality, where it infests a new host, "*Trizopagurus*" sp. (to be described as gen. nov., sp. nov.). In the Entophilinae, *Entophilus omnitectus* Richardson, 1903, is reported from Chesterfield Islands, a new locality, as a parasite of *Munida "incerta"* Henderson, a previously reported host. Nearly all species are illustrated and described or redescribed.

RÉSUMÉ

Crustacea Isopoda : Bopyridae des collections MUSORSTOM récoltés dans l'Indo-Pacifique tropical. I. Sous-familles Pseudioninae (en partie), Argeiinae, Orbioninae, Athelginae et Entophilinae.

Des collections MUSORSTOM faites en Nouvelle-Calédonie, dans le détroit de Makassar (Indonésie), aux Philippines et dans la région malgache, permettent de nombreuses observations nouvelles et renferment quelques espèces nouvelles de Pseudioninae trouvées sur des Crustacés non anomoures, un nouveau genre et une nouvelle espèce d'Argeiinae, plusieurs espèces d'Orbioninae parasites de crevettes pénéides, une espèce d'Athelginae trouvée sur deux espèces de pagures et le seul Entophilinae encore décrit. Les espèces de Pseudioninae, dont il est traité, sont *Pseudione indica* Chopra, 1930 (qui n'avait pas encore été signalée dans le Pacifique), récoltée sur *Plesionika narval* (nouvel hôte) dans le détroit de Makassar; *Ionella maculata* sp. nov., trouvée sur *Callianassa* sp. en Nouvelle-Calédonie, et *Gigantione elconaxii* sp. nov., trouvée sur *Elconaxius* sp. en Nouvelle-Calédonie. Dans les Argeiinae, nous décrivons *Eragia profunda*, gen. nov., sp. nov., parasite de *Prionocrangon* sp. nov. en Nouvelle-Calédonie. Les espèces d'Orbioninae examinées proviennent toutes, sauf lorsque cela est indiqué, de positions géographiques et d'hôtes nouveaux : *Orbione halipori* Nierstrasz & Brender à Brandis, 1923, des Philippines, sur *Haliporoides sibogae* (de Man) (hôte déjà connu); *Orbione* cf. *kempi* Chopra, 1923, de Nouvelle-Calédonie, sur *Sicyonia truncata* (Kubo); *Epipenaeon fissurae* Kensley, 1974, du détroit de Makassar, sur *Parapenaeus longipes* Alcock (hôte déjà connu); *Parapenaeon japonica* (Thielemann, 1910) du détroit de Makassar, sur *Metapenaeopsis sinica* Liu & Zhong, près de Panay Island, Philippines, sur *Metapenaeopsis velutinus* (Dana), du nord-ouest de Madagascar (zone déjà connue), sur *Metapenaeopsis hilarula* (de Man); *Parapenaeon brevicoxalis* Bourdon, 1981, est signalé des îles Chesterfield sur *Hymenopenaeus halli* Bruce, 1966; *Parapenaeon expansa* Bourdon, 1979, du détroit de Makassar, sur *Metapenaeopsis sinica* Liu & Zhong, des Seychelles, sur *Metapenaeopsis faouzii* Ramadan, de Madagascar (localité non nouvelle), sur *Metapenaeopsis mogiensis consobrina* (Nobili), et de Nouvelle-Calédonie, sur *Metapenaeopsis gaillardi* Crosnier; et *Parapenaeon secunda* Nierstrasz & Brender à Brandis, 1923, près de Manille, Philippines, sur *Metapenaeopsis palmensis* (Haswell), et du détroit de Makassar, sur *Metapenaeopsis sinica* Liu & Zhong. Dans les Athelginae se trouve *Pseudostegias setoensis* Shiino, 1933, des îles Chesterfield, une localité nouvelle où il a été trouvé sur un nouvel hôte, "*Trizopagurus*" sp. (espèce nouvelle qui va être l'espèce type d'un genre nouveau). Dans les Entophilinae, *Entophilus omnitectus* Richardson, 1903, est signalé des îles Chesterfield pour la première fois, trouvé sur *Munida "incerta"* Henderson, hôte sur lequel l'espèce avait déjà été signalée. Presque toutes les espèces sont illustrées, décrites ou redécrites.

The extensive collections of ORSTOM, housed in the Muséum national d'Histoire naturelle (designated MNHN), contained several uncatalogued and unidentified bopyrid isopods, parasites of many different decapod crustaceans. This report deals with a small part of that collection, with other portions to follow later.

FAMILY BOPYRIDAE Rafinesque, 1815

SUBFAMILY PSEUDIONINAE Codreanu, 1967

Pseudione indica Chopra, 1930

Fig. 1

Pseudione indica Chopra, 1930 : 115, 139-142; pl. V, fig. 1-5; text-fig. 4 [Type-locality Andaman Islands, Bay of Bengal; infesting *Pontophilus plebs* Kemp]. — MARKHAM, 1985a : 14. — PAGE, 1985 : 192.

MATERIAL EXAMINED. — **Indonesia.** Strait of Makassar. CORINDON 2 : st. CH 208, 00°15'S, 117°52'E, 150 m, 31 October 1980. Infesting *Plesionika narval* (Fabricius), host det. A. CROSNIER : 1 ♀, 1 ♂.

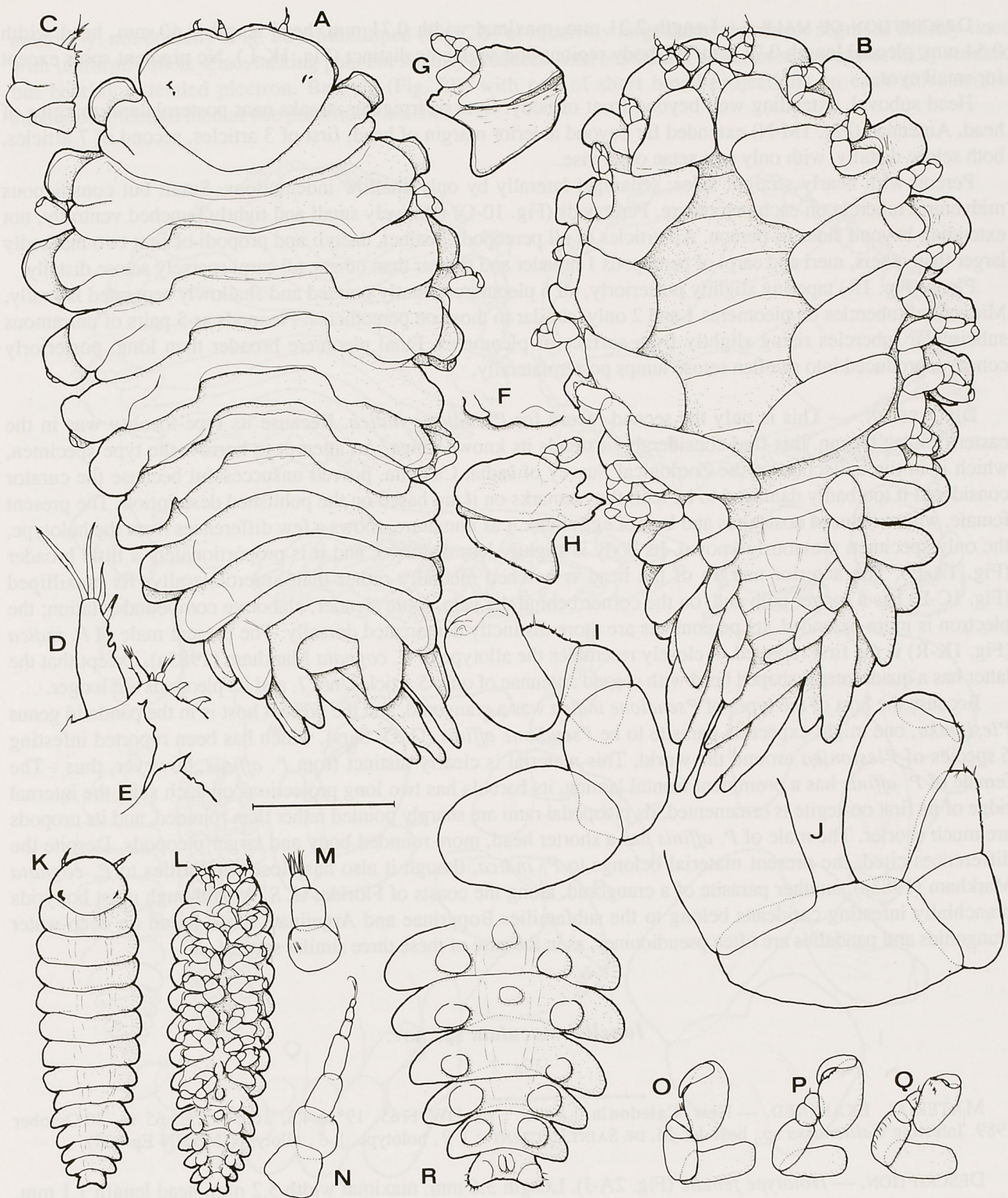


FIG. 1. — *Pseudione indica* Chopra, 1930. A-J, female; K-R, male. A, Dorsal view. B, Ventral view. C, Right maxilliped. D, Palp of same. E, Plectron of same. F, Barbula, right side. G, Right oostegite 1, external view. H, Same, internal view. I, Right pereopod 1. J, Right pereopod 7. K, Dorsal view. L, Ventral view. M, Right antenna 1. N, Right antenna 2. O, Right pereopod 1. P, Right pereopod 2. Q, Right pereopod 7. R, Pleon in ventral view.
Scale: 1.0 mm for A-C, F-H, K, L; 0.31 mm for O-R; 0.15 mm for D, E, I, J, M, N.

DESCRIPTION OF MALE. — Length 2.31 mm, maximal width 0.71 mm, head length 0.40 mm, head width 0.54 mm, pleonal length 0.71 mm. All body regions and segments distinct (Fig. 1K-L). No pigment spots except for small eyes.

Head suboval, extending well beyond front of body. Eyes as irregular streaks near posterolateral margins of head. Antennae (Fig. 1M-N) extended far beyond anterior margin of head; first of 3 articles, second of 7 articles, both setose distally, with only rare setae otherwise.

Pereon with nearly straight sides, separated laterally by only shallow indentations. Small but conspicuous midventral tubercle on each pereomere. Pereopods (Fig. 10-Q) relatively small and tightly bunched ventrally, not extending beyond sides of pereon. All articles of all pereopods distinct, dactyli and propodi of first two markedly larger than others, meri and carpi of pereopods 1 broader and shorter than others; all carpi sparsely setose distally.

Pleon (Fig. 1R) tapering slightly posteriorly, all 6 pleomeres bluntly pointed and shallowly separated laterally. Midventral tubercles on pleomeres 1 and 2 only, similar to those on pereomeres. Pleopods as 5 pairs of uniramous subcircular tubercles rising slightly from surface of pleomeres. Final pleomere broader than long, posteriorly concave, produced into swollen setose lumps posterolaterally.

DISCUSSION. — This is only the second record for *Pseudione indica*. Because its type-locality was in the eastern Indian Ocean, this find considerably extends its known range. An attempt to borrow the type-specimen, which is in the collection of the Zoological Survey of India, Calcutta, proved unsuccessful because the curator considered it too badly damaged to be lent; thus remarks on it are based on the published description. The present female, whose reduced oostegites and lack of eggs mark it as immature, shows a few differences from the holotype, the only specimen previously known. Its body is slightly less distorted, and it is proportionately a little broader (Fig. 1A-B). The anterior margin of the head is notched medially rather than anterolaterally. Its maxilliped (Fig. 1C-E) has a longer palp and, on the corner behind the palp, more slender, elaborate compound setation; the plectron is more extended. Its pereomeres are more distinctly demarcated dorsally. The present male of *P. indica* (Fig. 1K-R) is the first reported. It closely resembles the allotype of *P. cognata* Markham (1985a), except that the latter has a quadrilateral-shaped head with second antennae of only 5 articles, not 7, and its pleopods are longer.

Because the host of the types of *Pseudione indica* was a crangonid, and the present host is in the pandalid genus *Plesionika*, one might expect its parasite to be *Pseudione affinis* (G. O. Sars), which has been reported infesting 6 species of *Plesionika* around the world. This material is clearly distinct from *P. affinis*, however, thus: The female of *P. affinis* has a prominent frontal lamina, its barbula has two long projections on each side, the internal ridge of its first oostegite is ornamented, its pleopodal rami are sharply pointed rather than rounded, and its uropods are much shorter. The male of *P. affinis* has a shorter head, more rounded body and larger pleopods. Despite the differences cited, the present material belongs to *P. indica*, though it also has close similarities to *P. cognata* Markham (1985a), another parasite of a crangonid, along the coasts of Florida, U. S. A. Although most bopyrids branchially infesting carideans belong to the subfamilies Bopyrinae and Argeiinae, those found on deep-water crangonids and pandalids are often pseudionines, as in the case of these three similar species.

Ionella maculata sp. nov.

Fig. 2

MATERIAL EXAMINED. — New Caledonia. LAGON : stn DW 1165, 19°15.4'S, 163°19.2'E, 65 m, 30 October 1989. Infesting *Callianassa* sp., host det. M. DE SAINT-LAURENT : 1 ♀, holotype, 1 ♂, allotype (MNHN Ep-825).

DESCRIPTION. — *Holotype female* (Fig. 2A-J). Length 3.6 mm, maximal width 5.2 mm, head length 1.1 mm, pleon length 1.4 mm, distortion 8° dextrally. Body outline suboval, all body regions distinct (Fig. 2A-B). Circle of dark pigment spots near edges of dorsal surfaces of several pereomeres.

Head large, indistinctly bilobate, subtrapezoidal in outline, deeply set into pereon; no true frontal lamina, but fold resembling frontal lamina surrounding anterolateral margins and sides. Antennae minute, first pair in anterior concavity of head, second pair extending slightly forward (Fig. 2C). Eyes small, near anterolateral corners, visible

anteriorly, not dorsally (Fig. 2C). Maxilliped (Fig. 2D) of relatively large suboval anterior segment densely lined with uniformly short setae, lacking palp but slightly produced anteromedially; posterior segment markedly reduced but bearing extended plectron. Barbula (Fig. 2E) with pair of short broad projections on each side, neither subdivided, though medial one posteriorly notched.

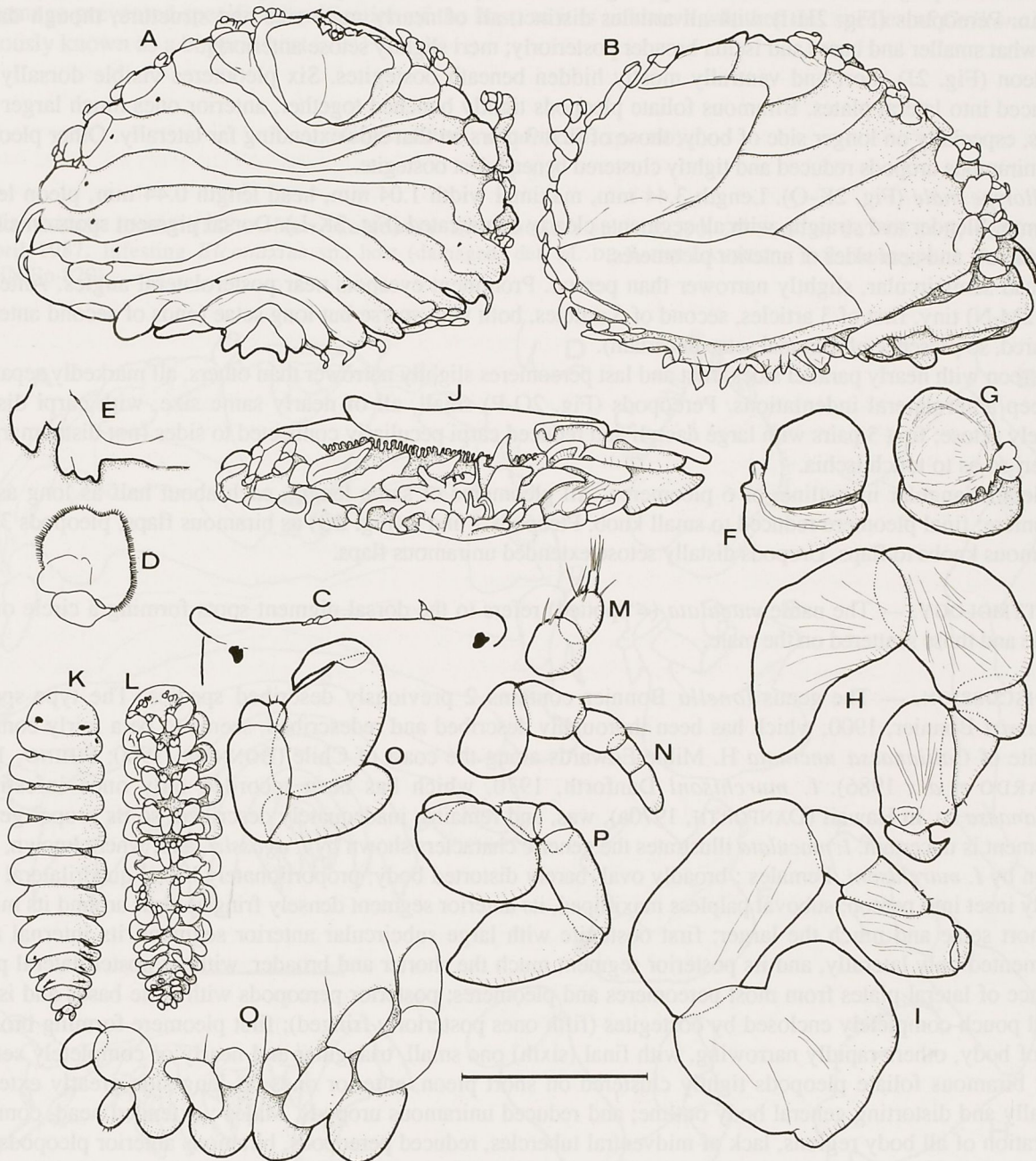


FIG. 2. — *Ionella maculata*, sp. nov. A-J, holotype female; K-Q, allotype male. A, Dorsal view. B, Ventral view. C, Anterodorsal margin of head. D, Right maxilliped. E, Right side of barbula. F, Right oostegite 1, external view. G, Same, internal view. H, Right pereopod 1. I, Right pereopod 7. J, Pleon, ventral view. K, Dorsal view. L, Ventral view. M, Right antenna 1. N, Right antenna 2. O, Left pereopod 1. P, Right pereopod 7. Q, Pleon, left side in ventral view.

Scale : 2.0 mm for A, B, D, F, G, K, L; 1.0 mm for C, E, J; 0.3 mm for H, I, O-Q; 0.15 mm for M, N.

Pereon broadly rounded, all pereomeres short and broad, both ends of pereon concave and enclosing both head and pleon. Coxal plates on both sides of most anterior pereomeres; pereomeres 6 and 7 produced laterally into slender falcate, posterolaterally extending projections. Large overlapping oostegites completely enclosing brood pouch; first oostegite (Fig. 2F-G) suboval, its posterior segment much broader but quite short and lacking posterolateral projection, its internal ridge digitate laterally; fifth oostegite (Fig. 2J) digitate along posterior margin. Pereopods (Fig. 2H-I) with all articles distinct, all of nearly same size and structure, though dactyli somewhat smaller and bases and ischia broader posteriorly; meri slightly setose anteriorly.

Pleon (Fig. 2J) short and ventrally mostly hidden beneath oostegites. Six pleomeres visible dorsally, not produced into lateral plates. Biramous foliate pleopods tightly bunched together, anterior ones much larger than others, especially on longer side of body, those of first 3 pairs on that side extending far laterally. Other pleopods and uniramous uropods reduced and tightly clustered beneath last oostegite.

Allotype male (Fig. 2K-Q). Length 3.44 mm, maximal width 1.04 mm, head length 0.44 mm, pleon length 0.80 mm. Slender and straight, with all segments clearly demarcated (Fig. 2K-L). Dorsal pigment spots on side of pereomere 1 and near sides of anterior pleomeres.

Head semicircular, slightly narrower than pereon. Prominent eyespots near posterolateral angles. Antennae (Fig. 2M-N) tiny, first of 3 articles, second of 5 articles, both with sparse but long setae (ends of second antennae obscured, so presence of terminal setae uncertain).

Pereon with nearly parallel sides, first and last pereomeres slightly narrower than others, all markedly separated by deep anterolateral indentations. Pereopods (Fig. 2O-P) small, all of nearly same size, with carpi distally sparsely setose; first 5 pairs with large dactyli and reduced carpi peculiarly connected to sides (not distal margins) of meri so as to touch ischia.

Pleon triangular in outline, of 6 pleomeres. All pleomeres of same length, each about half as long as any pereomere; final pleomere reduced to small knob. Pleopods 1 and 2 (Fig. 2Q) as biramous flaps; pleopods 3-5 as uniramous knobs to flaps. Uropods distally setose extended uniramous flaps.

ETYMOLOGY. — The name *maculata* (= spotted) refers to the dorsal pigment spots forming a circle on the female and those scattered on the male.

DISCUSSION. — The genus *Ionella* Bonnier contains 2 previously described species. The type-species *I. agassizi* Bonnier, 1900, which has been thoroughly described and redescribed, seems to be a fairly common parasite of *Callianassa uncinata* H. Milne Edwards along the coast of Chile (BONNIER, 1900; SHINO, 1964; STUARDO *et al.*, 1986). *I. murchisoni* Danforth, 1970, which has been recorded only once infesting a *Callianassa* sp. in Hawaii (DANFORTH, 1970a), was, and remains, inadequately described, so its proper generic placement is uncertain. *I. maculata* illustrates the generic characters shown by *I. agassizi*, and, where known, most shown by *I. murchisoni*. Females: broadly oval, barely distorted body; proportionately broad quadrilateral head deeply inset into pereon; suboval palpless maxilliped, its anterior segment densely fringed clear around its margin by short setae and much the larger; first oostegite with large subcircular anterior segment, its internal ridge ornamented only laterally, and its posterior segment much the shorter and broader, without posterolateral point; absence of lateral plates from most pereomeres and pleomeres; posterior pereopods with wide bases and ischia; brood pouch completely enclosed by oostegites (fifth ones posteriorly fringed); first pleomere forming broadest part of body, others rapidly narrowing, with final (sixth) one small, triangular and nearly or completely set into fifth; biramous foliate pleopods tightly clustered on short pleon, anterior ones on long side greatly extended laterally and distorting general body outline; and reduced uniramous uropods. Males: extended head, complete separation of all body regions, lack of midventral tubercles, reduced pereopods, biramous anterior pleopods, and posteriorly extending uniramous uropods. All three species infest species of *Callianassa*. *I. agassizi* differs from *I. maculata* in that its female is more nearly circular, its barbula is more elaborately toothed, its maxilliped is not produced anteromedially, all of its pereomeres lack lateral plates, its pleomeres are not distinctly separated, and its final pleomere is completely embedded in the preceding one; the male of *I. agassizi* is proportionally broader, all of its pleopods are biramous, and its uropods are much smaller. The female of *I. murchisoni* has indistinctly separated pleomeres, the last of which is not extended, and has deeply digitate pleopodal rami; the male of that species is

more oval in outline, its antennae are longer, and its pleopodal rami much more separated and extended. Inclusion of *I. maculata* in *Ionella* produces two slight exceptions to the original generic diagnosis because the female has lateral plates on two pereomeres, and only the first two pleopods of the male are biramous; the necessary resultant modifications of the diagnosis are not serious, especially in light of the other extensive consistency of characters of the species listed above.

Damage prevented specific identification of the host, so it is unknown whether this species of *Callianassa* is previously known as a bopyrid host.

Gigantione elconaxii, sp. nov.

Figs 3-4

MATERIAL EXAMINED. — New Caledonia. BIOGEOCAL : stn. CP 290, 20°36.91'S, 167°03.34'E, 920-760 m, 27 April 1987. Infesting *Elconaxius* sp., host (damaged) det. M. DE SAINT LAURENT : 1 ♀, holotype, 1 ♂, allotype (MNHN Ep-820).

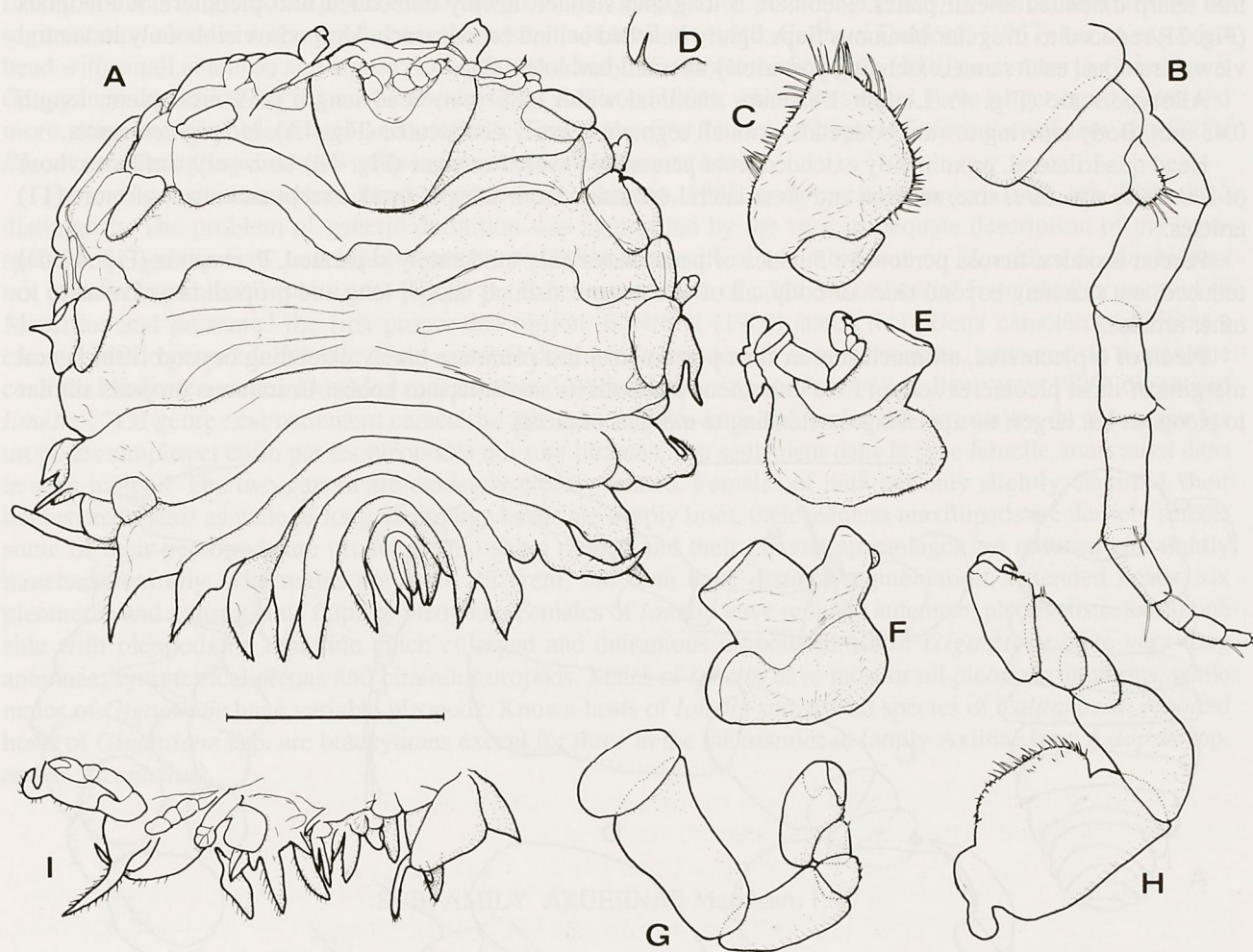


FIG. 3. — *Gigantione elconaxii*, sp. nov., holotype female. A, Dorsal view. B, Right antennae. C, Left maxilliped. D, Right side of barbula. E, Right oostegite 1, external view. F, Same, internal view. G, Right pereopod 1. H, Right pereopod 7. I, Pleon in ventral view.

Scale : 1.00 mm for A, D, E, F, I; 1.80 mm for C; 0.35 mm for G, H; 0.18 mm for B.

DESCRIPTION. — Holotype female (Fig. 3). Length 2.8 mm, maximal width 3.2 mm, head length 0.9 mm, pleon length 0.6 mm, distortion 19° dextrally. Body outline suboval, all body regions distinct (Fig. 3A-B). No pigment spots.

Head large and deeply set into pereon, trapezoidal in outline, bisecting first pereomere dorsally. Antennae (Fig. 3B) arising from deep anterior concavity; first one of 3 articles, of which 2 proximal ones very broad; second antenna of 8 articles, extending far beyond margin of head, both sparsely setose on distal ends of some articles. Maxilliped (Fig. 3C) suboval, lacking palp, anterior article much larger than posterior one and lined with fringe of long setae. Barbula (Fig. 3D) with 2 short simple projections on each side, lateral one much narrower than medial one.

Pereon broadest across pereomere 4, that also longest pereomere. Pereon encircling both head and pleon. Dorsolateral bosses on both sides of pereomeres 1-4; pereomeres 4-7 produced into slender curved points. Oostegite 1 (Fig. 3E-F) as broad as long, with entire internal ridge, no posterolateral projection, posterior border fringed by tiny setae. Pereopods (Fig. 3G-H) relatively small, all of about same size, though bases broader posteriorly; articles variously setose.

Pleon short, with anterior pleomeres overreaching posterior ones. All pleomeres except last (sixth) produced into sharp extended lateral plates. Pleomere 6 long and slender, deeply embedded into pleomere 5. Pleopods (Fig. 3I) reduced to irregular biramous flaps tightly bunched behind brood pouch. Uropods, visible only in ventral view, biramous, each ramus extending posteriorly as small lanceolate flap.

Allotype male (Fig. 4). Length 1.89 mm, maximal width 0.86 mm, head length 0.39 mm, pleon length 0.45 mm. Body tapering toward both ends, with all segments clearly demarcated (Fig. 4A). No pigment spots.

Head quadrilateral, prominently extended from pereon. No eyes. Antennae (Fig. 4B) both very similar to those of female in structure, size, setation and great lateral extension from sides of head, except antenna 2 of more (11) articles.

Pereon broadest across pereomere 5, sides of pereomeres only moderately separated. Pereopods (Fig. 4C-D) reduced, not reaching beyond sides of body, all of about same size; all dactyli long and propodi broad relative to other articles.

Pleon of 6 pleomeres, all much shorter than pereomeres; last pleomere barely extending beyond fifth; lateral margins of most pleomeres setose. Five uniramous pleopods as small flaps to knobs. Uniramous uropods similar to pleopods but larger; no appendages extending to margins of pleon.

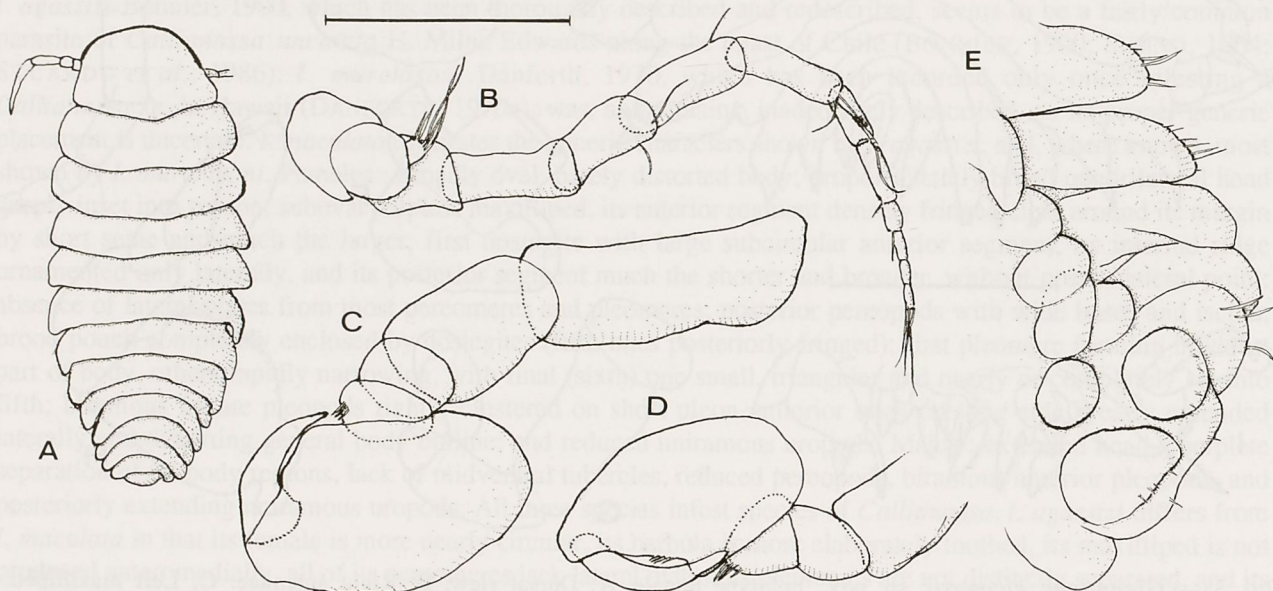


FIG. 4. — *Gigantione elconaxii*, sp. nov., allotype male. A, Dorsal view. B, Left antennae. C, Left pereopod 1. D, Right pereopod 7. E, Left margin of pleon in ventral view.

Scale: 1.00 mm for A; 0.18 mm for B-E.

ETYMOLOGY. — The name *elconaxii* is the genitive of the generic name of its host, in the axiid genus *Elconaxius*.

DISCUSSION. — So far, 11 species of *Gigantione* have been described, but some remain poorly known. The female of *G. elconaxii* differs from all other species by having a relatively narrow trapezoidal (rather than rectangular or suboval) head, which bisects the first pereomere and bears dorsally placed antennae; its male differs from other species in having very long second antennae, in being more oval, with its pereomeres less separated and its pleopods shorter and its uropods less extended. The females of the other species differ thus: *G. bouvieri* Bonnier, 1900, as redescribed by MONOD (1932), has a more extended head, broader lateral extensions on the longer side of the pereon and much more conspicuous uropods; *G. giardi* Nobili (1906), as described by NOBILI (1907), has a more extended head and uropods, a more elaborate internal ridge on the first oostegite and digitate-margined pleonal lateral plates; *G. hawaiiensis* Danforth, 1970 (as described without name by DANFORTH, 1963), differs the same ways as *G. bouvieri*; *G. ishigakiensis* Shiino (1941) and *G. moebii* Kossmann (1881), which may be synonyms, have more extended heads, longer but less sharply tapered coxal plates and lateral plates and more prominent uropods; *G. mortenseni* Adkison (1984), the only species known from a large series, has a conspicuous frontal lamina, longer coxal plates and more prominent uropods; *G. pikei* Page (1985) is subrectangular with all segmentation obscure and uropods conspicuous but not at all extended; *G. pratti* Danforth (1967) has an extended head with small antennae and a posteriorly distorted body; *G. rathbunae* Stebbing (1910) is similar to *G. bouvieri*; *G. sagamiensis* Shiino (1958) and *G. uberlackerae* Adkison (1984), which are similar, have longer coxal plates and more extended final pleomeres and uropods. This is the first record of bopyrid infestation of any species of *Elconaxius*, though species in 3 other axiid genera are known as hosts.

The two genera considered here, *Gigantione* Kossmann, 1881, and *Ionella* Bonnier, 1900, are difficult to distinguish. The problem of generic definition was aggravated by the very inadequate description of the type-species of *Gigantione*, *G. moebii* by KOSSMANN (1881), a parasite of a xanthid crab on Mauritius. *G. moebii* was not reported again until BOURDON (1969) published an account of additional material from another xanthid in Mauritius and presented the first proper description. BONNIER (1900) stated that "Deux caractères suffisent à caractériser ce genre : la femelle adulte possède des lames pleurales sur tous les somites, tant ceux du thorax que ceux de l'abdomen, et ses uropodes sont biramés." Without referring to *Gigantione*, BONNIER (1900) diagnosed *Ionella* : "Ce genre...est nettement caractérisé par l'absence des lames pleurales sur les somites du pléon, par les uropodes simples et enfin par les pléopodes qui sont biramés, non seulement dans le sexe femelle, mais aussi dans le sexe mâle..." The two genera are evidently closely related. Females of both are only slightly distorted, their bodies are at least as wide as long, their large heads are deeply inset, their palpless maxillipeds are densely setose; some of their pereopods are produced into sharp points; and their pleonal appendages are reduced and tightly bunched ventrally. The males are more different, but both have distinct segmentation, extended heads, six pleomeres and conspicuous flaplike pleopods. Females of *Ionella* have reduced antennae, pleons distorted to one side with pleopods on that side much enlarged and uniramous uropods; those of *Gigantione* have very long antennae, symmetrical pleons and biramous uropods. Males of *Ionella* have most or all pleopods biramous, while males of *Gigantione* have variable pleopods. Known hosts of *Ionella* spp. are all species of *Callianassa*; reported hosts of *Gigantione* spp. are brachyurans except for three in the thalassinidean family Axiidae (two *Axiopsis* spp. and an *Elconaxius*).

SUBFAMILY ARGEIINAE Markham, 1977

Genus *ERAGIA* nov.

DIAGNOSIS. — Female : Body only slightly distorted. Quadrilateral head embedded in pereon, bearing very reduced frontal lamina; maxilliped with anterior article about twice size of posterior one, articulating palp small. Pereon suboval, broader than long; some anterior dorsolateral bosses weakly developed; first oostegite with nearly unornamented internal ridge and very slender posterolateral projection; pereopods 1 and 2 much smaller than others,

close to head; pereopod 3 or pereopods 3 and 4 on sides of body; other pereopods aligned behind brood pouch. Pleon, of 6 pleomeres, greatly extended, with ends of long lateral plates forming nearly parallel sides; 5 pairs of uniramous pleopods as tiny knobs; structure of uropods ambiguous. Male : Unknown. Host : In crangonid genus *Prionocrangon*.

ETYMOLOGY. — *Eragia* is an anagram of the generic names *Argeia* and *Gareia*, applied to previously described genera of the subfamily Argeiinae. Gender feminine.

TYPE-SPECIES. — By present designation, *Eragia profunda* sp. nov.

Eragia profunda sp. nov.

Fig. 5

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn. CP 72, 22°10'S, 167°33'E, 2100-2110 m, 4 September 1985. Infesting *Prionocrangon* sp. nov., host det. L. B. HOLTHUIS, 1 ♀, holotype (MNHN-Ep-829).

DESCRIPTION. — Holotype female (Fig. 5). Length 4.60 mm, maximal width 4.67 mm, head length 0.95 mm, pleonal length 2.12 mm. All body regions separated, head embedded in oval pereon, but pleon greatly extended posteriorly (Fig. 5A), making body key-shape overall.

Head trapezoidal, much wider than long, bearing very reduced frontal lamina anterodorsally. No eyes. Antennae (Fig. 5B-C) reduced, first one of 3 articles, second of 4 articles, each antenna with sparse terminal setae. Maxilliped (Fig. 5D-F) suboval, anterior article about twice as long as posterior one; short broad articulating setose palp on anterior margin of maxilliped, not reaching most anterior part of maxilliped. Barbula (Fig. 5G) with 2 small falcate projections on each side.

Pereon oval, much broader than long, pereomeres 1-3 only obscurely separated, and pereomere 7 concealed dorsally beneath pleon. Coxal plates slightly developed on pereomere 1. Indistinct dorsolateral bosses on both sides of pereomeres 1-3. Oostegites completely surrounding brood pouch but not fully covering it; oostegite 1 (Fig. 5H-I) broadly rounded, each plate equally long, with internal ridge unornamented except for single clublike process laterally, slender falcate posterolateral projection; fifth oostegites with some long setae posteriorly. Pereopods 1 and 2 (Fig. 5J) tiny, close beside head on anterior margin of pereon; pereopods 3-7 (Fig. 5K) much larger, third pereopod or third and fourth pereopods on sides of body, others (Fig. 5L) in nearly straight line across body just behind brood pouch.

Pleon (Fig. 5L) greatly extended posteriorly. Six pleomeres, first one very short, second somewhat longer, next three all slightly longer than second, sixth longest. All pleomeres, including final one, produced into long blunt, laterally extending, nontapering lateral plates; ends of lateral plates 2-5 making sides of pleon nearly parallel. Five pairs of reduced uniramous claviform pleopods. Sixth pleomere bearing peculiar central structure, either long anal cone or unpaired uropod.

Male : Unknown.

ETYMOLOGY. — The Latin word *profunda*, meaning "deep", reflects the collection of this species at a depth of more than 2000 m, one of the deepest records for any species of bopyrid.

DISCUSSION. — The single female is evidently somewhat immature and the male unknown, so much remains unrecorded about this species. Nonetheless, it clearly shows characters excluding it from any previously described genus. The female is placed in the Subfamily Argeiinae (see MARKHAM, 1977) because of its broad short embedded quadrilateral head with a reduced frontal lamina; the shape and proportions of its maxilliped and the size and placement of its palp; its open brood pouch and first oostegite with simple internal ridge; the pleon of 6 pleomeres produced into blunt lateral plates and bearing reduced uniramous claviform pleopods; and its host in the caridean family Crangonidae. The female differs from those of other argeiines (those considered by MARKHAM, 1977, and the monotypic genus *Gareia* described by BOURDON & BRUCE, 1983), most conspicuously by its unique

key-shaped body outline caused by the peculiar extension of the pleon and by the arrangement and size differential of its pereopods. For these reasons it is placed in a new genus.

This is the first record of bopyrid infestation of any species of the deep-water crangonid genus *Prionocrangon*. Although the host has been identified as a new species, it is unknown when it may be described.

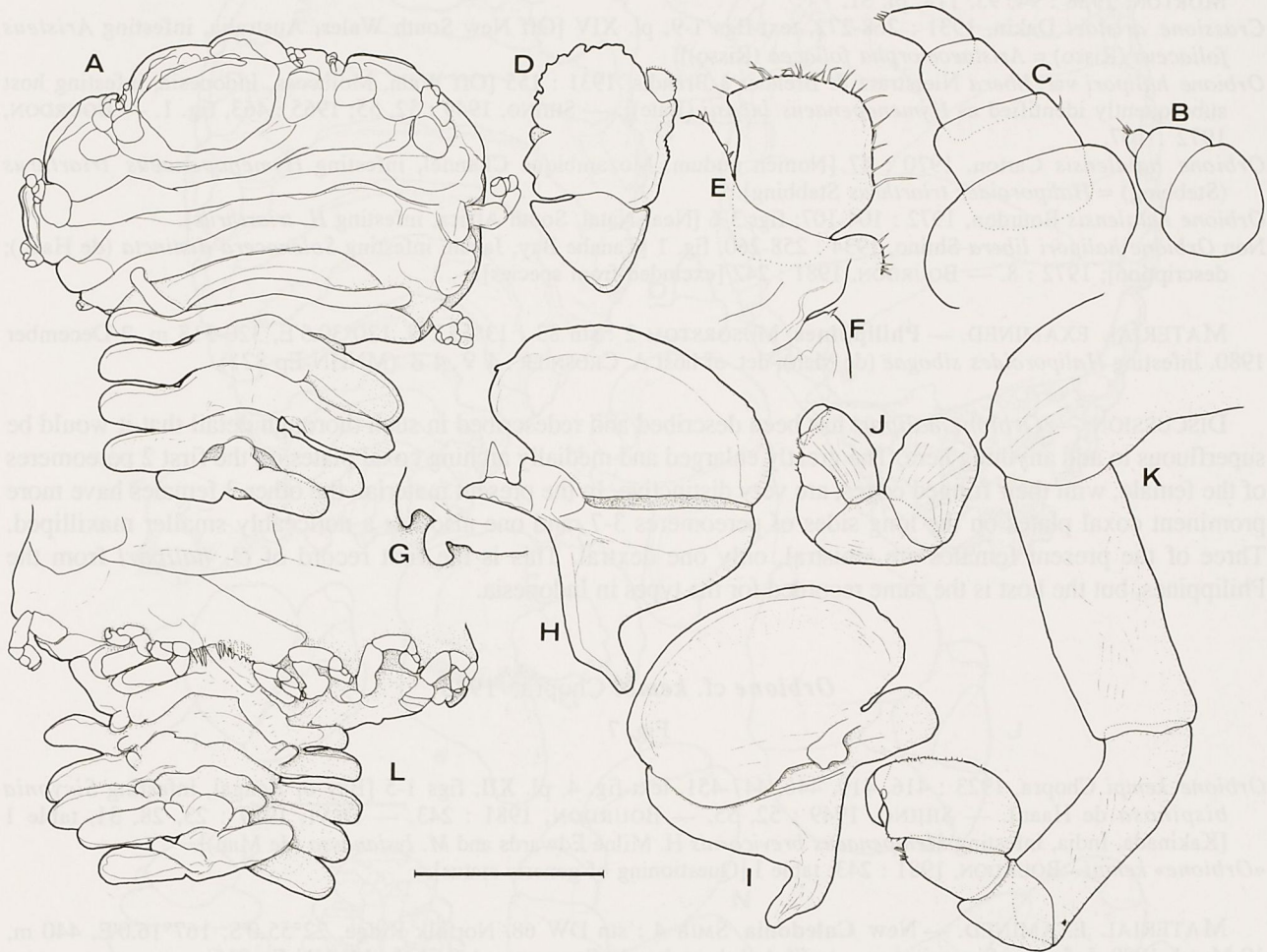


FIG. 5. — *Eragia profunda* gen. nov., sp. nov., holotype female. A, Dorsal view. B, Right antenna 1. C, Right antenna 2. D, Maxilliped. E, Palp of same. F, Plectron of same. G, Right side of barbula. H, Right oostegite 1, external view. I, Same, internal view. J, Right pereopod 1. K, Right pereopod 7. L, Posterior pereopods and pleon in ventral view.

Scale : 2.0 mm for A, L; 1.0 mm for D, G-I; 0.35 mm for J, K; 0.18 mm for B, C, E, F.

SUBFAMILY ORBIONINAE Codreanu, 1967

Orbione halipori Nierstrasz & Brender à Brandis, 1923

Fig. 6

Orbione halipori Nierstrasz & Brender à Brandis, 1923 : 64-66, fig. 2a-h [Paternoster and Kei Islands, Indonesia, infesting *Haliporus sibogae* (de Man) = *Haliporoides sibogae* (de Man)]. — DAKIN, 1931 : 270. — SHIINO, 1949 : 52, 55; 1952 : 38; 1958 : 53-55, fig. 14 [off Owase, Mie Prefecture, Japan, infesting *Parahaliporus sibogae* (de Man) = *Haliporoides sibogae*]; 1972 : 8. — BOURDON, 1979a : 471-477, 480, figs 1-3 [Madagascar, infesting *H. sibogae*]

- madagascariensis* Crosnier and *Hymenopenaeus halli* Bruce]; 1979c : 431 [Reexamination of types; also Lorenzo Marques, infesting *Hymenopenaeus triarthrus* (Stebbing); and Sydney, Australia, infesting *Aristaeomorpha foliacea* Risso; incorporation of *O. halipori* var. *libera* and *O. natalensis* into *O. halipori*]; 1982 : 195. — MARKHAM, 1982 : 362-365, 385, figs 21, 22 [Hong Kong, infesting *Metapenaeus ensis* (de Haan)]; 1986 : 144, 159, fig. 11. — OWENS & GLAZEBROOK, 1985 : 107, table 2 [Gulf of Carpentaria, Australia, infesting *M. ensis*]. — PAGE, 1985 : 208. — MORTON, 1988 : 94, 95, 118, pl. 31.
- Crassione aristaei* Dakin, 1931 : 268-272, text-figs 1-9, pl. XIV [Off New South Wales, Australia, infesting *Aristeus foliaceus* (Risso) = *Aristaeomorpha foliacea* (Risso)].
- Orbione halipori* var. *libera* Nierstrasz & Brender à Brandis, 1931 : 155 [Off Wain, Moluccas, Indonesia, infesting host subsequently identified as *Hymenopenaeus lucasii* (Bate)]. — SHIINO, 1949 : 52, 55; 1965 : 463, fig. 1. — BOURDON, 1972 : 107.
- Orbione natalensis* Carton, 1970 : 47 [Nomen nudum. Mozambique Channel, infesting *Hymenopenaeus triarthrus* (Stebbing) = *Haliporoides triarthrus* Stebbing].
- Orbione natalensis* Bourdon, 1972 : 104-107; figs.3-6 [Near Natal, South Africa, infesting *H. triarthrus*].
- Non *Orbione halipori libera* Shiino, 1934 : 258-260, fig. 1 [Tanabe Bay, Japan, infesting *Solenocera distincta* (de Haan); description]; 1972 : 8. — BOURDON, 1981 : 242 [excluded from species].

MATERIAL EXAMINED. — **Philippines**. MUSORSTOM 2 : stn 83 : 13°55.2'N, 120°30.5'E, 320-318 m, 2 December 1980. Infesting *Haliporoides sibogae* (de Man), det. of host A. CROSNIER : 4 ♀, 4 ♂ (MNHN-Ep 821).

DISCUSSION. — *Orbione halipori* has been described and redescribed in such thorough detail that it would be superfluous to add anything here. The greatly enlarged and medially arching coxal plates on the first 2 pereomeres of the female, with their fringed edges, are very distinctive. In the present material, the other 3 females have more prominent coxal plates on the long sides of pereomeres 3-7, and one also has a noticeably smaller maxilliped. Three of the present females are sinistral, only one dextral. This is the first record of *O. halipori* from the Philippines, but the host is the same recorded for the types in Indonesia.

Orbione cf. *kempi* Chopra, 1923

Fig. 7

- Orbione kempi* Chopra, 1923 : 416, 419, 446, 447-451, text-fig. 4, pl. XII, figs 1-5 [Bay of Bengal, infesting *Sicyonia bispinosa* de Haan]. — SHIINO, 1949 : 52, 55. — BOURDON, 1981 : 243. — DEVI, 1987 : 23, 28, 31, table 1 [Kakinada, India, infesting *Metapenaeus brevicornis* H. Milne Edwards and *M. lysianassa* (de Man)].
- «*Orbione*» *kempi* - BOURDON, 1981 : 243; table I [Questioning of generic status].

MATERIAL EXAMINED. — **New Caledonia**. SMIB 4 : stn DW 68, Norfolk Ridge, 22°55.0'S, 167°16.0'E, 440 m, 10 March 1989. Infesting *Sicyonia truncata* (Kubo), host det. A. CROSNIER : 1 ♀, 1 ♂ (MNHN-Ep 815).

DISCUSSION. — The present material differs from the type material of *Orbione kempi* of CHOPRA (1923) in a few respects, and it is not fully certain that it is assignable to it. To indicate that further material may prove that it is actually an undescribed species, I have reported it as *Orbione* cf. *kempi*. The original description was based on a single pair, and that is all that is present here, so the range of variability in *O. kempi* is uncertain. This female is slightly more distorted, the projections on its barbula less extended, the posterolateral projections on its first oostegites slightly longer and narrower, and its uropods less extended. (The peculiar extension and division of the lateral plate on the left side of pleomere 1 are probably an individual anomaly.) The body proportions, frontal lamina, shape and palp of the maxilliped, coxal plates, sizes and basal enlargements of the pereopods and structure of the pleonal appendages all conform with those of the types. Although some details of the type male are uncertain, the present male seems to agree with it in most characters, except that its second antennae have four articles, not three, and the dactyli of its pereopods become somewhat smaller posteriorly. Like the types, this material infests a species of *Sicyonia*, assigned to *S. truncata*, a new specific record. New Caledonia is a new locality record for *O. kempi*.

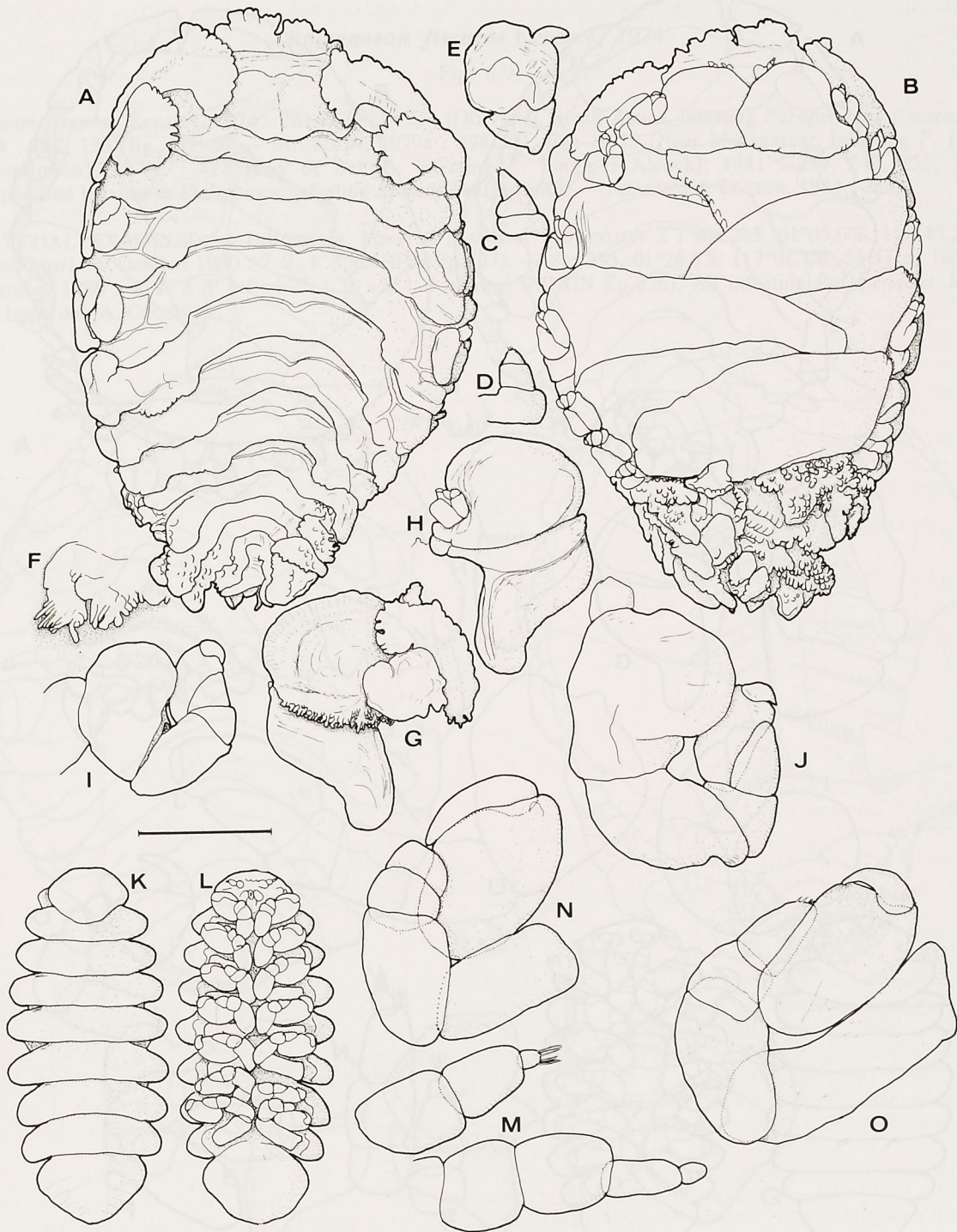


FIG. 6. — *Orbione halipori* Nierstasz & Brender à Brandis, 1923. A-J, female. K-O, male. A, Dorsal view. B, Ventral view. C, Right antenna 1. D, Right antenna 2. E, right maxilliped. F, Right side of barbula. G, Right oostegite 1 and coxal plate, external view. H, Same, internal view. I, Right pereopod 1. J, Right pereopod 7. K, Dorsal view. L, Ventral view. M, Right antennae. N, Left pereopod 1. O, Left pereopod 7.

Scale : 4.00 mm for A, B; 0.96 mm for C, D, I, J; 1.92 mm for E-H, K, L; 0.15 mm for M; 0.30 mm for N, O.

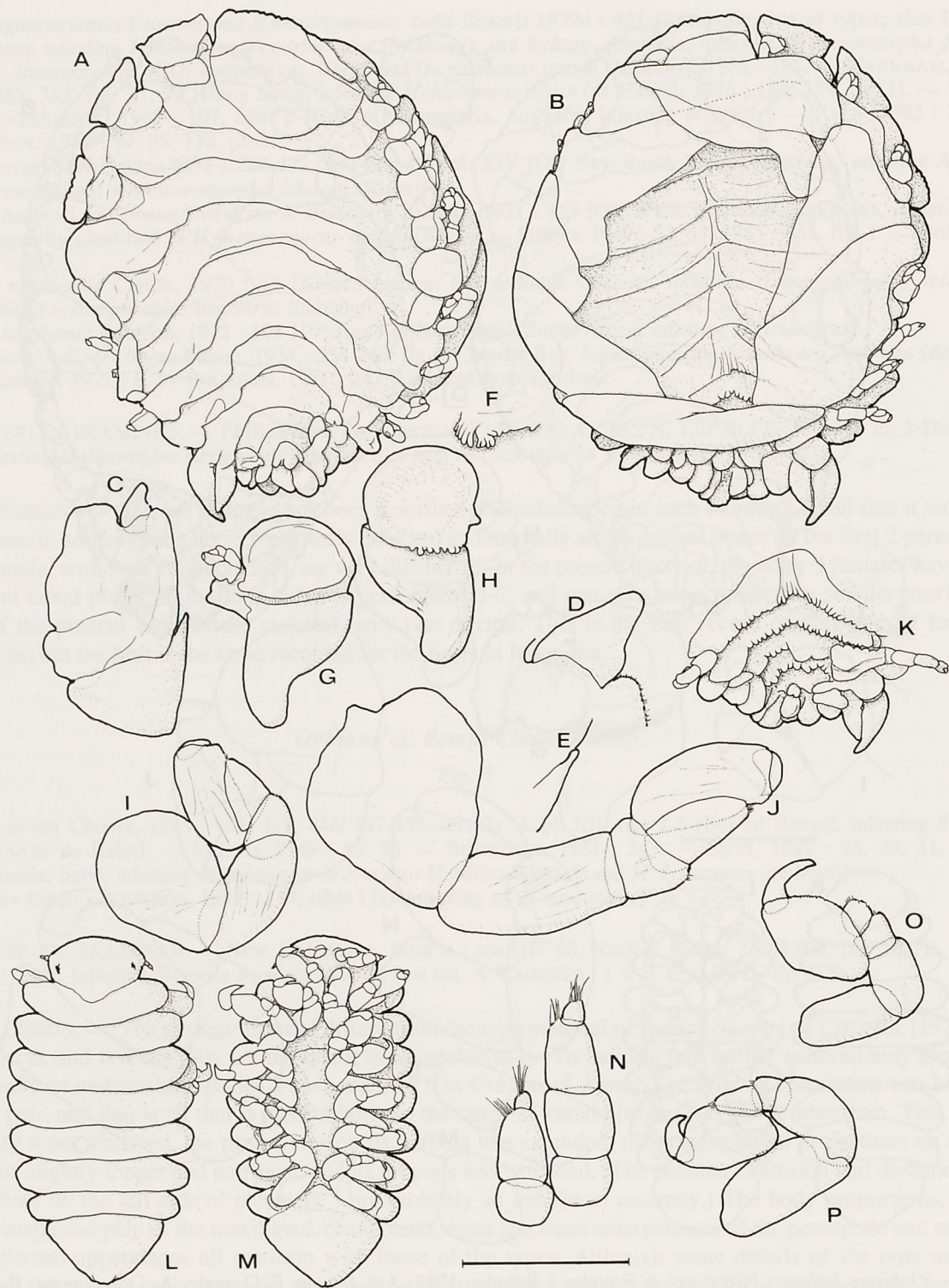


FIG. 7. — *Orbione* cf. *kempii* Chopra, 1923. A-K, female; L-P, male. A, Dorsal view. B, Ventral view. C, Left maxilliped. D, Palp of same. E, Plectron of same. F, Right side of barbula. G, Right oostegite 1, external view. H, Same, internal view. I, Right pereopod 1. J, Right pereopod 7. K, Pleon in ventral view. L, Dorsal view. M, Ventral view. N, Left antennae. O, Right pereopod 1. P, Right pereopod 7.

Scale : 1.00 mm for A, B, F-H, K; 0.50 mm for C, L, M; 0.31 mm for D, E, I, J, O, P; 0.15 mm for N.

Epipenaeon fissurae Kensley, 1974

Figs 8-9

Epipenaeon fissurae Kensley, 1974 : 261-263, fig. 2a-j [Off Natal, South Africa, infesting *Parapenaeus fissurus* Bate]; 1978 : 152, 153; fig. 67F-G. — BOURDON, 1979a : 498-501, figs 19-20 [Near Madagascar, infesting *P. fissurus*; redescription]; 1979c : 428 [Bay of Bengal, infesting *P. longipes* Alcock]; 1981 : 239, 242, 255, 259-260 [unspecified locality in Philippines, infesting unidentified penaeid]. — NEARHOS & LESTER, 1984 : 258.

MATERIAL EXAMINED. — **Indonesia**. Strait of Makassar. CORINDON 2 : stn 205, 01°05.0'S, 117°45.2'E, 85-79 m, fish trawl, 30 October 1980 : 7 ♀, 6 ♂ (MNHN Ep-827). — Stn 295, 01°26.5'S, 117°02.1'E, 54-51 m, fish trawl, 11 November 1980 : 4 ♀, 3 ♂ (of which 1 ♀ and 1 ♂ drawn) (MNHN Ep-826). All infesting *Parapenaeus longipes* Alcock, hosts det. A. CROSNIER.

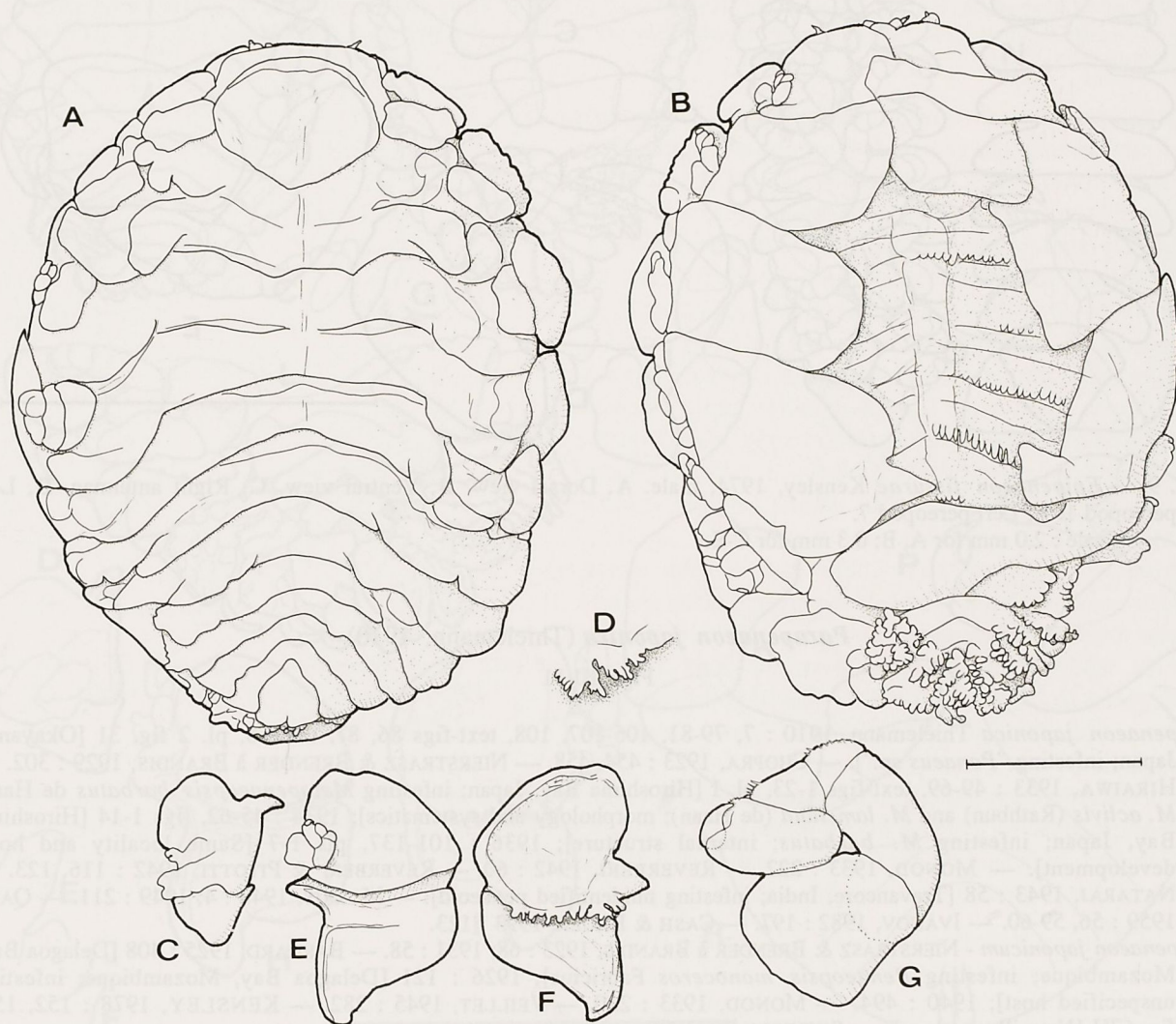


FIG. 8. — *Epipenaeon fissurae* Kensley, 1974, female. A, Dorsal view. B, Ventral view. C, Right maxilliped. D, Right side of barbula. E, Right oostegite 1, external view. F, Same, internal view. G, Left pereopod 1. Scale : 2.0 mm for A, B; 0.3 mm for C-F.

DISCUSSION. — Diagnostic characters for *E. fissurae*, as described and illustrated by KENSLEY (1974) and BOURDON (1979a), are, for the female, the shape of the head (Fig 8A), the angled nonarticulating maxillipedal palp

(Fig. 8C), the deeply digitate processes on the barbula (Fig. 8D), the elaborate internal ridge of the first oostegite (Fig. 8F), the tuberculate pleopods (Fig. 8B) and the notched final pleomere (Fig. 8A); and, for the male, the shape and proportions of the body regions (Fig. 9A) and pereopods 1 and 2 with larger dactyli and shorter meri and carpi than in the other 5 pereopods. The specimens previously illustrated are quite similar to each other, but where they differ, the present material is more similar to that of BOURDON (1979a). The female illustrated has a slightly more slender posterolateral projection on the first oostegite and a posterior pleon notch of length intermediate between those previously illustrated. The male illustrated lacks eyes. Of the females examined, three are dextral and eight sinistral. *Parapenaeon longipes* is not a new host record for *Epipenaeon fissurae*, but Strait of Makassar is a new locality.

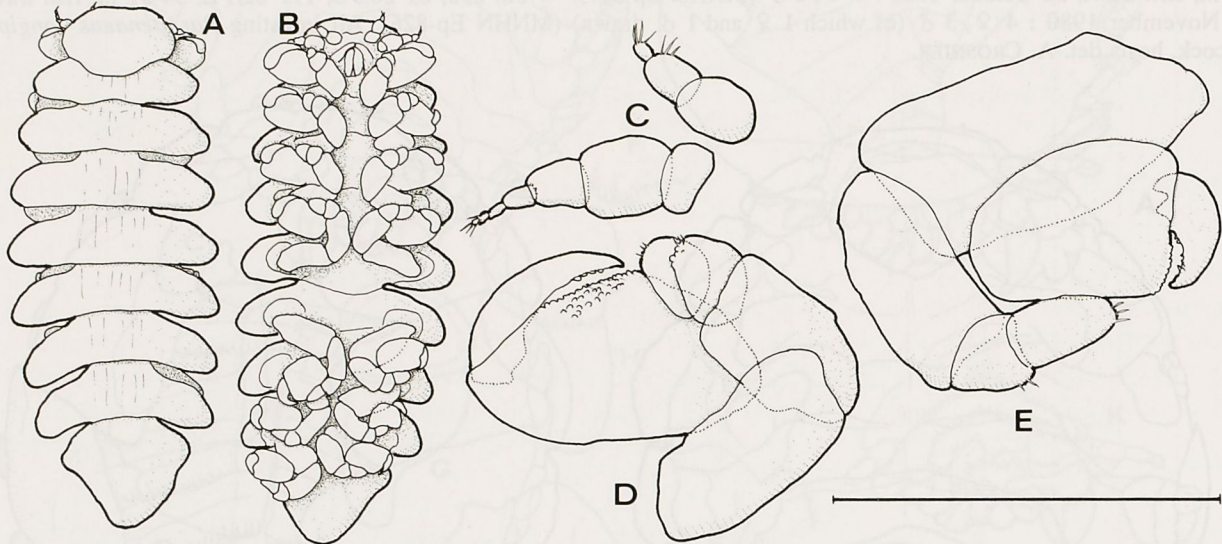


FIG. 9. — *Epipenaeon fissurae* Kensley, 1974, male. A, Dorsal view. B, Ventral view. C, Right antennae. D, Left pereopod 1. E, Left pereopod 7.

Scale : 2.0 mm for A, B; 0.3 mm for C-E.

Parapenaeon japonica (Thielemann, 1910)

Figs 10-11

- Epipenaeon japonica* Thielemann, 1910 : 7, 79-81, 106-107, 108, text-figs 86, 87, table 8, pl. 2 fig. 31 [Okayama, Japan; infesting "*Penaeus* sp."]. — CHOPRA, 1923 : 454, 458. — NIERSTRASZ & BRENDER à BRANDIS, 1929 : 302. — HIRAIWA, 1933 : 49-69, text-figs 1-23, pl. I [Hiroshima Bay, Japan; infesting *Metapenaeopsis barbatus* de Haan, *M. aclivis* (Rathbun) and *M. lamellata* (de Haan); morphology and systematics]; 1934 : 45-62, figs 1-14 [Hiroshima Bay, Japan; infesting *M. barbatus*; internal structure]; 1936 : 101-137, pls 1-7 [Same locality and host; development]. — MONOD, 1933 : 222. — REVERBERI, 1942 : 60. — REVERBERI & PITOTTI, 1942 : 116, 123. — NATARAJ, 1943 : 58 [Travancore, India; infesting unidentified penaeoid]. — MORRIS, 1948 : 4; 1949 : 211. — QAZI, 1959 : 56, 59-60. — IVANOV, 1982 : 197. — CASH & BAUER, 1993 : 123.
- Epipenaeon japonicum* - NIERSTRASZ & BRENDER à BRANDIS, 1923 : 68; 1931 : 58. — BARNARD, 1925 : 408 [Delagoa Bay, Mozambique; infesting *Penaeopsis monoceros* Fabricius]; 1926 : 121 [Delagoa Bay, Mozambique; infesting unspecified host]; 1940 : 494. — MONOD, 1933 : 220. — VEILLET, 1945 : 282. — KENSLEY, 1978 : 152, 153, fig. 67H [New illustrations]. — SINDERMANN, 1990 : 196.
- Apopenaeon japonicum* - SHIINO, 1934 : 260-263, fig. 2 [Tanabe Bay, Japan; infesting *Metapenaeopsis barbatus*]; 1939 : 80, fig. 1 [Tuyusaki, Fukuoka Prefecture, Kyusyu, Japan; infesting *M. aclivis*]; 1950 : 157. — BECK, 1980 : 148, 150, 152.
- Epipenaeon japonicus* - HIRAIWA & SATO, 1939 : 105-115, 121-122 [Hiroshima, Japan; infesting *M. barbatus*; effects on host]. — REVERBERI, 1943 : 45, fig. 37; 1949 : 45-47, figs 37-38. — MORRIS, 1948 : 7, 14. — BAFFONI, 1950 : 215. — SINDERMANN & ROSENFELD, 1967 : 361. — SINDERMANN, 1970 : 171. — DEVI, 1987 : 23, 26-27, 31, 32, table 1 [Kakinada, India; infesting *Penaeus japonicus* Bate].

Apopenaeon japonicum var. *hiraiwai* Shiino, 1950 : 151-155, fig. 1 [Kutino, Izo, Japan; infesting *M. aclivis*]; 1958 : 51-53, fig. 13, table I, plate III fig. 7 [Several Japanese localities; infesting *M. aclivis* and *M. barbatus*].
 ?"Bopyrid parasites" [in part] - CHEUNG, 1963 : 428 [Hong Kong; infesting one or more species of five penaeid genera].
Apopenaeon japonicum hiraiwai - STROMBERG, 1971 : 6, 7, 29, 31, 33-34, 39, 42. — SHIINO, 1950 : 155 [Japanese records]. — PALISOC, 1987 : 286.
Apopenaeon japonica - SHIINO, 1950 : 155.

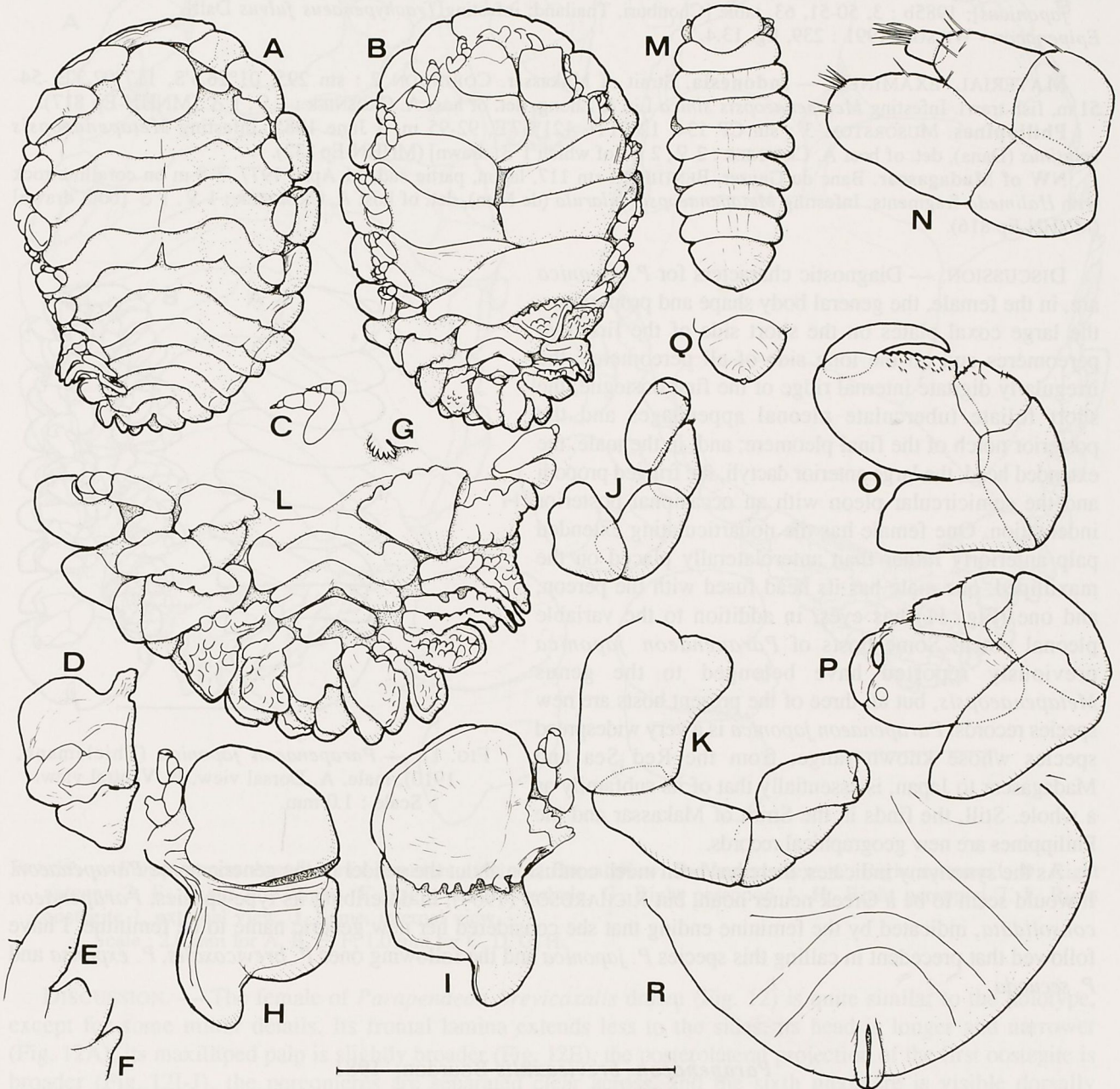


FIG. 10. — *Parapenaeon japonica* (Thielemann, 1910). A-L, female. M-R, male. A, Dorsal view. B, Ventral view. C, Right antennae. D, Maxilliped. E, Palp of same. F, Plectron of same. G, Right side of barbula. H, Oostegite 1, external view. I, Same, internal view. J, Right pereopod 1. K, Right pereopod 7. L, Pleon, ventral view. M, Pleon, dorsal view. N, Right antennae. O, Right pereopod 1. P, Right pereopod 7. Q, Pleon in dorsal view. R, Same in ventral view.

Scale : 4.0 mm for A, B, G; 2.0 mm for C, D, H, I, L, M, Q; 0.6 mm for E, F, J, K; 0.15 mm for N.

- Parapenaeon japonicum* - BOURDON, 1979a : 480-486, figs 6-7 [Madagascar; infesting *M. monoceros* (Fabricius) and *Penaeus semisulcatus* de Haan; redescription and discussion]; 1979c : 432 [Gulf of Martaban, Burma; infesting *Parapenaeopsis sculptilis* (Heller)]. — BRANFORD, 1980 : 276, table 1 [Red Sea; infesting *Penaeus latisulcatus* Kishinouye]. — IVANOV, 1982 : 196 [Western Indian Ocean; infesting *Metapenaeus monoceros*]. — MIQUEL, 1982 : 94. — MARKHAM, 1986 : 159. — ANDERSON, 1990 : 290. — COURTNEY, 1991 : 615, 617, 620, table 2 [Central coast of Queensland, Australia; infesting *Penaeus longistylus* Kubo].
- Parapenaeon japonica* - MARKHAM, 1982 : 366-369, 385, fig. 23-24 [Pearl River Estuary, Hong Kong; infesting *Penaeus japonicus*]; 1985b : 3, 50-51, 63, table [Chonburi, Thailand; infesting *Trachypenaeus fulvus* Dall].
- Epipenaeon* - WILSON, 1991 : 239, fig. 13.4.

MATERIAL EXAMINED. — **Indonesia**. Strait of Makassar. CORINDON 2 : stn 295, 01°26.5'S, 117°02.3'E, 54-51 m, fish trawl. Infesting *Metapenaeopsis sinica* Liu & Zhong, det. of host A. CROSNIER : 1 ♀, 1 ♂ (MNHN-Ep 817).

Philippines. MUSORSTOM 3 : stn CP 134, 12°01'N, 121°57'E, 92-95 m, 5 June 1985. Infesting *Metapenaeopsis velutinus* (Dana), det. of host A. CROSNIER : 2 ♀, 2 ♂ [of which 1 ♂ drawn] (MNHN-Ep 832).

NW of Madagascar. Banc du Geyser. BENTHEDI : stn 117, lagon, partie sud, 11 April 1977, 3-8 m on coralline rock with *Halimeda* fragments. Infesting *Metapenaeopsis hilarula* (de Man), det. of host A. CROSNIER : 1 ♀, 1 ♂ [both drawn] (MNHN-Ep 816).

DISCUSSION. — Diagnostic characters for *P. japonica* are, in the female, the general body shape and proportions, the large coxal plates on the short side of the first two pereomeres and on the long side of all pereomeres, the irregularly digitate internal ridge of the first oostegite, the short foliate tuberculate pleonal appendages and the posterior notch of the final pleomere; and, in the male, the extended head, the large anterior dactyli, the fringed propodi and the semicircular pleon with an occasional posterior indentation. One female has the nonarticulating extended palp anteriorly rather than anterolaterally placed on the maxilliped, one male has its head fused with the pereon, and one (Fig. 11) has eyes, in addition to the variable pleonal notch. Some hosts of *Parapenaeon japonica* previously reported have belonged to the genus *Metapenaeopsis*, but all three of the present hosts are new species records. *Parapenaeon japonica* is a very widespread species whose known range, from the Red Sea and Madagascar to Japan, is essentially that of its subfamily as a whole. Still, the finds in the Strait of Makassar and the Philippines are new geographical records.

As the synonymy indicates, there has been much confusion about the gender of the generic name *Parapenaeon*. It would seem to be a Greek neuter noun, but RICHARDSON (1904), in describing its type-species, *Parapenaeon consolidata*, indicated by the feminine ending that she considered her new generic name to be feminine. I have followed that precedent in calling this species *P. japonica* and the following ones *P. brevicoxalis*, *P. expansa* and *P. secunda*.

Parapenaeon brevicoxalis Bourdon, 1981

Figs 12-13

Parapenaeon brevicoxale Bourdon, 1981 : 239, 249-251, figs 10-11, table II [between Bohol and Cebu Islands, Philippines; infesting *Penaeopsis rectacuta* (Bate)].

MATERIAL EXAMINED. — **Chesterfield Islands**. MUSORSTOM 5 : stn 364: 19°45.30'S, 158°46.50'E, 675 m, 19 October 1986. Infesting *Hymenopenaeus halli* Bruce, det. of host A. CROSNIER : 2 ♀, 1 ♂ (MNHN-Ep 830). —

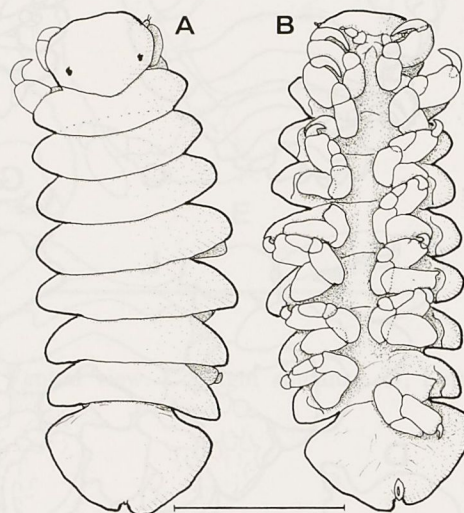


FIG. 11. — *Parapenaeon japonica* (Thielemann, 1910), male. A, Dorsal view. B, Ventral view. Scale : 1.0 mm.

Stn 365, 19°42.82'S, 158°48.00'E, 710 m, 19 October 1986. Infesting *Hymenopeneus halli* Bruce, det. of host A. CROSNIER : 7 ♀ (1 infested by hyperparasitic *Cabirops* sp.; 1 drawn), 6 ♂ (1 drawn) (MNHN-Ep 831).

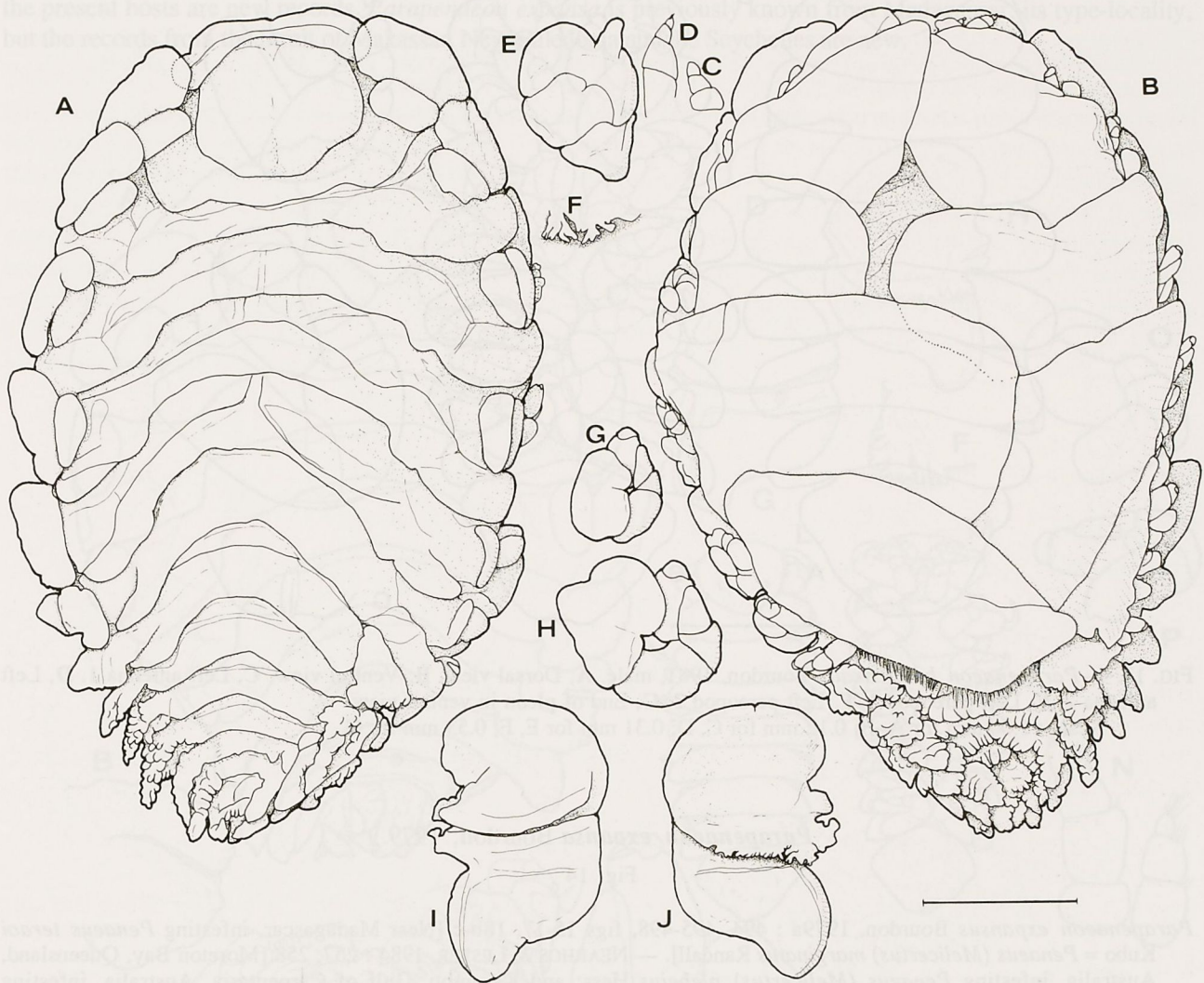


FIG. 12. — *Parapeneaeon brevicoxalis* Bourdon, 1981. A, Dorsal view. B, Ventral view. C, Right antenna 1. D, Right antenna 2. E, Right maxilliped. F, Right side of barbula. G, Right pereopod 1. H, Right pereopod 7. I, Right oostegite 1, external view. J, Same, internal view.

Scale : 2.0 mm for A, B, E, F; 1.0 mm for C, D, G, H.

DISCUSSION. — The female of *Parapeneaeon brevicoxalis* drawn (Fig. 12) is quite similar to the holotype, except for some minor details. Its frontal lamina extends less to the sides, its head is longer and narrower (Fig. 12A), its maxilliped palp is slightly broader (Fig. 12E), the posterolateral projection of the first oostegite is broader (Fig. 12I-J), the pereomeres are separated clear across, and the sixth pleomere is visible dorsally (Fig. 12A). The male drawn (Fig. 13) differs in having a narrower head and slightly more extended pleon. Three of the females are dextral and seven sinistral; all closely resemble the one illustrated. One of the males examined has a markedly pointed pleon, but otherwise the males are essentially alike. Although one of the females bore a hyperparasite, it was also accompanied by a male, an unusual occurrence. This is the first record of *P. brevicoxalis* since its initial discovery in the Philippines, so Chesterfield Islands is a new locality record for it; *Hymenopeneus halli* is a new host record.

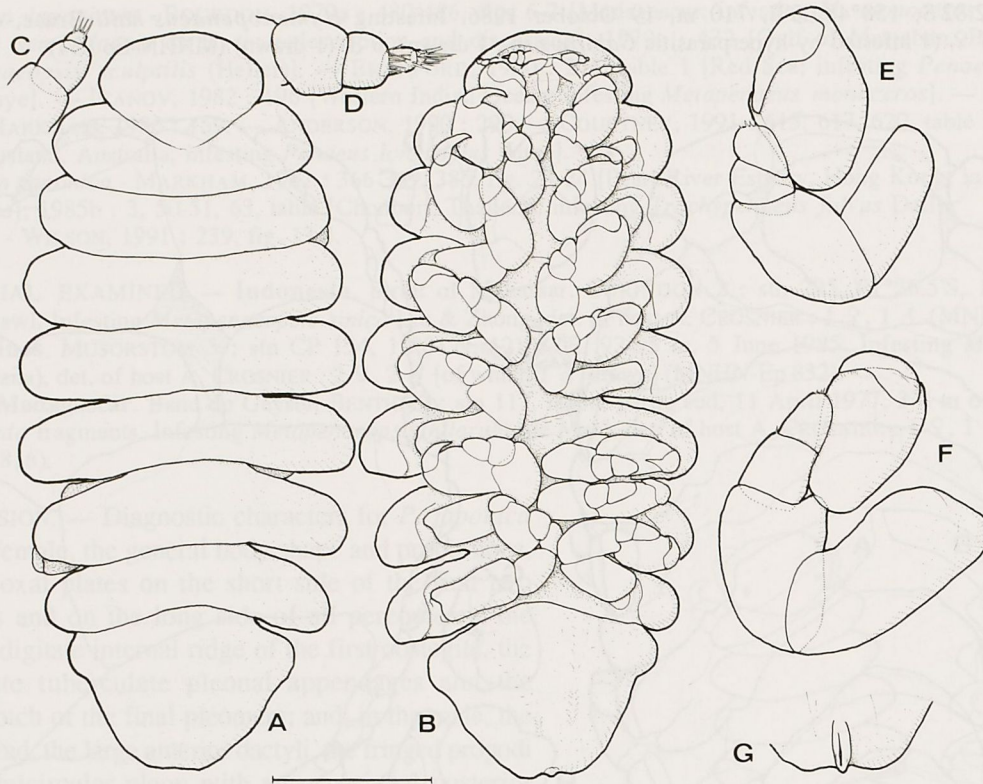


FIG. 13. — *Parapenaeon brevicoxalis* Bourdon, 1981, male. **A**, Dorsal view. **B**, Ventral view. **C**, Left antenna 1. **D**, Left antenna 2. **E**, Left pereopod 1. **F**, Left pereopod 2. **G**, End of pleon in ventral view.
Scale : 1.00 mm for A, B; 0.12 mm for C, D; 0.31 mm for E, F; 0.53 mm for G.

***Parapenaeon expansa* Bourdon, 1979**

Fig. 14

Parapenaeon expansus Bourdon, 1979a : 494, 495-498, figs 15-17, 18b-c [Near Madagascar, infesting *Penaeus teraoi* Kubo = *Penaeus (Melicertus) marginatus* Randall]. — NEARHOS & LESTER, 1984 : 257, 258 [Moreton Bay, Queensland, Australia, infesting *Penaeus (Melicertus) plebejus* Hess; and Karumbu, Gulf of Carpentaria, Australia, infesting *Penaeus* sp.]. — OWENS & GLAZEBROOK, 1985 : 105-112, tables 2-4 [Several localities, northern Australia, infesting *P. indicus* H. Milne Edwards, *P. merguensis* de Man and *P. longistylus* Kubo]. — ANDERSON, 1990 : 290. — OWENS & ROTH LISBERG, 1991 : 779.

?*Parapenaeon* prox. *expansus* Bourdon, 1979c : 435 [North Darwin, Northern Territory, Australia, infesting "tiger prawn" ? = *Penaeus esculentus* Haswell or *P. semisulcatus* de Haan].

MATERIAL EXAMINED. — **New Caledonia.** Baie Iré, night dive, P. LABOUE coll., 15 m, 29 May 1990. Infesting *Metapenaeopsis gaillardi* Crosnier, det. of host A. CROSNIER : 1 ♀, 1 ♂ [Both drawn] (MNHN-Ep 818).

Indonesia. Strait of Makassar. CORINDON 2 : stn 201, 01°10.2'S, 117°06.1'E, 21 m, fish trawl, 30 October 1980. Infesting *Metapenaeopsis sinica* Liu & Zhong, det. of host A. CROSNIER : 1 ♀ (MNHN-Ep 828).

Seychelles. REVES 2 : stn. 4, 05°07.7'S, 56°34.0'E, 32 m, 2 September 1980. Infesting *Metapenaeopsis faouzii* Ramadan, det. of host A. CROSNIER : 1 ♀ (MNHN-Ep 823).

Madagascar. NW coast. Infesting *Metapenaeopsis mogiensis consobrina* (Nobili), det. of host A. CROSNIER : 1 ♀, 1 ♂ (MNHN-Ep 833).

DISCUSSION. — Although the present material differs from the types of *Parapenaeon expansa* in some details, it appears assignable to that species because of the female's body shape, great extension of frontal lamina and coxal

plates, deeply digitate barbula and internal ridge, pointed lateral plates and cleft last pleomere. The males are less similar, in that the type had a smaller head, no eyes, larger seventh dactyli and a longer pleon. All of the present material infested species of *Metapenaeopsis*, while all previous records were of parasites of *Penaeus* spp., so all of the present hosts are new records. *Parapenaeon expansa* is previously known from Madagascar, its type-locality, but the records from the Strait of Makassar, New Caledonia and the Seychelles are new.

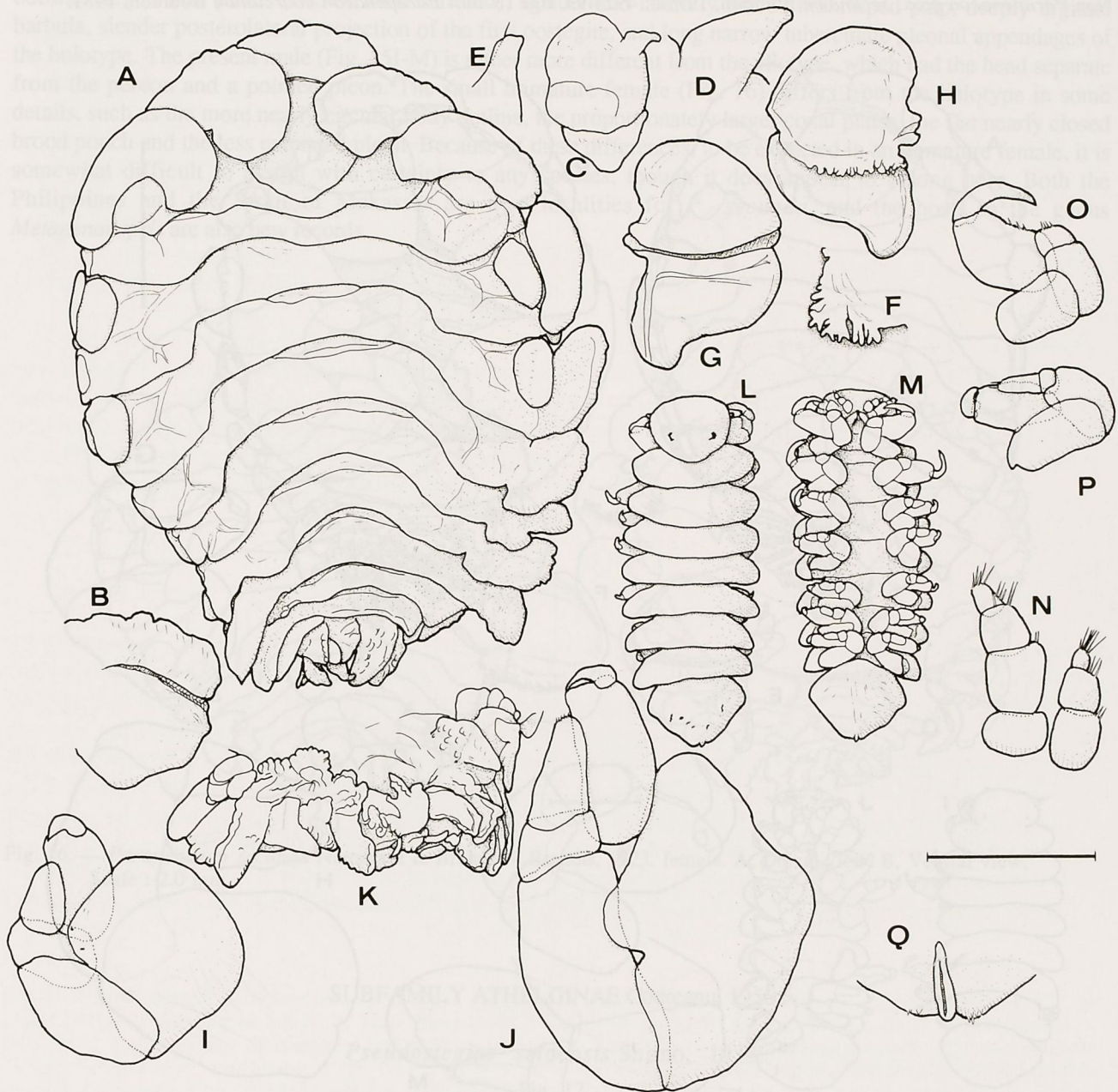


Fig. 14. — *Parapenaeon expansa* Bourdon, 1979. A-K, female; L-Q, male. A, Dorsal view. B, Right side of head. C, Right maxilliped. D, Palp of same. E, Plectron of same. F, Right side of barbula. G, Right oostegite 1, external view. H, Same, internal view. I, Right pereopod 1. J, Right pereopod 7. K, Pleon in ventral view. L, Dorsal view. M, Ventral view. N, Right antennae. O, Right pereopod 1. P, Right pereopod 7. Q, End of pleon in ventral view. Scale : 2.00 mm for A-C, F-H, K; 1.00 mm for L, M; 0.52 mm for D, E; 0.31 mm for I, J, O, P; 0.15 mm for N, Q.

Parapenaeon secunda Nierstrasz & Brender à Brandis, 1923

Figs 15-16

Parapenaeon secundum Nierstrasz & Brender à Brandis, 1923 : 67-68, fig. 4a-e [South of Flores Island, Indonesia, infesting *Parapenaeus fissurus* (Bate)]. — NIERSTRASZ & BRENDRER à BRANDIS, 1932 : 93-94. — PILLAI, 1954 : 21. — BOURDON, 1979c : 435; 1981 : 245, 255.

Non *Parapenaeon* prox. *secundum* Bourdon, 1979a : 492-495, figs 13-14 = *Parapenaeon coarctatum* Bourdon, 1981.

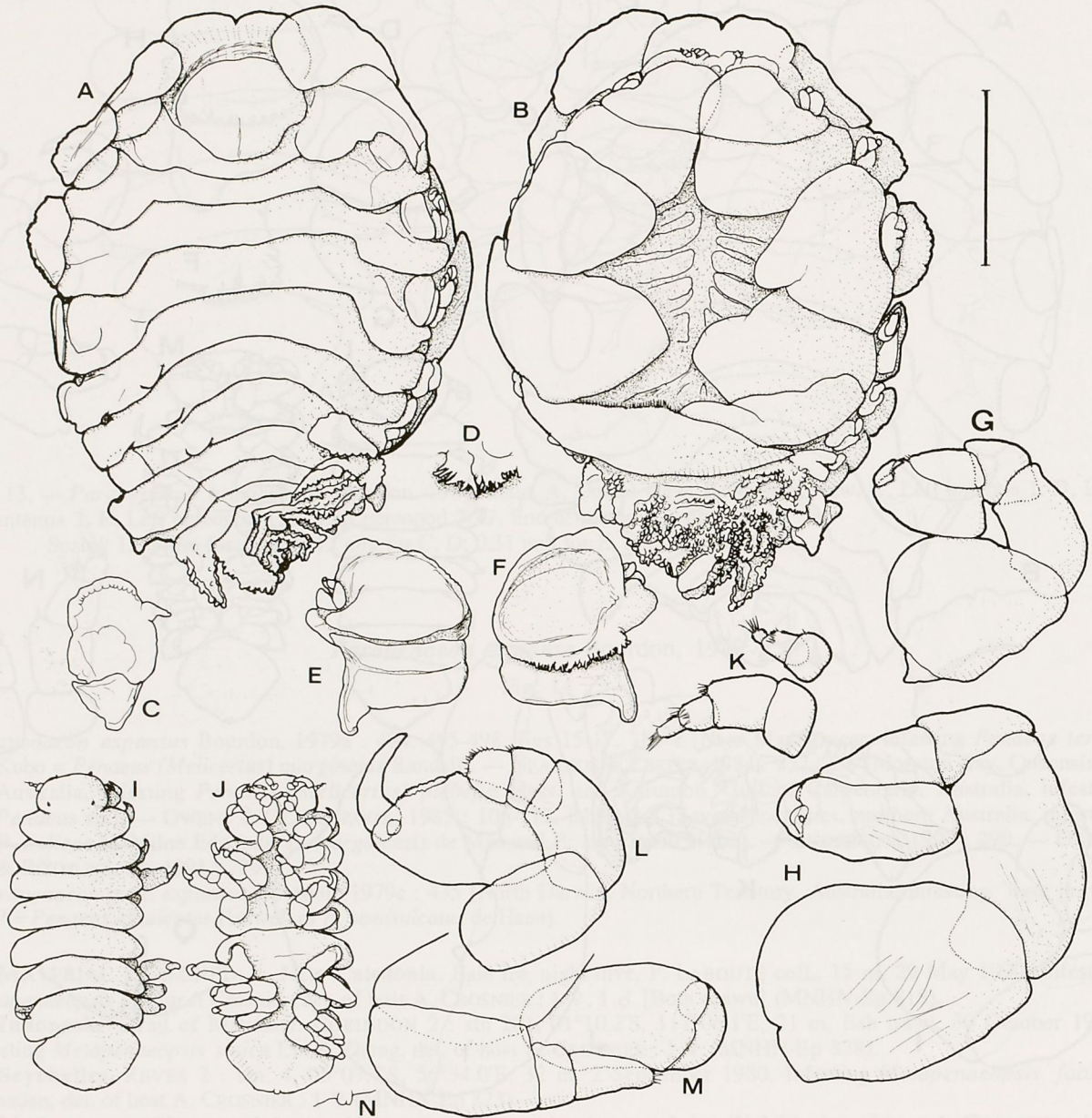


Fig. 15. — *Parapenaeon secunda* Nierstrasz & Brender à Brandis, 1923, A-H, female; I-N, male. A, Dorsal view. B, Ventral view. C, Right maxilliped. D, Right side of barbula. E, Right oostegite 1, external view. F, Same, internal view. G, Left pereopod 1. H, Left pereopod 7. I, Dorsal view. J, Ventral view. K, Right antennae. L, Right pereopod 1. M, Left pereopod 7. N, End of pleon in ventral view.

Scale : 4.0 mm for A-F, I, J; 0.5 mm for G, H; 0.3 mm for K-N.

MATERIAL EXAMINED. — **Philippines.** MUSORSTOM 2 : stn 86, near Manila, 50 m, 02 December 1980. Infesting *Metapenaeopsis palmensis* (Haswell), det. of host A. CROSNIER : 1 ♀ immature [Drawn] (MNHN-Ep 822).

Indonesia. Strait of Makassar. CORINDON 2 : stn 295, 01°26.5S, 117°02.1'E, 54-51 m. Infesting *Metapenaeopsis sinica* Liu & Zhong, det. of host A. CROSNIER : 1 ♀, 1 ♂ [Both drawn] (MNHN).

DISCUSSION. — Although some doubt remains whether all described species of *Parapenaeon* are valid and thus distinguishable, this material seems assignable to *P. secunda*. The adult female (Fig. 15A-H) shows the body outline, large coxal plates (two of them serrated), slender and laterally placed maxilliped palp, deeply digitate barbula, slender posterolateral projection of the first oostegite, and long narrow tuberculate pleonal appendages of the holotype. The present male (Fig. 15I-M) is rather more different from the allotype, which had the head separate from the pereon and a pointed pleon. The small immature female (Fig. 16) differs from the holotype in some details, such as the more nearly circular body outline, the proportionately larger coxal plates, the flat nearly closed brood pouch and the less extended pleon. Because of these differences, to be expected in an immature female, it is somewhat difficult to assign with certainty to any species, though it does appear to belong here. Both the Philippines and the Strait of Makassar are new localities for *P. secunda*, and the hosts in the genus *Metapenaeopsis* are also new records.

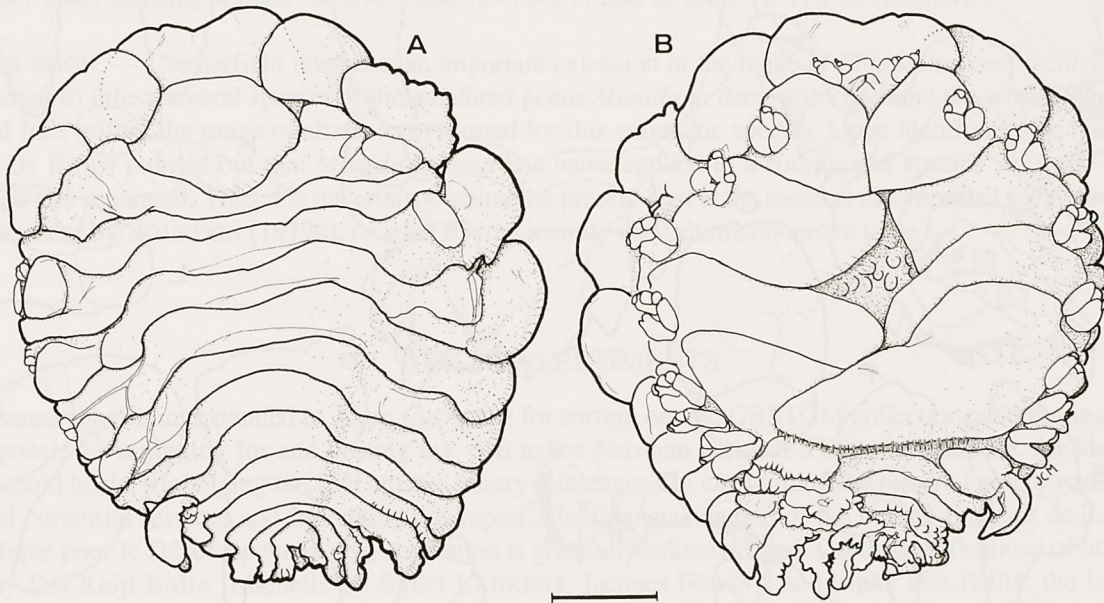


Fig. 16. — *Parapenaeon secunda* Nierstrasz & Brender à Brandis, 1923, female. A, Dorsal view. B, Ventral view. Scale : 2.0 mm.

SUBFAMILY ATHELGINAE Codreanu, 1956

Pseudostegias setoensis Shiino, 1933

Fig. 17

Pseudostegias setoensis Shiino, 1933 : 290-293, fig. 16 [Seto, Japan, infesting *Clibanarius bimaculatus* de Haan]; 1950 : 161-162; 1952 : 35-36; 1958 : 68 [Seto, Wakayama Prefecture, Japan, infesting *C. bimaculatus*; and Taiwan, infesting *C. striolatus* Dana]; 1972 : 9. — LEMOS DE CASTRO, 1965 : 105-108. — MARKHAM, 1982 : 369-370, 372-373, 385 [Hong Kong, infesting *C. bimaculatus* and *C. ransonii* Forest]. — MORTON & MORTON, 1983 : 96, 98, 201, fig. 7, 5 (6), table 10.2 [Hong Kong, infesting *C. bimaculatus* and *C. striolatus*]. — PAGE, 1985 : 201, 203.

MATERIAL EXAMINED. — **Chesterfield Islands.** MUSORSTOM 5 : stn 361, 19°53.50'S, 158.38'10'E, 400 m, 19 October 1986. Infesting "*Trizopagurus*" sp. (to be described as gen. nov., sp. nov. by J. FOREST), det. of host J. FOREST : 1 ♀, 1 ♂ (MNHN-Ep 819).

New Caledonia. SMIB 4 : stn DW 67, Ride de Norfolk, 22°55.1'S, 167°15.6'E, 460 m, 10 March 1989. Infesting "*Trizopagurus*" sp. (to be described as gen. nov., sp. nov. by J. FOREST), det. of host J. FOREST : 1 ♀, 1 ♂ [Both drawn], (MNHN-Ep 834).

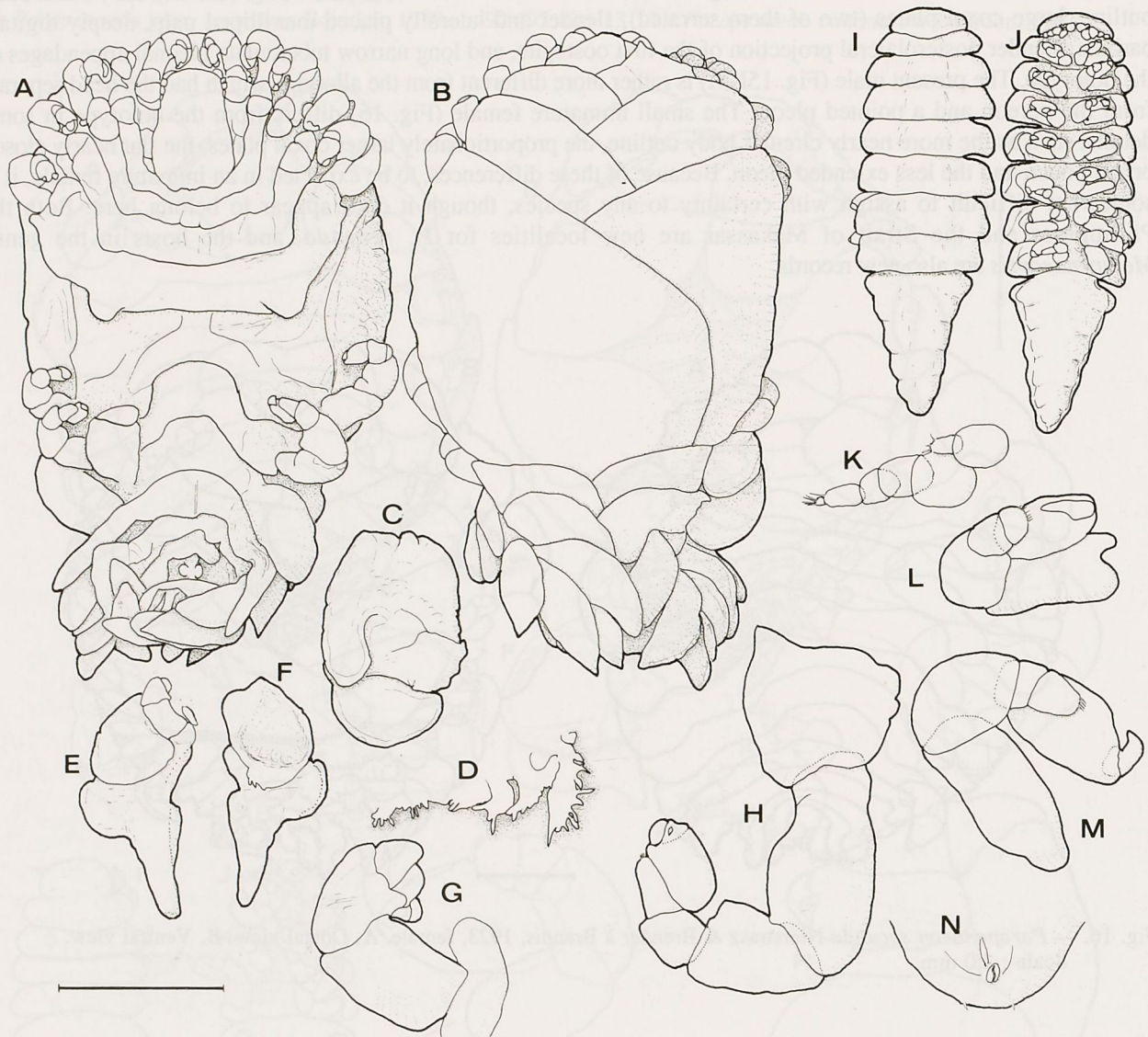


Fig. 17. — *Pseudostegias setoensis* Shiino, 1933, A-H, female; I-N, male. A, Dorsal view. B, Ventral view. C, Right maxilliped. D, Left side of barbula. E, Right oostegite 1 in external view. F, Same in internal view. G, Right pereopod 1. H, Right pereopod 7. I, Dorsal view. J, Ventral view. K, Right antennae. L, Left pereopod 1. M, Left pereopod 7. N, End of pleon in ventral view.

Scale : 4.0 mm for A, B, E, F; 2.0 mm for C, D, I, J; 1.0 mm for G, H; 0.3 mm for K-N.

DISCUSSION. — In contrast to previously recorded specimens, the female drawn is relatively slightly broader anteriorly, and its pleonal lateral plates less extended; and the illustrated male has head and pleon both slightly shorter and no eyes. The other two specimens examined are nearly identical with those illustrated. Chesterfield

Islands and New Caledonia are new localities for *Pseudostegias setoensis*, and the host hermit crab, the first not in the genus *Clibanarius*, is also a new record.

SUBFAMILY ENTOPHILINAE Richardson, 1903

Entophilus omnitectus Richardson, 1903

Entophilus omnitectus Richardson, 1903 : 824-826, figs 6-8 [Between islands of Hawaii and Molokai, Hawaii, infesting *Munida normanni* Henderson; made type of Subfamily Entophilinae nov.]. — RICHARDSON, 1904 : 679-681, figs 34-39 [Reprint of above article]. — NIERSTRASZ & BRENDER à BRANDIS, 1923 : 63, 66. — DANFORTH, 1963 : 847, 849; 1970a : 27; 1970b : 462. — BOURDON, 1976 : 385-391, figs 21-23 [Madagascar, infesting *M. incerta* Henderson; redescription]; 1979b : 511 [Azores, infesting *M. sanctipauli* Henderson; mention of unpublished records from Australia and Philippines]. — BOURDON *et al.*, 1981 : 498-500, 502, fig. 6II. — MARKHAM, 1986 : 144, 148, 156, fig. 1H. — ADKISON & COLLARD, 1990 : 649-654, figs 1b-1, 2 [Northern Gulf of Mexico, infesting *M. valida* Smith and *M. microphthalmia* A. Milne Edwards].

MATERIAL EXAMINED. — **Chesterfield Islands**. MUSORSTOM 5 : stn 365, 19°42.82'S, 150°48.00'E, 710 m, 19 October 1986. Infesting *Munida "incerta"* Henderson, det. of host K. BABA : 2 ♀, 2 ♂, (MNHN).

DISCUSSION. — Chesterfield Islands is an important extension of the range of *Entophilus omnitectus*, which is now known to infest several species of the galatheid genus *Munida* in deep waters around the world. The present material falls within the range of characters reported for this enigmatic species. Upon identifying the host on my behalf, Dr BABA pointed out that *Munida incerta* is a name applied to a complex of species yet to be properly described and separated. Thus it is uncertain whether the present host is the same as that reported for *E. omnitectus* at Madagascar by BOURDON (1979b), or what its true identity may ultimately prove to be.

ACKNOWLEDGMENTS

Sincerest thanks are extended to Alain CROSNIER for sorting out the ORSTOM collections and putting them at my disposal, for arranging for and hosting my visit to the Muséum national d'Histoire naturelle, for identifying the penaeoid hosts, for helping me find elusive library references, for cataloguing the material and providing other essential curatorial services and for editing this report. The financial support of the Institut Français de Recherche Scientifique pour le Développement en Coopération is gratefully acknowledged. Other identifications of hosts were made by Drs Keiji BABA, Michelle DE SAINT LAURENT, Jacques FOREST, and Lipke HOLTHUIS, the latter also providing advice on nomenclature. Dr Robert WASMER passed on the infested *Prionocrangon*, which had come into his possession. Dr R. BOURDON and an anonymous reviewer made valuable comments on the manuscript, including suggestions for revisions of some identifications and more extensive discussions. Mrs W. A. MARKHAM provided facilities at the Arch Cape Marine Laboratory, of which this is publication number 23.

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