

## Crustacea Isopoda: Bopyridae in the MUSORSTOM collections from the tropical Indo-Pacific. II. Species in subfamily Pseudioninae infesting non-anomuran hosts

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### ABSTRACT

*Gigantione petalomerae* sp. nov. infests the dromiid crab *Petalomera pulchra* Miers in New Caledonia. Two species of *Pseudione* show new host and geographic records: *P. nephropsi* Shiino, 1951, infests *Metanephropsis velutinus* Chan & Yu at Tanimbar Islands, Indonesia; *P. elongata elongata* (Hansen, 1897) infests *Nematocarcinus* sp. in Chesterfield Islands; both species are redescribed in detail. *Pseudione tanimbarensis*, sp. nov. infests *Nephropsis sulcata* Macpherson at Tanimbar Islands, Indonesia. As a result of these redescriptions, the subspecies *P. nephropsi atlantica* Bourdon, 1971, is considered a separate species, *Pseudione atlantica* Bourdon, 1971, and the variety *P. elongata* var. *normalis* Nierstrasz & Brender à Brandis, 1931, is considered invalid.

### RÉSUMÉ

**Crustacea Isopoda : Bopyridae des collections MUSORSTOM récoltés dans l'Indo-Pacifique tropical. II. Espèces de la sous-famille Pseudioninae infestant des hôtes non anomuriens.**

*Gigantione petalomerae* sp. nov. a été trouvé sur le crabe dromiide *Petalomera pulchra* Miers en Nouvelle-Calédonie. De nouveaux hôtes et de nouvelles localisations géographiques sont mentionnés pour deux espèces de *Pseudione* : *P. nephropsi* Shiino, 1951, trouvée sur *Metanephropsis velutinus* Chan & Yu, aux îles Tanimbar, en Indonésie et *P. elongata elongata* (Hansen, 1897) sur *Nematocarcinus* sp. aux îles Chesterfield; ces deux espèces sont redécrites en détail. *Pseudione tanimbarensis* sp. nov. infeste *Nephropsis sulcata* Macpherson aux îles Tanimbar. Des conséquences de ces redescriptions sont l'élévation au rang d'espèce de la sous-espèce *P. nephropsi atlantica* Bourdon, 1971, tandis que la variété *P. elongata* var. *normalis* Nierstrasz & Brender à Brandis, 1931, est considérée comme non valide.

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The extensive collections of ORSTOM, housed in the Muséum national d'Histoire naturelle (designated MNHN), contain many uncatalogued and unidentified bopyrid isopods, parasites of numerous different decapod crustaceans. This report, one of a continuing series, deals with a small part of that material.

FAMILY BOPYRIDAE Rafinesque

SUBFAMILY PSEUDIONINAE Codreanu

*Gigantione petalomeræ* sp. nov.

Fig. 1

"Bopyrid."— McLAY, 1993: 166 [Chesterfield Islands; infesting *Petalomera pulchra* Miers].

MATERIAL EXAMINED. — **Chesterfield Islands**. CHALCAL 1: stn. DC 53, 21°19.5'S, 158°55.3'E, 60 m, 24.07.1984. Infesting *Petalomera pulchra* Miers, host det. C. L. McLAY: 1 ♀, holotype; 1 ♂, allotype (MNHN Ep-888).

DESCRIPTION. — *Holotype female* (Fig. 1A-I): Length 6.9 mm, maximal width 6.8 mm, head length 1.8 mm, head width 2.4 mm, pleon length 2.8 mm. Body outline nearly circular, body axis distorted only 18°; all body regions and segments distinct (Fig. 1A).

Head subrectangular, about 2/3 embedded in pereon. Short frontal lamina not quite extended to sides of head; small anterolateral flaps projecting slightly from each side of head. Dorsal surface produced into 2 large low lobes. Antennae fairly large, extending beyond anterior margins of head, of 3 and 5 articles respectively. Barbula (Fig. 1B) with single terete projection on each side and triangular lobe in center. Maxilliped (Fig. 1C) suboval, its anterior article much larger than posterior one and marginally fringed by dense setae.

Pereon largely enclosing both head and pleon, rounded on both sides but bulging outward slightly more on long side, broadest across pereomere 4. Coxal plates well-developed on both sides of all pereomeres, those on long sides very long and slender and reflexed over dorsal surfaces of pereomeres; those opposite somewhat broader and angled to extend forward along sides of pereomeres. Indistinct dorsolateral bosses on long sides of some pereomeres. Oostegites almost completely enclosing brood pouch, but not tightly pressed onto each other. Oostegite 1 (Fig. 1D-E) with much larger anterior plate, deep groove separating it from posterior region externally; internal ridge bearing 5 long slender flexible projections along lateral half, nothing on medial half. Pereopods 1-4 on long side visible dorsally along side of body, others hidden in dorsal view, all of about same size (Fig. 1F-G) and with all articles present; pereopod 7 much more setose, its basis produced into prominent lobe along flexor margin.

Pleon of 6 distinct pleomeres, each produced into lateral plates on both sides; lateral plates on longer sides basally constricted into falcate points, lanceolate ones opposite extending out from slender sides of pleomeres without constriction. Sixth pleomeres also produced into slender lateral plates. All pleonal appendages visible only in posterior view (Fig. 1H): 5 pairs of biramous pleopods (Fig. 1I) with deeply digitate margins; they and minute biramous uropods tightly clustered inside cavity formed by lateral plates.

*Allotype male* (Fig. 1J-N): Length 4.7 mm, maximal width 1.7 mm, head length 0.7 mm, head width 1.1 mm, pleonal length 1.4 mm. All body regions and segments distinctly separated. Minute splotchy eyes near posterolateral corners of head; tiny scattered pigment spots on dorsal surfaces of some pereomeres and of first pleomere (Fig. 1J-K).

Head trapezoidal, broadest at posterior margin but narrower than pereomere 1. Antennae (Fig. 1L) of 3 and 5 articles, respectively; antenna 1 quite reduced, but antenna 2 extending beyond margins of head on both sides.

Pereon broadest across pereomere 5, tapering slightly both ways from there. Pereopods (Fig. 1M-N) all equally developed and about same size, with all articles distinct; propodi somewhat larger and dactyli sharper posteriorly. Pereopods moderately covering much of ventral surface of pereon without extending beyond sides.

Pleon (Fig. 1N) of 6 distinct pleomeres, tapering slightly posteriorly; margins sparsely setose. Five pairs of irregularly lengthened uniramous flaplike pleopods, progressively smaller posteriorly. Pair of large uniramous uropods extending prominently rearward at end of body.

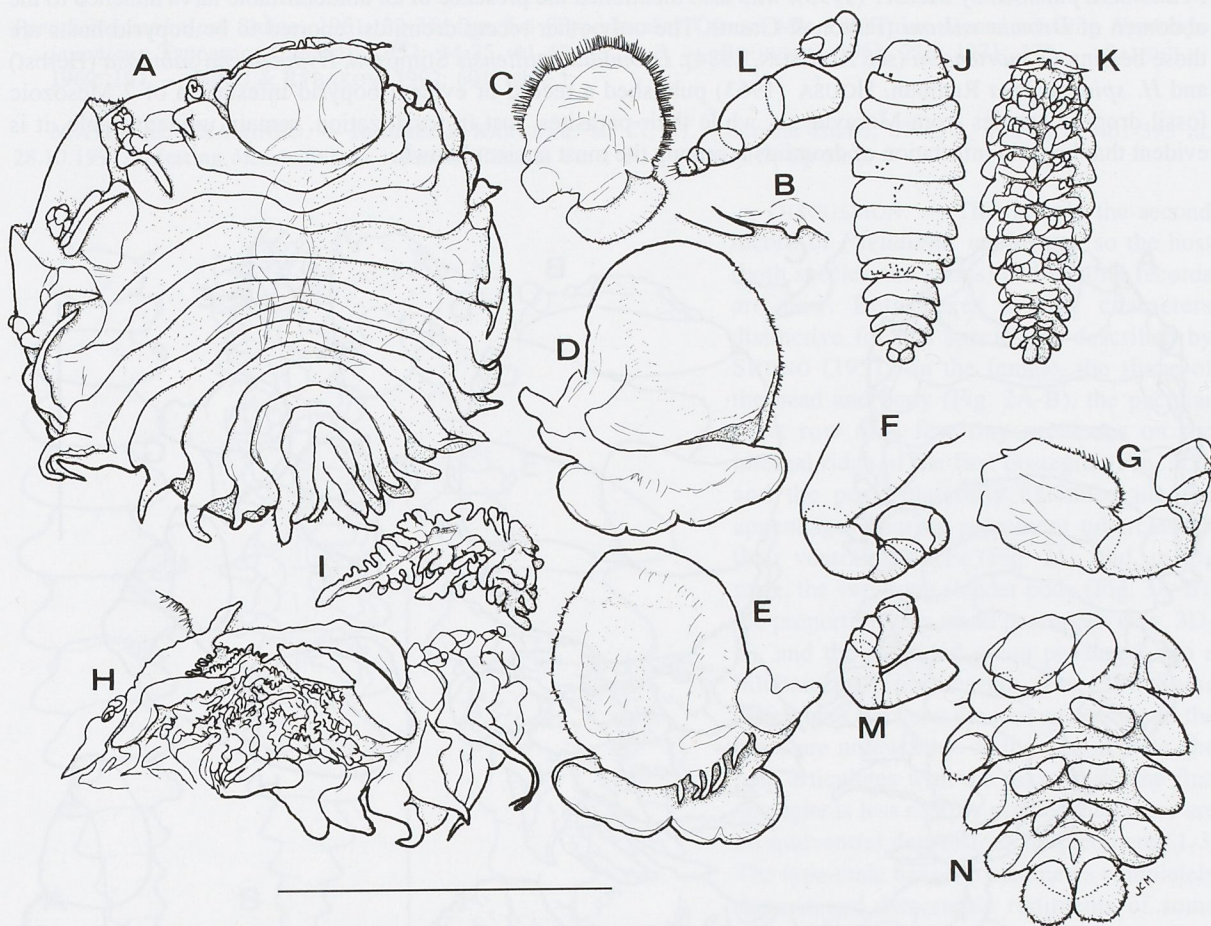


FIG. 1. — *Gigantione petalomeræ*, sp. nov., A-I, holotype female; J-N, allotype male. A, dorsal view. B, barbula, right side. C, right maxilliped. D, right oostegite 1, external view. E, same, internal view. F, right pereopod 1. G, right pereopod 7. H, pleon, ventral view. I, right pleopod 2. J, dorsal view. K, ventral view. L, left antennae. M, left pereopod 1. N, right pereopod 7 and pleon in ventral view.

Scale: 2.5 mm for B-F, I; 5.0 mm for A, H, J-L; 10.0 mm for M-N; 16.7 mm for F-G.

ETYMOLOGY. — Specific name *petalomeræ*, genitive singular of generic name of the host of the new species.

DISCUSSION. — The genus *Gigantione* contains 12 previously described species, as discussed by MARKHAM (1994). Three of the species are parasites of thalassinideans, the others infesting diverse brachyurans. For now, I am retaining the genus in the subfamily Pseudioninae, although some of its characters indicate that its placement in the Ioninae, the typical parasites of the Brachyura, might be more appropriate. Regardless, it belongs among the least differentiated bopyrid genera. The new species, *G. petalomeræ*, is most similar to *G. mortenseni* Adkison (1984), from the Gulf of Mexico and eastern Florida, U. S. A., which is, interestingly, the only other bopyrid species known to infest recent dromiid crabs. The diagnostic differences between these 2 species are that the female of *G. mortenseni* has a more elaborate barbula, a proportionately longer first oostegite and coxal plates more nearly alike on opposite sides; its male has a more extended head, a rather sharply tapered pleon, pleopods and uropods more distinctly bilobate and the latter more extended. In presenting a new generic diagnosis of *Gigantione*

(MARKHAM, 1994), I did not mention the structure of the seventh pereopods of the females, whose bases are characteristically expanded into lobes along the flexor margins, as seen also in *G. petalomera* (Fig. 1G).

The type-specimens of *G. petalomerae* were first recorded without identification in the report on its host, *Petalomera pulchra*, by McLAY (1993), who also mentioned the presence of an unidentifiable larva attached to the abdomen of *Dromia wilsoni* (Fulton & Grant). The only other recent dromiids reported to be bopyrid hosts are those bearing *G. mortenseni* (see ADKISON, 1984): *Dromidia antillensis* Stimpson, *Hypoconcha sabulosa* (Herbst) and *H. spinosissima* Rathbun. HOUSA (1963) published a record of evident bopyrid infestation of 2 Mesozoic fossil dromiid species from Moravia, so, while their parasites, lost in fossilization, remain unidentifiable, it is evident that bopyrid infestation of dromiids is among the most ancient known.

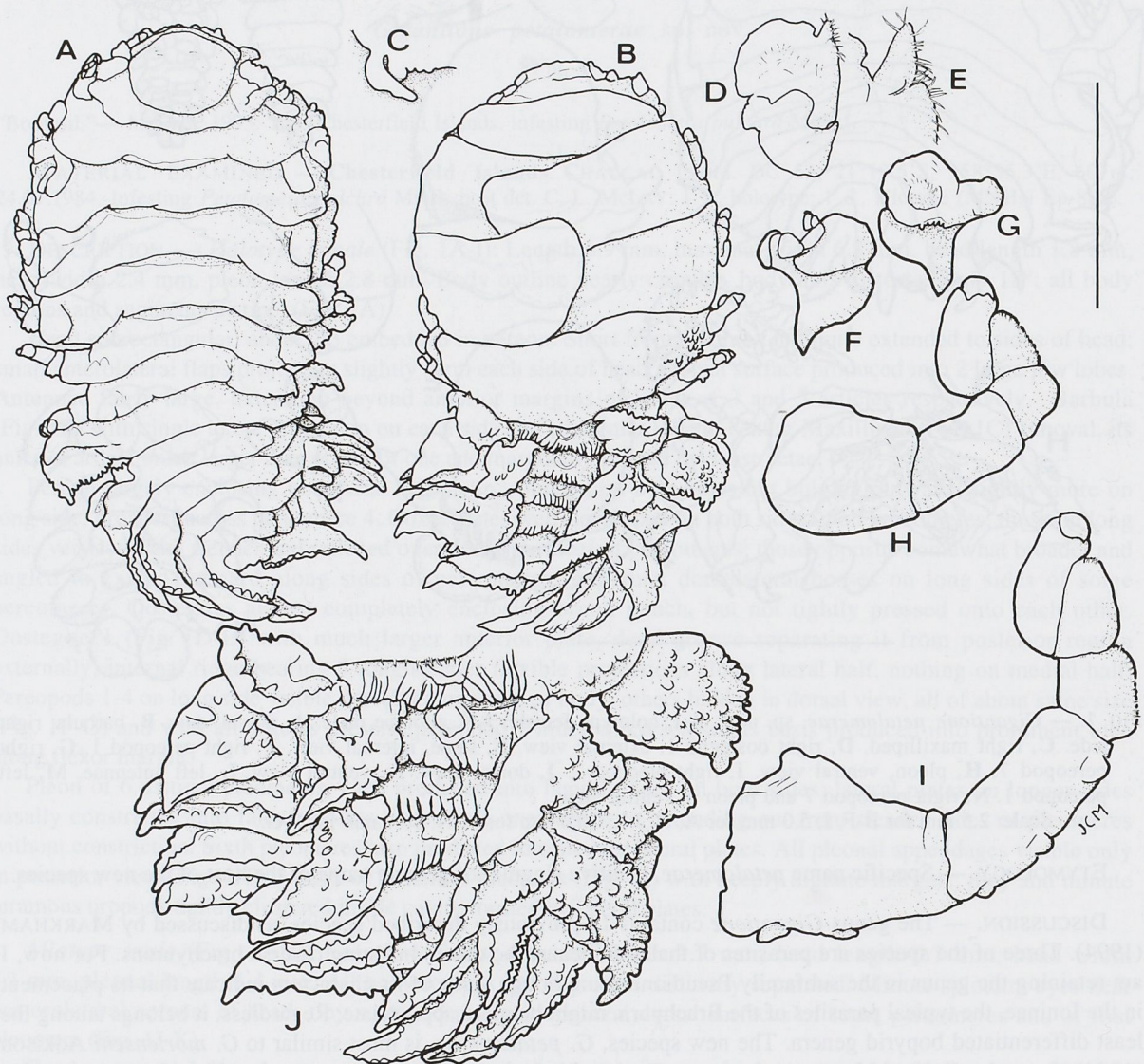


FIG. 2. — *Pseudione nephropsi* Shiino, 1951, reference female. A, dorsal view. B, ventral view. C, right side of barbula. D, right maxilliped. E, palp of same. F, right oostegite 1, external view. G, same, internal view. H, right pereopod 1. I, right pereopod 7. J, pleon in ventral view.

Scale: 1.8 mm for E, H-I; 5.4 mm for C-D; 5.9 mm for J; 10.8 mm for A-B, F-G.

*Pseudione nephropsi* Shiino, 1951

Figs 2-3

*Pseudione nephropsi* Shiino, 1951: 32-36; figs 5-6 [Type-locality Owase, Mie Prefecture, Japan; infesting *Nephrops japonicus* Tapparone-Canefri]; 1952: 34-35, 41-42; 1972: 7. — BOURDON, 1968: 216; 1971: 375. — ŞADOĞLU, 1969: 197. — HØEG & RYBAKOV, 1992: 601, table 1.

MATERIAL EXAMINED. — **Indonesia**. KARUBAR: st. CC 41, Tanimbar Island, 07°45'S, 132°42'E, 401-393 m, 28.10.1991. Infesting *Metanephrops velutinus* Chan & Yu: 1 ♀, 1 ♂ (MNHN-Ep 889).

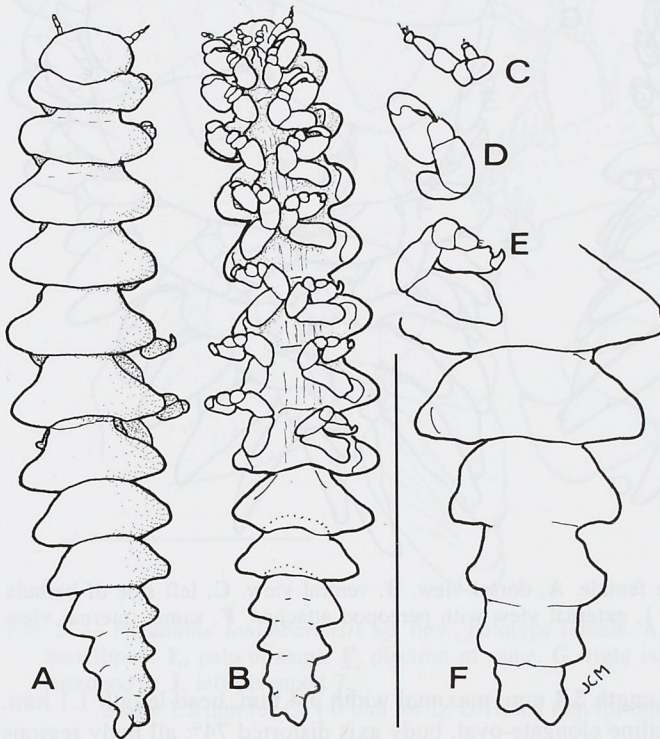


FIG. 3. — *Pseudione nephropsi* Shiino, 1951, reference male.

**A**, dorsal view. **B**, ventral view. **C**, right antennae. **D**, right pereopod 1. **E**, left pereopod 7. **F**, pleon in ventral view.

Scale: 2.6 mm for C-F; 5.0 mm for A-B.

differed from the typical one, BOURDON (1971) observed that it possibly deserved separate species status. In particular, the lack of tubercles on the pleonal appendages of the female sets it off enough for such status. Accordingly, I am here considering *Pseudione atlantica* Bourdon, 1971, a separate species and thus not using any subspecific designation for the new material of *Pseudione nephropsi*.

DISCUSSION. — This is only the second record of *Pseudione nephropsi*, so the host (both species and genus) and locality records are new. Both sexes display characters distinctive for this species, as described by SHIINO (1951): in the female, the shape of the head and body (Fig. 2A-B), the peculiar short row of a few tiny processes on the internal ridge of the first oostegite (Fig. 2G), and the posterolaterally extended pleonal appendages bearing prominent tubercles on their ventral surfaces (Fig. 2J); and, in the male, the very long slender body (Fig. 3A-B), the proportionately small pereopods (Fig. 3D-E), and the extended pleon produced into a bilobate posterior margin (Fig. 3F). Some differences between the new material and the types are noteworthy. In the type-female, the palp articulates with the maxilliped, the first oostegite is less sharply pointed, and there are no midventral depressions on pleomeres 1-3. The type-male has all 6 pleomeres completely distinct and discernible rudiments of some pleopods.

BOURDON (1971) described the subspecies *Pseudione nephropsi atlantica* as a parasite of *Nephropsis atlantica* (Norman) from the Congo. In presenting a tabulation of the characters by which his new subspecies

*Pseudione tanimbarensis* sp. nov.

Figs 4-6

MATERIAL EXAMINED. — **Indonesia**. KARUBAR: st. CP 81, Tanimbar Islands, 09°34'54"S, 131°01'49"E, 199-206 m, 4.11.1991. Infesting *Nephropsis sulcata* Macpherson, host det. T.-Y. CHAN: 1 ♀, holotype; 1 ♂ (damaged), allotype (MNHN-Ep 891).

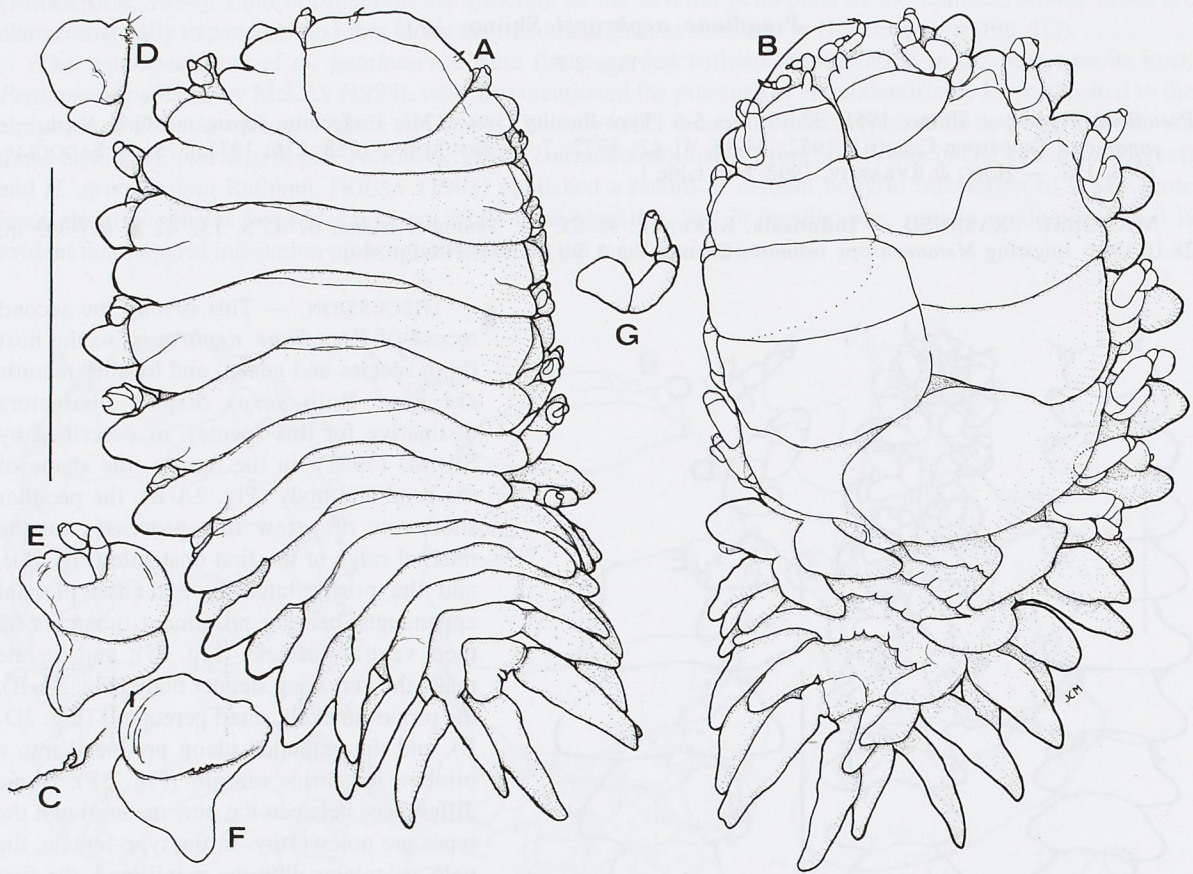


FIG. 4. — *Pseudione tanimbarensis* sp. nov., holotype female. A, dorsal view. B, ventral view. C, left side of barbula. D, left maxilliped, external view. E, left oostegite 1, external view with pereopod attached. F, same, internal view. G, right pereopod 7. Scale: 2.5 mm.

DESCRIPTION. — Holotype female (Figs 4-5). Length 5.4 mm, maximal width 3.4 mm, head length 1.1 mm, head width 1.4 mm, pleon length 2.0 mm. Body outline elongate-oval, body axis distorted  $74^\circ$ ; all body regions and segments distinct (Fig. 4A-B).

Head suboval, deeply set into pereon. Fully developed frontal lamina completely covering front of head, but not extending beyond its sides. Antennae reduced, only antennae 2 reaching margins of head, of 3 and 8 articles respectively (Fig. 5A-B). Barbula (Fig. 5C) with small angled outer projection and broadly lobate inner projection on each side and irregularly lobed margins in center. Maxilliped (Fig. 5D) subtriangular, its anterior article much larger than posterior one; nonsegmented articulating palp (Fig. 5E) just lateral to anteromedial corner of maxilliped and barely extending beyond its front, its margin and adjacent corner of maxilliped bearing sparse long setae; plectron (Fig. 5F) acutely angled but not prominent, its tip bearing minute setae. No eyes visible.

Pereon surrounding head laterally, doubly oval, tapering both ways from pereomere 3, then abruptly broader across pereomere 5 and tapering from there through pleon. Small coxal plates well-developed on both sides of pereomeres 1-4, those on long sides prominent and laterally extended. Dorsolateral projections on both sides of pereomeres 1-3 and prominent on long sides of pereomeres 5 and 6. Oostegites completely enclosing brood pouch. Oostegite 1 (Fig. 5G-H) with anterior and posterior plates equally long, latter slightly concave posteriorly; internal ridge entire except for some tiny lobes near center. Pereopods extending laterally and visible dorsally along sides of body, all with all articles distinct and bases lobate, their bases and ischia progressively larger posteriorly (Fig. 5I-J).

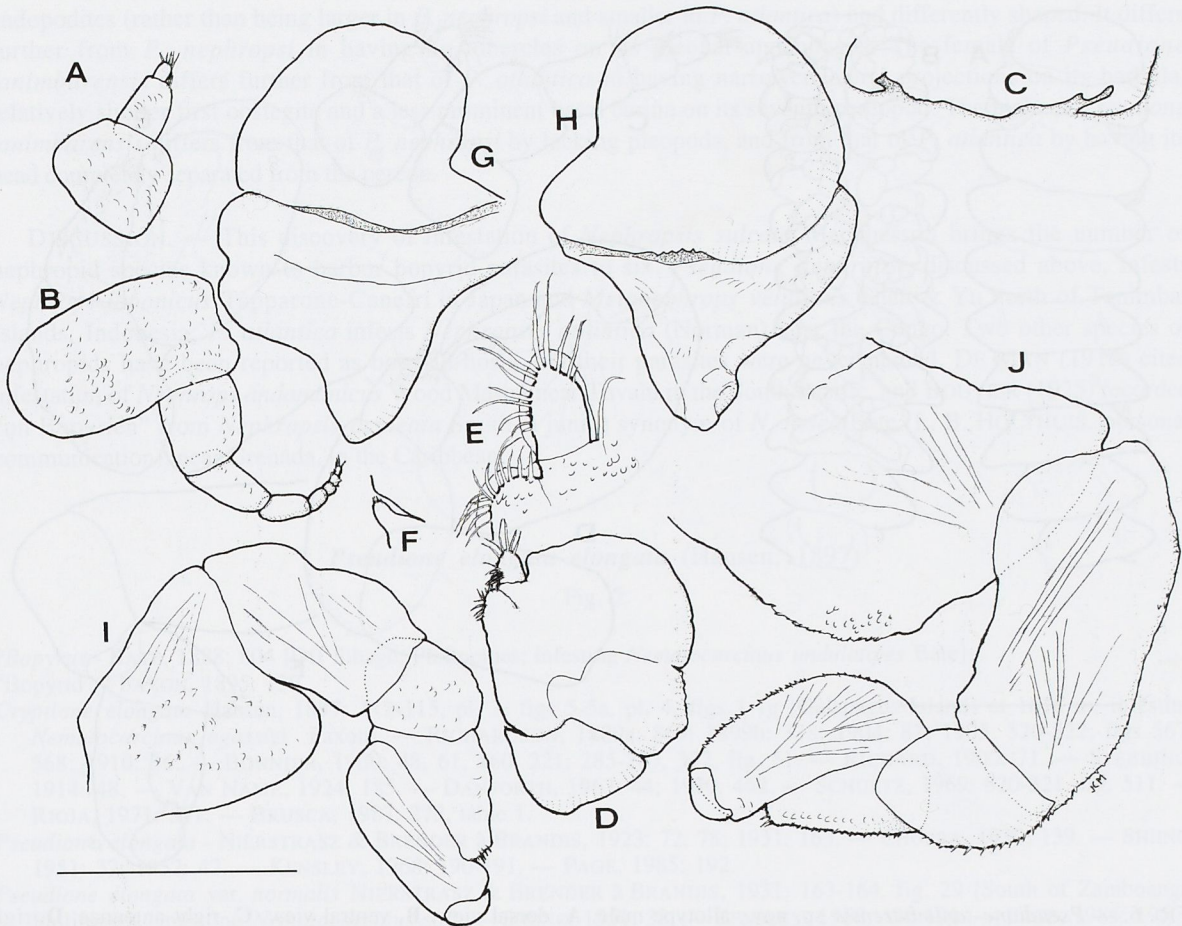


FIG. 5. — *Pseudione tanimbarensis* sp. nov., holotype female. A, right antenna 1. B, left antenna 2. C, barbula. D, right maxilliped. E, palp of same. F, plectron of same. G, right oostegite 1, external view. H, same, internal view. I, left pereopod 1. J, left pereopod 7.

Scale: 1.2 mm for C; 1.0 mm for D, G-H; 0.4 mm for others.

Pleon greatly extended, of 6 distinct broad, anteriorly convex pleomeres; pleomeres 1-5 each produced into long slender lateral plates on both sides, deeply separated by basal constriction on long sides but slightly overlapping opposite. Five pairs of biramous pleopods, their endopodites lanceolate and reaching far laterally, their endopodites falcately curved and extending rearward. Pleomere 6 heart-shape, with tiny posterior anal cone and lanceolate uniramous pleopods similar to but larger than lateral plates and extending far posteriorly.

*Allotype male* (Fig. 6): Length 3-4 mm (uncertain because of damage), maximal width 0.9 mm, head length 0.4 mm, head width 0.7 mm, pleonal length unknown. All body regions and segments distinctly separated. Sides of body nearly parallel (Fig. 6A-B).

Head suboval, broadest just before posterior margin and narrower than pereon. Antennae (Fig. 6C) of 3 and 6 articles, respectively; antennae 2 extending beyond margins of head on both sides. No eyes.

Pereon broadest across pereomere 3, but only slightly so; all pereomeres deeply separated by anterolateral indentations. Pereopods (Fig. 6D-F) all equally developed, decreasing slightly in overall size and markedly in dactylus size posteriorly; all carpi and meri fused, other articles distinct. Pereopods moderately covering much of ventral surface of pereon without extending beyond sides.

Pleon of at least 3 distinct pleomeres, total number uncertain because of missing posterior region, pleon tapering slightly posteriorly. Evidently no pleopods or midventral projections. Status of uropods unknown.

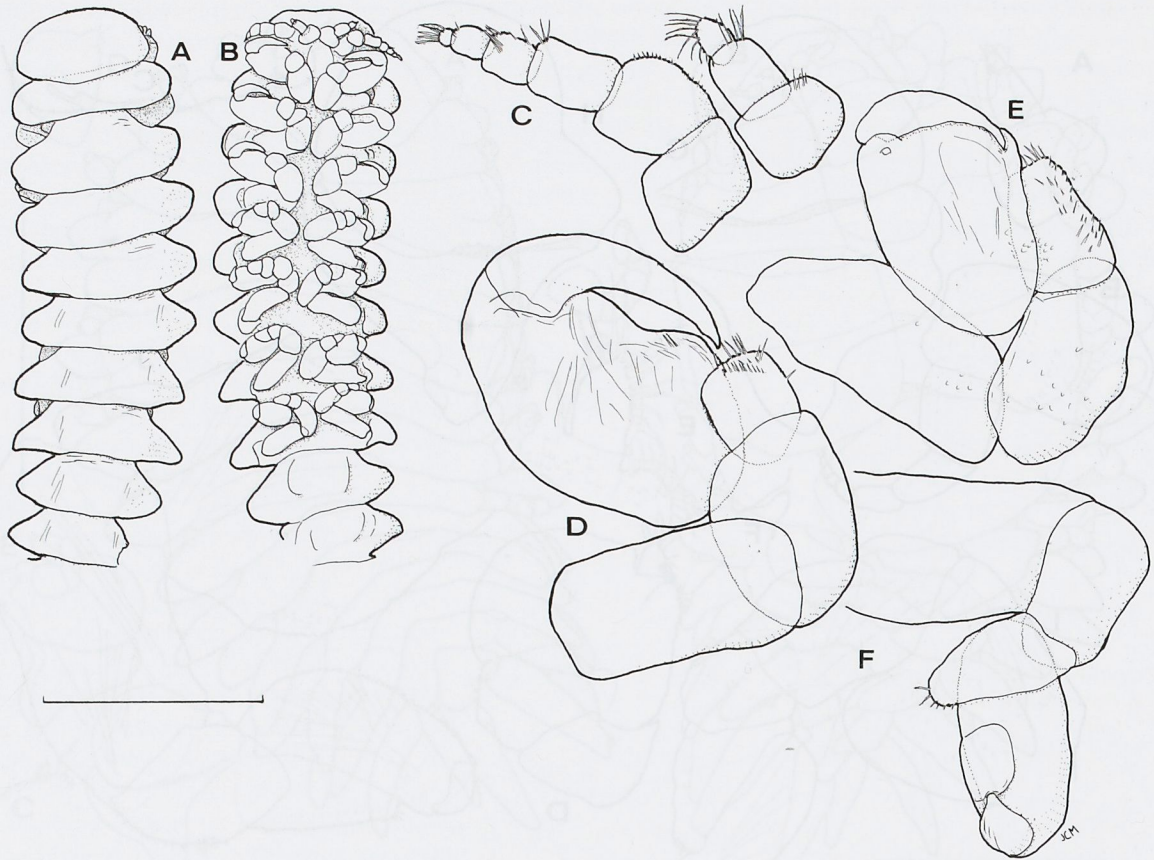


FIG. 6. — *Pseudione tanimbarensis* sp. nov., allotype male. A, dorsal view. B, ventral view. C, right antennae. D, right pereopod 1. E, right pereopod 3. F, right pereopod 7. Scale: 1.2 mm for A-B; 0.2 mm for C-F.

ETYMOLOGY. — Specific name *tanimbarensis*, derived from name of type locality, Tanimbar Islands.

DISCUSSION. — *Pseudione tanimbarensis* belongs to that small group of species infesting hosts in the family Nephropidae, in host selection as well as morphology and probable lineage. It would be considered a third subspecies of *Pseudione nephropsis* Shiino, 1951, considered above, if I were not raising the second subspecies to specific rank as *Pseudione atlantica* Bourdon, 1971. Characters that *Pseudione tanimbarensis* shares with those two species are, in the female: body much longer than wide; sides of head completely embedded in pereon, with frontal lamina across whole anterior but not along sides at all; no eyes; palp on or next to anteromedial corner of maxilliped and extending little or none beyond it; 2 pairs of lateral projections on barbula, though inner pair much reduced; first oostegite with only short row of small lobes on internal ridge and falcately pointed posterolateral projection; brood pouch completely enclosed; meri and carpi of pereopods fused; pleon extended far posteriorly; pleomeres deeply separated laterally and produced into extended slender lateral plates; first pleomere wider than last pereomere; reduced sixth pleomere heart-shape, plainly visible dorsally; large pleopodal endopodites curved to extend rearward. Males of the three species share these characters: body long and slender; head suboval, much broader than long, lacking eyes; antennae 2 extending beyond margins of head; pereomeres and pleomeres deeply separated laterally; first pereopods larger and with more sharply pointed dactyli than others. The female of *Pseudione tanimbarensis* differs from the other two species in being much more distorted and having its coxal plates placed laterally, not dorsally, and in having all pleopodal endopodites about the same size as their respective



endopodites (rather than being larger in *P. nephropsis* and smaller in *P. atlantica*) and differently shaped. It differs further from *P. nephropsis* in having no tubercles on its pleonal appendages. The female of *Pseudione tanimbarensis* differs further from that of *P. atlantica* in having narrower lateral projections on its barbula, relatively shorter first oostegite and a less prominent basal carina on its seventh pereopod. The male of *Pseudione tanimbarensis* differs from that of *P. nephropsis* by lacking pleopods, and from that of *P. atlantica* by having its head completely separated from the pereon.

DISCUSSION. — This discovery of infestation of *Nephropsis sulcata* Macpherson brings the number of nephropid species known to harbor bopyrid parasites to six. *Pseudione nephropsis*, discussed above, infests *Nephrops japonicus* Tapparone-Canefri in Japan and *Metanephrops velutinus* Chan & Yu north of Tanimbar Islands, Indonesia; *P. atlantica* infests *Nephropsis atlantica* (Norman) near the Congo. Two other species of nephropids have been reported as bopyrid hosts, but their parasites were never named. DE MAN (1916) cited infestation of *Nephrops andamanicus* Wood Mason near Tuvalu in the South Pacific, and BOUVIER (1925) recorded “un Bopyrien” from *Nephropsis aculeata* Smith, a junior synonym of *N. rosea* Bate (L. B. HOLTHUIS, personal communication), near Grenada, in the Caribbean.

*Pseudione elongata elongata* (Hansen, 1897)

Fig. 7

?*Bopyrus* - BATE, 1888: 804 [Off Sibago, Philippines; infesting *Nematocarcinus undulatipes* Bate].

“Bopyrid” - FAXON, 1895: 159.

*Cryptione elongata* Hansen, 1897: 112-115, pl. 3, figs 5-5a, pl. 4, figs 1-1g [Galapagos Islands at 1618 m; infesting *Nematocarcinus agassizi* Faxon]. — RICHARDSON, 1889a: 869; 1899b: 338; 1904: 87; 1905: 520-522; figs 567-568; 1910: 36. — BONNIER, 1900: 48, 61, 160, 221, 285-287, 332, fig. 51. — RICHARD, 1900: 71. — STEBBING, 1914: 48. — VAN NAME, 1924: 185. — DANFORTH, 1963: 44; 1970: 462. — SCHULTZ, 1969: 320-321, fig. 511. — RIOJA, 1971: 511. — BRUSCA, 1987: 273, table 1.

*Pseudione elongata* - NIERSTRASZ & BRENDER à BRANDIS, 1923: 72, 78; 1931: 163. — CHOPRA, 1930: 139. — SHIINO, 1951: 32; 1952: 42. — KENSLEY, 1968: 190-191. — PAGE, 1985: 192.

*Pseudione elongata* var. *normalis* NIERSTRASZ & BRENDER à BRANDIS, 1931: 163-164, fig. 29 [South of Zamboanga, Philippines; infesting *Nematocarcinus* sp.]. — SHIINO, 1951: 32. — KENSLEY, 1968: 190-191. — PAGE, 1985: 195.

MATERIAL EXAMINED. — **Chesterfield Islands**. MUSORSTOM 5: st. CC 384, 19°42.40'S, 158°50.80'E, 772-776 m, 21.10.1986. Infesting *Nematocarcinus* sp.: 13 ♀, 16 ♂ (of which 2 immature), 1 cryptoniscan larva (MNHN-Ep 890).

DESCRIPTIVE NOTES. — Female body outline and proportions (Fig. 7A-B) as in type, as well as configuration of barbula (Fig. 7E), shape of maxilliped (Fig. 7F), first oostegite (Fig. 7I), posterior dorsal margins of pereomeres, proportions of articles of pereopods (Fig. 7K-L) and orientation of pleonal appendages. Female's frontal lamina separated as in *normalis* form, maxilliped palp (Fig. 7G) shorter, internal ridge of oostegite 1 (Fig. 7J) more elaborate than in type. One of other females with maxilliped (not drawn) lacking projection next to palp as in female drawn, so more like that of type. One female with knobs on pleopods 1 and 2 (not drawn); two other females (Fig. 7M-N) with uropods more like those of holotype than one drawn in detail.

Male (Fig. 7O-P) proportionately slightly broader than type male and with head separated as in *normalis* form; matching type-male in general body shape and head shape, size and structure of antennae (Fig. 7Q-R), pereopods (Fig. 7S-T), midventral tubercles (Fig. 7P) and pleonal appendages (Fig. 7P, U). Immature male (Fig. 7V-W) with pereopods proportionately longer, midventral tubercles absent and pleopods greatly reduced.

One of the hosts (Fig. 7X) had an anterior opening into the swelling of the branchiostegite revealing the female inside. In the lot examined, there were 15 infested specimens of *Nematocarcinus* sp. Of these, 8 were infested dextrally and 7 sinistrally. Two of the parasites were missing; of the 13 females present, each was accompanied by at least 1 male, 2 mature males were with 1 female, 1 mature and 2 immature males were with another female, and 1 mature male and a cryptoniscan larva were with yet another female.

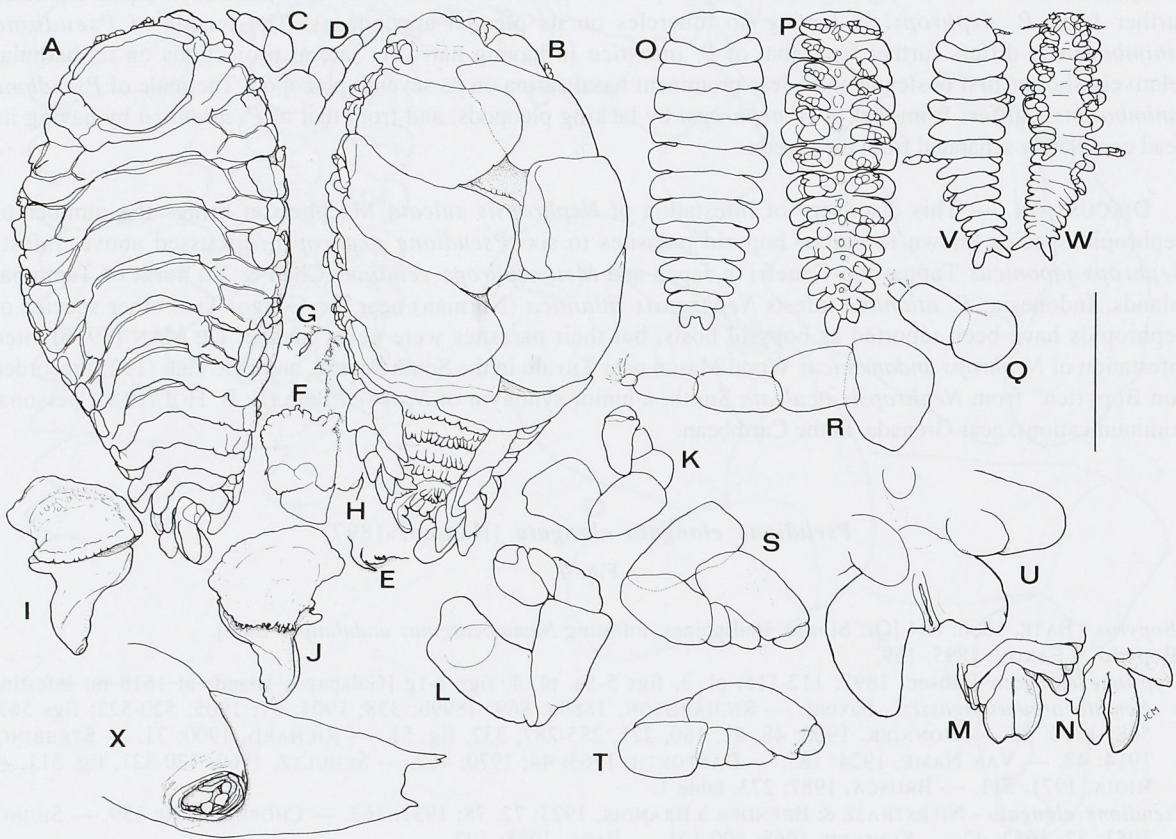


FIG. 7. — *Pseudione elongata elongata* (Hansen, 1897), A-L, reference female; M, second female; N, third female; O-U, reference male; V-W, immature male; X, fourth female on host *Nematocarcinus* sp. A, dorsal view. B, ventral view. C, right antenna 1. D, left antenna 2. E, right side of barbula. F, right maxilliped. G, palp of same. H, pleon of same. I, right oostegite 1, external view. J, same, internal view. K, right pereopod 1. L, right pereopod 7. M, end of pleon in dorsal view. N, same. O, dorsal view. P, ventral view. Q, right antenna 1. R, right antenna 2. S, left pereopod 1. T, left pereopod 7. U, end of pleon, ventral view. V, same, dorsal view. W, ventral view. X, parasite in host's branchial chamber.

Scale: 0.2 mm for Q-R; 0.4 mm for S-U; 1.2 mm for C-D, K-L, V-W; 2.5 mm for G-H, O-P; 5.0 mm for A-B, E-F, I-J, M-N; 10.0 mm for X.

SYSTEMATIC REMARKS. — The specimens mentioned by BATE (1888) seem never to have been identified, though their locality and host make it likely that they represented *P. elongata*. FAXON (1895) cited the specimens subsequently described as the types of *P. elongata*. HANSEN (1897) provided a very detailed description of this species, based on a single pair. He placed it in the new genus *Cryptione*, for which he gave no diagnosis, stating only that "...it is necessary to institute ... new genera. — a result with which I am rather dissatisfied, not being sure that they will all prove valid." NIERSTRASZ & BRENDER à BRANDIS (1923) synonymized *Cryptione* with *Pseudione*, with which action I agree, though most subsequent authors disregarded this generic transfer. NIERSTRASZ & BRENDER à BRANDIS (1931) described the new variety, *Pseudione elongata* var. *normalis*, which they considered to differ from the typical form mainly because its male had the head separated from its first pereomere, as is typical in the genus *Pseudione*; I am disregarding that varietal name, while noting that all of the males examined here also show such a separation. RIOJA (1971), in a catalog of species from Latin America, said that *P. elongata* was known from Acapulco, on Mexico's Pacific coast, but he cited no source for that record, nor do I know of any. BRUSCA (1987), in a list of the fauna of the Galapagos Islands, called it endemic to that

archipelago, thus overlooking the record of NIERSTRASZ & BRENDER à BRANDIS (1931) from the Philippines. And in an account of the Bopyridae of the eastern Pacific (MARKHAM, 1992), I accidentally omitted it despite its occurrence in the Galapagos. KENSLEY (1968) described the new subspecies *Pseudione elongata africana*, a parasite of *Nematocarcinus longirostris* Bate off southwestern South Africa. Thus this account deals with the typical subspecies, though this is the first time it has been so cited.

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#### LITERATURE CITED

- ADKISON, D. L., 1984. — Two new species of *Gigantione* Kossmann (Isopoda: Epicaridea: Bopyridae) from the western North Atlantic. *Proceedings of the Biological Society of Washington*, **97**: 761-772.
- BATE, C. S., 1888. — Report on the Crustacea Macrura dredged by H. M. S. Challenger during the years 1873-1876. *Report of the scientific Results of the Voyage of H.M.S. Challenger 1873-76*, Zoology, **24**: i-xc, 1-918, pls 1-150.
- BONNIER, J., 1900. — Contribution à l'étude des épicarides. Les Bopyridae. *Travaux de la Station biologique de Wimereux*, **8**: 1-476.
- BOURDON, R., 1968. — Les Bopyridae des mers européennes. *Mémoires du Muséum national d'Histoire naturelle*, nouvelle série (A), **50** (2): 77-424.
- BOURDON, R., 1971. — Épicarides nouveaux pour la côte occidentale d'Afrique équatoriale. *Bulletin de l'Institut français d'Afrique Noire*, (A), **33**: 371-391.
- BOUVIER, E. L., 1925. — Les macroures marcheurs. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877-78), in the Caribbean Sea (1878-79), and along the Atlantic coast of the United States (1880), by the U. S. Coast Survey Steamer "Blake.", Lieut.-Com. C.D. Sigsbee, U.S.N., and Commander J.R. Bartlett, U.S.N., commanding. *Memoirs of the Museum of Comparative Zoology, Harvard College*, **47** (5): 399-472, 11 pls.
- BRUSCA, R. C., 1987. — Biogeographic relationships of Galapagos marine isopod crustaceans. *Bulletin of Marine Science*, **41** (2): 268-281.
- CHOPRA, B., 1930. — Further notes on bopyrid isopods parasitic on Indian Decapoda Macrura. *Records of the Indian Museum*, **32** (2): 113-147, pls 4-6.
- DANFORTH, C. G., 1963. — First record of a Hawaiian shore bopyrid (Isopoda: Bopyridae). *Journal of Parasitology*, **49** (5): 847-850.
- DANFORTH, C. G., 1970. — Epicaridea (Isopoda) of Hawaii. *Bulletin of the Southern California Academy of Sciences*, **69**: 27-31.
- DE MAN, J. G., 1916. — The Decapoda of the Siboga Expedition. Part III. Families Eryonidae, Palinuridae, Scyllaridae and Nephopsidae. *Siboga-Expeditie Monograph*, 39a<sup>2</sup>: 1-122, 4 pls.
- FAXON, W., 1895. — Reports on an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos, in charge of Alexander Agassiz, by the U. S. Fish Commission Steamer "Albatross", during 1891, Lieut.-Commander Z.L. Tanner, U.S.N., commanding. XV. The stalk-eyed Crustacea. *Memoirs of the Museum of Comparative Zoology, Harvard College*, **18**: 1-292, pl. A-K + 1-56, 1 map.

- HANSEN, H. J., 1897. — Reports on the dredging operations off the west coast of Central America to the Galapagos Islands, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. Fish Commission Steamer *Albatross* during 1891, Lieut.- Commander Z. L. Tanner, U. S. Navy, commanding. XXII. The Isopoda. *Bulletin of the Museum of Comparative Zoology, Harvard College*, **31** (5): 96-129. 6 pls.
- HØEG, J. T. & RYBAKOV, A. V., 1992. — Revision of the Rhizocephala Akentrogenida (Cirripedia), with a list of all the species and a key to the identification of families. *Journal of Crustacean Biology*, **12**: 600-609.
- HOŮŠA, V., 1963. — Parasites of Tithonian decapod crustaceans (Stramberk, Moravia). *Ústřed. Ústavu Geologie, Sborník* (Odd. Palent.), **28**: 101-114, 2 pls.
- KENSLEY, B., 1968. — *Pseudione elongata africana*, a new subspecies of bopyrid isopod from the west coast of the Cape Peninsula, South Africa. *Crustaceana*, **15**: 188-192.
- MARKHAM, J. C., 1992. — The Isopoda Bopyridae of the eastern Pacific – Missing or just hiding? *Proceedings of the San Diego Society of Natural History*, **17**: 1-4.
- MARKHAM, J. C., 1994. — Crustacea Isopoda: Bopyridae in the MUSORSTOM collections from the tropical Indo-Pacific I. Subfamilies Pseudioninae (in part), Argeiinae, Orbioninae, Athelginae and Entophilinae. In: A. CROSNIER (ed.), Résultats des Campagnes MUSORSTOM, Volume 12. *Mémoires du Muséum national d'Histoire naturelle*, **161**: 225-253.
- McLAY, C.L., 1993. — Crustacea Decapoda: The sponge crabs (Dromiidae) of New Caledonia and the Philippines with a review of the genera. In: A. CROSNIER (ed.), Résultats des Campagnes MUSORSTOM, Volume 10. *Mémoires du Muséum national d'Histoire naturelle*, **156**: 111-251.
- NIERSTRASZ H. F., & G. A. BRENDER à BRANDIS, 1923. — Die Isopoden der Siboga-Expedition. II. Isopoda Genuina. I. Epicaridea. *Siboga-Expeditie Monograph*, 32b: 57-121, pls 4-9.
- NIERSTRASZ H. F., & G. A. BRENDER à BRANDIS, 1931. — Papers from Dr. Th. Mortensen's Pacific Expedition 1914-16. LVII. Epicaridea II. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i København*, **91**: 147-226, pl. 1.
- PAGE, R. D. M., 1985. — Review of the New Zealand Bopyridae (Crustacea: Isopoda: Epicaridea). *New Zealand Journal of Zoology*, **12**: 185-212.
- RICHARD, J., 1900. — Essai sur les Crustacés considérés dans leurs rapports avec l'hygiène, la médecine et la parasitologie. Lille: Le Bigot Frères. 85 pp.
- RICHARDSON, H., 1899a. — Key to the isopods of the Pacific coast of North America, with descriptions of twenty-two new species. *Proceedings of the United States National Museum*, **21**: 815-869.
- RICHARDSON, H., 1899b. — Key to the isopods of the Pacific coast of North America, with descriptions of twenty-two new species. *Annals and Magazine of Natural History*, (7) **4**: 157-187, 260-277, 321-338.
- RICHARDSON, H., 1904. — Contributions to the Natural History of the Isopoda. *Proceedings of the United States National Museum*, **27**: 1-89.
- RICHARDSON, H., 1905. — A monograph on the isopods of North America. *Bulletin of the United States National Museum*, **54**: i-lij + 1-727.
- RICHARDSON, H., 1910. — Marine isopods collected in the Philippines by the U. S. Fisheries steamer *Albatross* in 1907-8. *Bureau of Fisheries Documents*, (736): 1-44.
- RIOJA, E., 1971. — Clase IV. Los crustáceos (Crustacea). Pp. 470-554. In: CENDERO, L., editor: Zoología Hispanoamericana - Invertebrados. México, D. F.: Editorial Porrúa, S. A.
- ŞADOĞLU, P., 1969. — Variations in eye degeneration and pigment in some parasitic isopods during their life cycle. *Pubblazioni della Stazione Zoologica di Napoli*, **37**: 173-209.
- SCHULTZ, G. A., 1969. — How to know the marine isopod crustaceans. Dubuque, Iowa: Wm. C. Brown Company. vii + 359 pp.
- SHIINO, S. M., 1951. — Some bopyrid parasites found on the decapod crustaceans from the waters along Mie Prefecture. *Report of the Faculty of Fisheries, Prefectural University of Mie*, **1**: 26-40.
- SHIINO, S. M., 1952. — Phylogeny of the family Bopyridae. *Annual Report of the Prefectural University of Mie* (Section 2, Natural Science), **1**: 33-56. [In Japanese with English Summary].

- SHIINO, S. M., 1972. — [The Epicaridea (list of species) from Japan]. *Kansai Shizenkagaku*, **24**: 7-10. [In Japanese].
- STEBBING, T. R. R., 1914. — South African Crustacea. (Part VII of S. A. Crustacea, for the Marine Investigations in South Africa). *Annals of the South African Museum*, **15**: 1-55, 12 pls.
- VAN NAME, W. G., 1924. — Isopods from the Williams Galapagos Expedition. *Zoologica*, **5** (18): 181-210, pls 8-19.

## Crustacea Decapoda: Revision of *Pasiphaea sivado* (Risso, 1816) and related species, with descriptions of one new genus and five new species (Pasiphaeidae)

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### ABSTRACT

The study of many samples collected by Muscovyite cruises, deposited in the Muséum national d'Histoire naturelle, as well as the reexamination of types and published specimens reveal that *Pasiphaea sivado* (Risso, 1816) and the related species, *P. propinqua* de Man, 1916, *P. japonica* Onishi, 1976, *P. maritima* Iwazaki, 1959 and *P. asiatica* Burakovsky, 1993, belong to one group. All are characterized by a terminal spine on the sixth abdominal somite and a branching reduction. However, *P. asiatica* is strongly devoid of arthrobranchiae, has unpaired first pereopods and three pairs of spines on the posterior margin of telson and has to be separated; a new genus *Altopasiphaea* is proposed for it. The other species mentioned above, except *P. maritima*, bear three arthrobranchiae from the fourth to sixth thoracic somites. *P. maritima* and five new species found in the Muscovyite material and belonging to this group have four pleurobranchiae from the fourth to seventh thoracic somites. On the other hand, *P. propinqua*, *P. japonica* and *P. sivado* have one pair, but rudimentary, pleurobranchia on the eighth somite. A key for all these species is provided.

### RÉSUMÉ

Crustacés Décapodes: Révision de *Pasiphaea sivado* (Risso, 1816) et des espèces qui lui sont proches. Description d'un genre et cinq espèces nouvelles (Pasiphaeidae).

L'étude de nombreuses récoltes, rassemblées lors des campagnes Muscovyite et déposées au Muséum national d'Histoire naturelle et la réexamen de types et de spécimens publiés montrent que *Pasiphaea sivado* (Risso, 1816) et les espèces proches, *P. propinqua* de Man, 1916, *P. japonica* Onishi, 1976, *P. maritima* Iwazaki, 1959 et *P. asiatica* Burakovsky, 1993, appartiennent à un même groupe qui se caractérise par la présence d'une épine terminale sur le sixième segment abdominal et une réduction des branchies. Toutefois, *P. asiatica* est totalement dépourvue d'arthrobranchies et si des premiers péréopodes ont une épine et trois paires d'épines sur le bord postérieur du telson, il convient de la séparer; pour elle, un nouveau genre *Altopasiphaea* est proposé. Les autres espèces mentionnées ci-dessus, à l'exception de *P. maritima*, possèdent trois arthrobranchies réparties sur les segments thoraciques 4-6. *P. maritima* et cinq espèces nouvelles, trouvées dans le matériel Muscovyite et appartenant au groupe considéré ici, possèdent quatre pleurobranchies réparties sur les segments thoraciques 4-7. Enfin, *P. propinqua*, *P. japonica* et *P. sivado* ont une pleurobranchie rudimentaire, mais rudimentaire, sur le segment thoracique 8. Une clé d'identification pour toutes ces espèces est proposée.

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