

Crustacea Isopoda : New records of Bopyridae from New Caledonian waters

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ABSTRACT

In the first account of bopyrid isopods from New Caledonia, 7 species, all from new host species in the caridean shrimp families Palaemonidae and Alpheidae, are recorded. Previously described species are *Schizobopyrina andamanica* (Chopra, 1932) and *Filophryxus dorsalis* Bruce, 1972. Herein

described are *Bopyrinina paucimaculata* sp. nov., *Eriphrixus obesus* gen. nov., sp. nov. *Metaphrixus rastriferis* sp. nov. and *Mediophrixus pinuum* gen. nov., sp. nov. A final species was unsuitable for identification or description.

RÉSUMÉ

Signalisations nouvelles de Bopyridae (Crustacea Isopoda) dans les eaux néo-calédoniennes.

Dans cette première publication sur des Isopodes bopyriens récoltés en Nouvelle-Calédonie, sept espèces, toutes fixées sur des nouveaux hôtes, des crevettes appartenant aux familles des Palaemonidae et des Alpheidae, ont été trouvées. Parmi

ces sept espèces, deux, *Schizobopyrina andamanica* (Chopra, 1932) et *Filophryxus dorsalis* Bruce, 1972, étaient déjà connues ; quatre autres, incluant deux nouveaux genres, sont décrites ici : *Bopyrinina paucimaculata* sp. nov., *Eriphrixus obesus* gen. nov., sp. nov., *Metaphrixus rastriferis* sp. nov. et *Mediophrixus pinuum* gen. nov., sp. nov. Une dernière espèce n'a pu être ni identifiée, ni décrite.

While examining material in the collection of the Muséum national d'Histoire naturelle in Paris, which had come from near New Caledonia, Dr A. J. BRUCE discovered several pontoniine shrimps infested by bopyrid isopods, which he submitted for identification. From another collection he sent a parasite infesting an alpheid shrimp. All the parasites proved to be new records for their localities and hosts, while at least four were undescribed species as well.

FAMILY BOPYRIDAE Rafinesque

SUBFAMILY BOPYRINAE Rafinesque

Bopyrinina paucimaculata sp. nov.

Figs 1-3

Balss, MENU and TIRARD colls, host det. A. J. BRUCE : 1 ♀, holotype, 1 ♂, allotype (MNHN-EP 450).

MATERIAL EXAMINED. — New Caledonia. SMIB 2 : stn DW 6, 22°56' S, 167°16' E, 442-462 m, 17 September 1986. Infesting *Periclimenes hertwigi*

DESCRIPTION. — Holotype female (Figs 1, 2). Length 4.00 mm, maximal width 2.81 mm, head

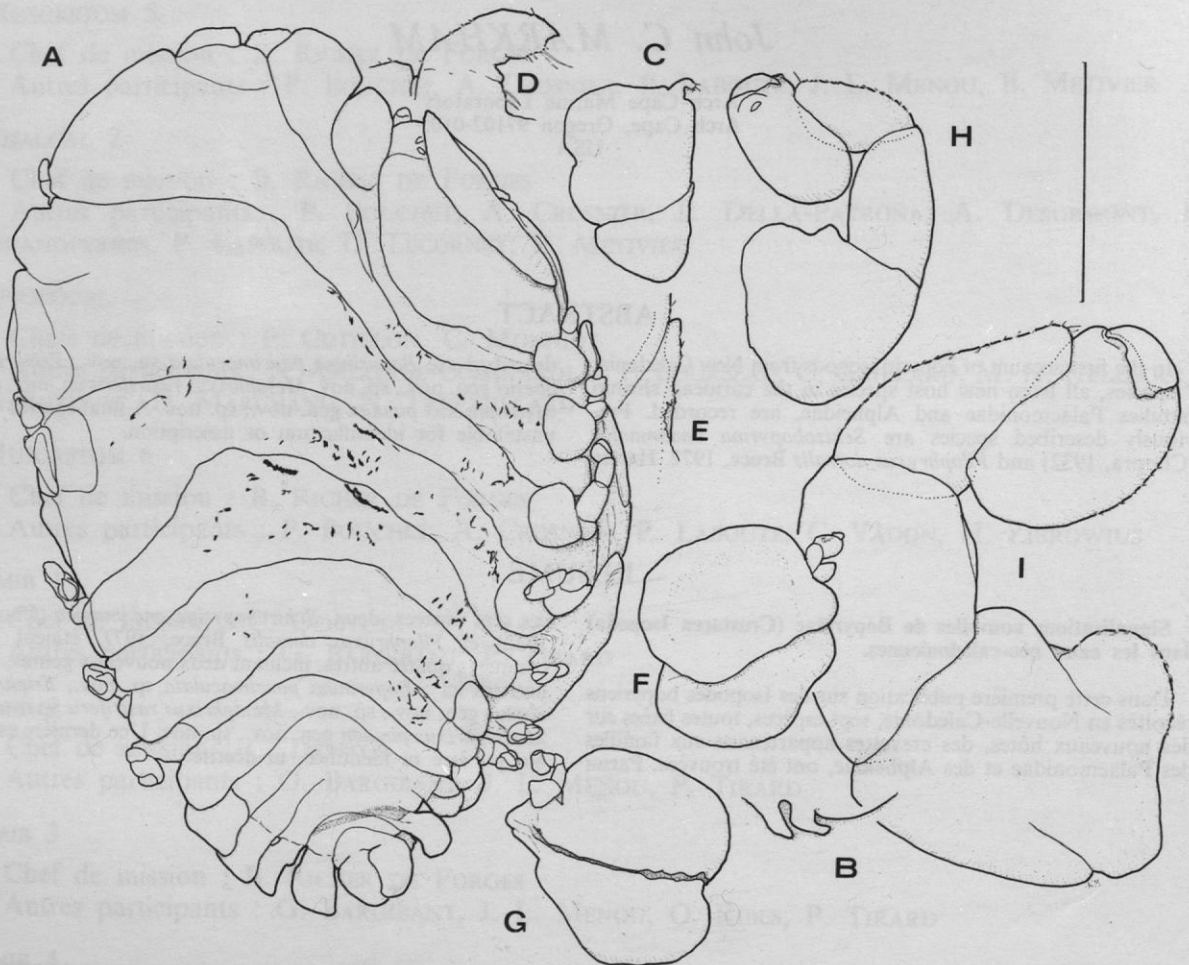


FIG. 1. — *Bopyrinina paucimaculata* sp. nov., holotype female. A. Dorsal view. B. Right side of barbula. C. Right maxilliped. D. Palp of same. E. Plectron of same. F. Right oostegite 1, internal view. G. Same, external view. H. Right pereopod 1. I. Left pereopod 1. Scale : 1.0 mm for C ; 1.14 mm for A, B, F, G ; 0.23 mm for D, E, H, I.

length 0.51 mm, head width 1.11 mm, pleon length 0.72 mm. Distortion 62° sinistrally. All body regions distinct. Scattered irregular pink pigment spots on dorsal surface of pereon (figs 1A, 2).

Head subovate, bordered anteriorly by prominent frontal lamina sharply reflexed over dorsal surface. No eyes. Barbula (fig. 1B) with pair of stubby falcate projections on each side, no medial ornamentation. Maxilliped (fig. 1C) subtriangular, truncate anteriorly, with anterior segment about twice size of posterior; nonarticulating palp (fig. 1D) arising from anterior margin laterally to corner, sharply curved toward midline, sparsely setose terminally; long slender plectron (fig. 1E) extending anteriorly but not outward.

All pereomeres distinct, third one broadest. Coxal plates prominent along short sides of all pereomeres, indistinct or absent opposite. Broad oostegites completely surrounding and enclosing all but central region of brood pouch (fig. 2). First oostegite (fig. 1F, G) subcircular, anterior segment longer than posterior one; internal ridge completely unornamented, posterior border nearly truncate and not at all produced into point. Pereopods (fig. 1H, I) extending slightly from body margins, all of approximately same proportions but more than doubling in size posteriorly; all bases produced into slight to large carinae; all meri and carpi fused, each merocarpus setose along anterior margin.

Pleon of 6 pleomeres, their dorsal separation faint on longer side and obscure opposite. (Type with probably abnormal dorsal crease across pleomeres 4 and 5.) All pleomeres deeply separated laterally and produced into extended foliate lateral plates, many overlapping those behind them. Pleopods (fig. 2) 4 pairs of raised uniramous flaps, those on long side much more regularly arranged. Uropods like lateral plates.

Allotype male (Fig. 3). Length 1.61 mm; maximal width 0.55 mm; head length 0.25 mm; head width 0.35 mm; pleonal length 0.44 mm. All body regions distinct. Sides of pereon nearly parallel with slight taper each way; head and pleon abruptly narrower than pereon. Scattered dorsal pigment spots on some pereomeres and pleon (fig. 3A, B).

Head prominently extended, suboval, nearly straight across front. Eyes as irregularly shaped large dark spots near posterolateral corners.

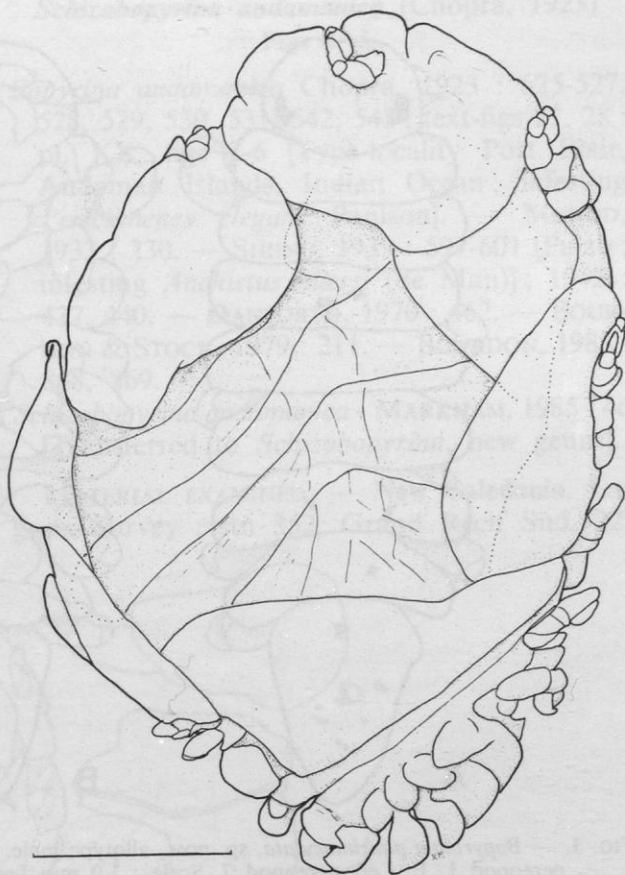


FIG. 2. — *Bopyrinina paucimaculata* sp. nov., holotype female, ventral view. Scale: 1.0 mm.

Antennae (fig. 3C) of 3 and 4 articles, respectively, each terminally setose.

Pereomeres distinctly separated by lateral incision, their sides nearly straight, first one concave anteriorly. Pereopods (figs 3D, E) posteriorly slightly larger and their dactyli smaller; all articles distinguishable; minute scales covering region of each propodus opposing tip of dactylus.

Pleon subtriangular, broadly pointed posteriorly. No indication of segmentation or appendages. Posterior margin with pair of ventrally visible cuticular extensions, possibly only artifacts of preservation.

ETYMOLOGY. — The name *paucimaculata* (= "sparsely spotted") refers to the dorsal pigmentation of both sexes, which is less abundant than that of the type-species, *Bopyrinina dorsimaculata*.

DISCUSSION. — This is only the second known species of *Bopyrinina* Shiino. The type-species, *B.*

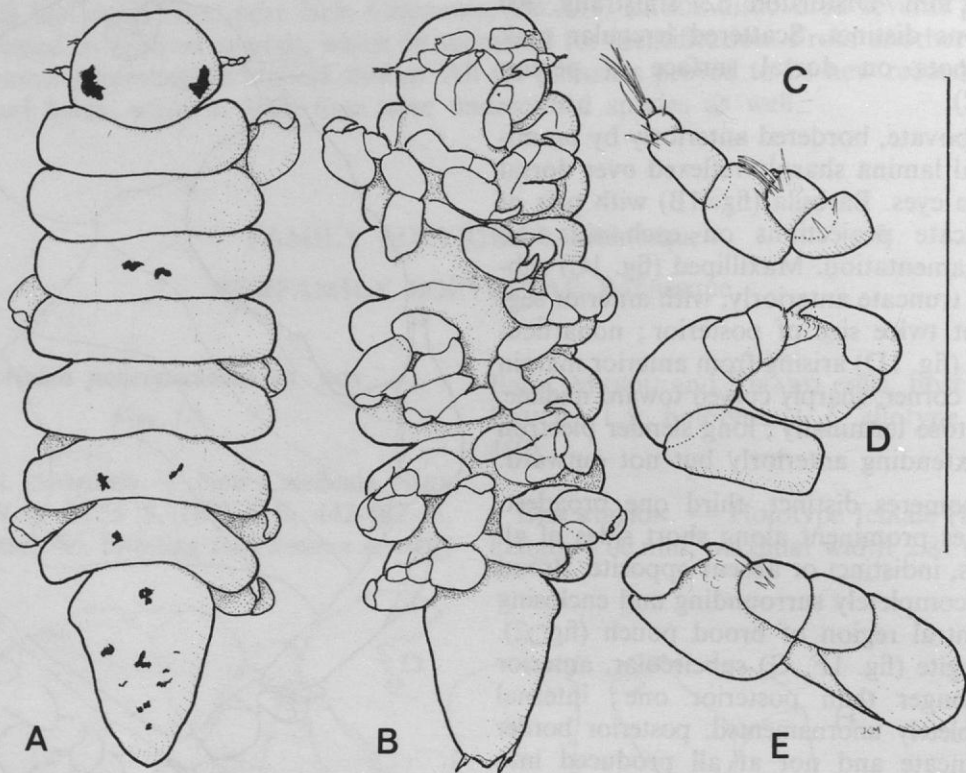


FIG. 3. — *Bopyrinina paucimaculata*, sp. nov., allotype male. A. Dorsal view. B. Ventral view. C. Right antennae. D. Left pereopod 1. E. Left pereopod 7. Scale : 1.0 mm for A, B; 0.32 mm for C-E.

dorsimaculata Shiino, 1933, is a parasite of *Periclimenes* sp. at Seto, Japan (SHIINO, 1933). Characters of the new species confirm its placement in *Bopyrinina*, but the species differ enough to necessitate a redefinition of that genus. (Because neither species is known from more than its type pair, it is not possible to assess intraspecific variation.) Contrary to the original generic diagnosis, *B. paucimaculata* shows some dorsal separation of pleomeres and 4 pairs of pleopods; what SHIINO (1933) interpreted as plates on the last pleomere, I consider to be uropods, which are thus present in both species. Characters shared by both species which I consider important at the generic level, but which SHIINO did not mention in his diagnosis, are the shape of the maxilliped and the placement of its palp, the complete lack of a posterolateral point on the first oostegite, the structure of the pleopods and the prominence of the lateral plates.

Amended diagnosis of *Bopyrinina* Shiino, 1933 :

Female : Body moderately distorted, either dextrally or sinistrally; variously pigmented, at least dorsally. Head separate, extending beyond pereonal margin. bearing long broad frontal lamina; no eyes; barbula of 2 blunt falcate projections on each side; maxilliped with nonarticulating falcate palp placed on anterior margin away from corner and slender plectron pressed against anterior segment. Oostegites completely surrounding margins of brood pouch but not enclosing it ventrally; first oostegite not at all produced into posterolateral point; basis of each pereopod slightly to greatly carinate. Pleon of 6 pleomeres, first 5 produced into prominent separated flaplike lateral plates on both sides and sixth pleomere with uniramous uropods of same structure as lateral plates; 3 or 4 pairs of extended uniramous flaplike pleopods.

Male : Body almost 3 times as long as broad; sides of pereon nearly parallel, both head and pleon abruptly narrower and distinct from pereon. Head suboval, nearly straight anteriorly, with

eyes near posterolateral corners. Pereomeres well-separated laterally. Pleon subtriangular, completely fused and lacking appendages. Hosts in palaemonid genus *Periclimenes*.

Bopyrina paucimaculata differs from *B. dorsimaculata* in that the female of the latter has pigment both dorsally and ventrally, its frontal lamina is not reflexed, there are coxal plates on both sides of the pereomeres, its oostegites enclose its brood pouch much less, the meri and carpi of its pereopods are distinct, its pleomeres are fused clear across dorsally, most of its lateral plates do not touch each other, and it has only 3 pairs of pleopods. The male of *B. dorsimaculata* differs from that of *B. paucimaculata* in having much smaller eyes and the first pereomere anteriorly convex rather than concave.

Schizobopyrina andamanica (Chopra, 1923)

Figs 4, 5

Bopyrina andamanica Chopra, 1923 : 525-527, 528, 529, 530, 531, 542, 543 ; text-figs 27, 28 ; pl. XX, figs 1-6 [Type-locality Port Blair, Andaman Islands, Indian Ocean ; infesting *Periclimenes elegans* Paulson]. — MONOD, 1933 : 230. — SHIINO, 1939 : 597-601 [Palao ; infesting *Anchistus miersi* (de Man)] ; 1942 : 437, 440. — DANFORTH, 1970 : 462. — BOURDON & STOCK, 1979 : 211. — BOURDON, 1983 : 868, 869.

Schizobopyrina andamanica - MARKHAM, 1985 : 46 [Transferred to *Schizobopyrina*, new genus].

MATERIAL EXAMINED. — New Caledonia. Lagoon Survey : stn 352, Grand Récif Sud, 22°

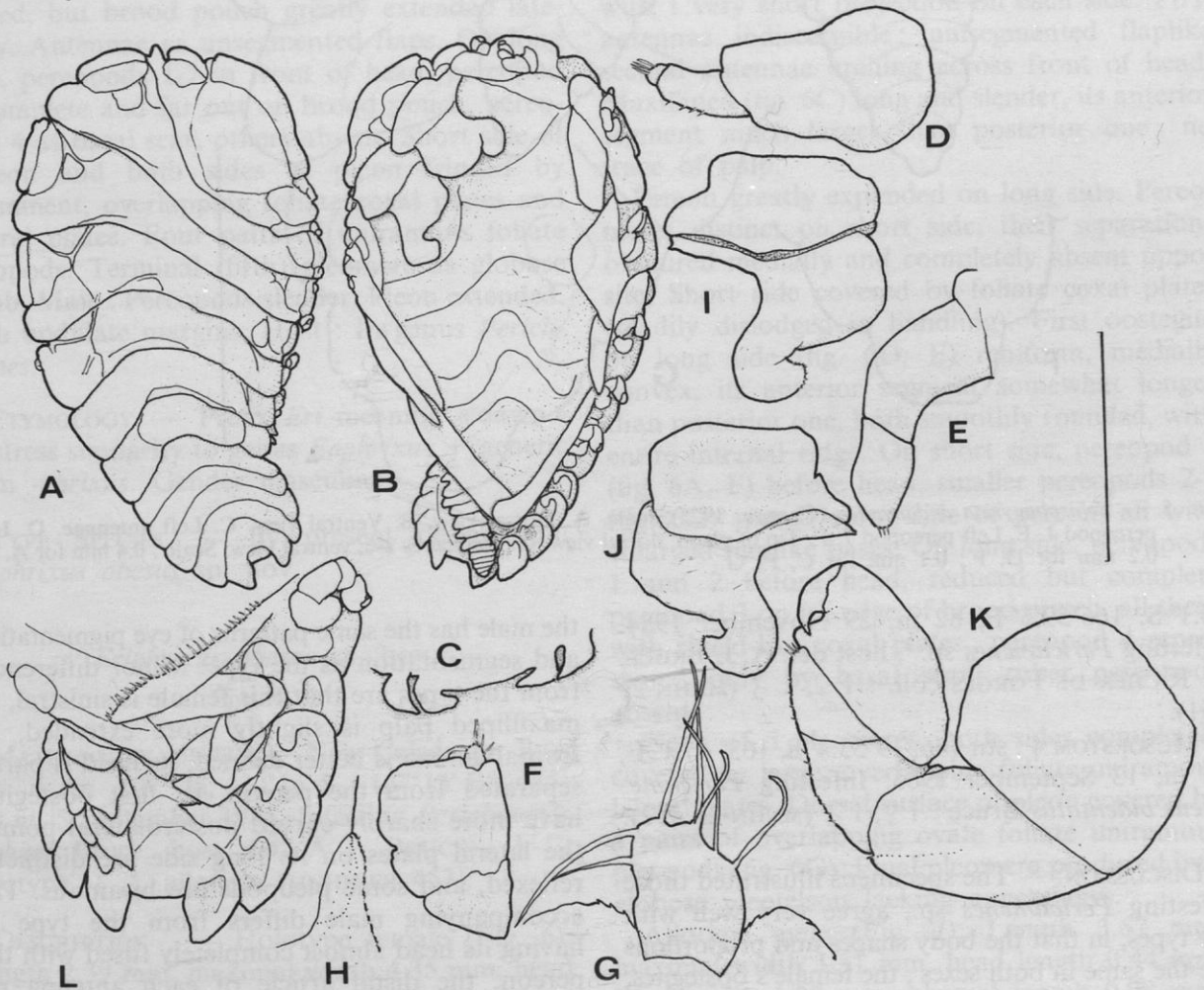


FIG. 4. — *Schizobopyrina andamanica* (Chopra, 1923), female. A. Dorsal view. B. Ventral view. C. Barbula. D. Right antenna 1. E. Right antenna 2. F. Right maxilliped. G. Palp of same. H. Plectron of same. I. Right oostegite 1, external view. J. Same, internal view. K. Right pereopod 1. L. Pleon, ventral view. Scale : 2.0 mm for A, B ; 1.0 mm for C, F, I, J, L ; 0.18 mm for D, E, G, H, K.

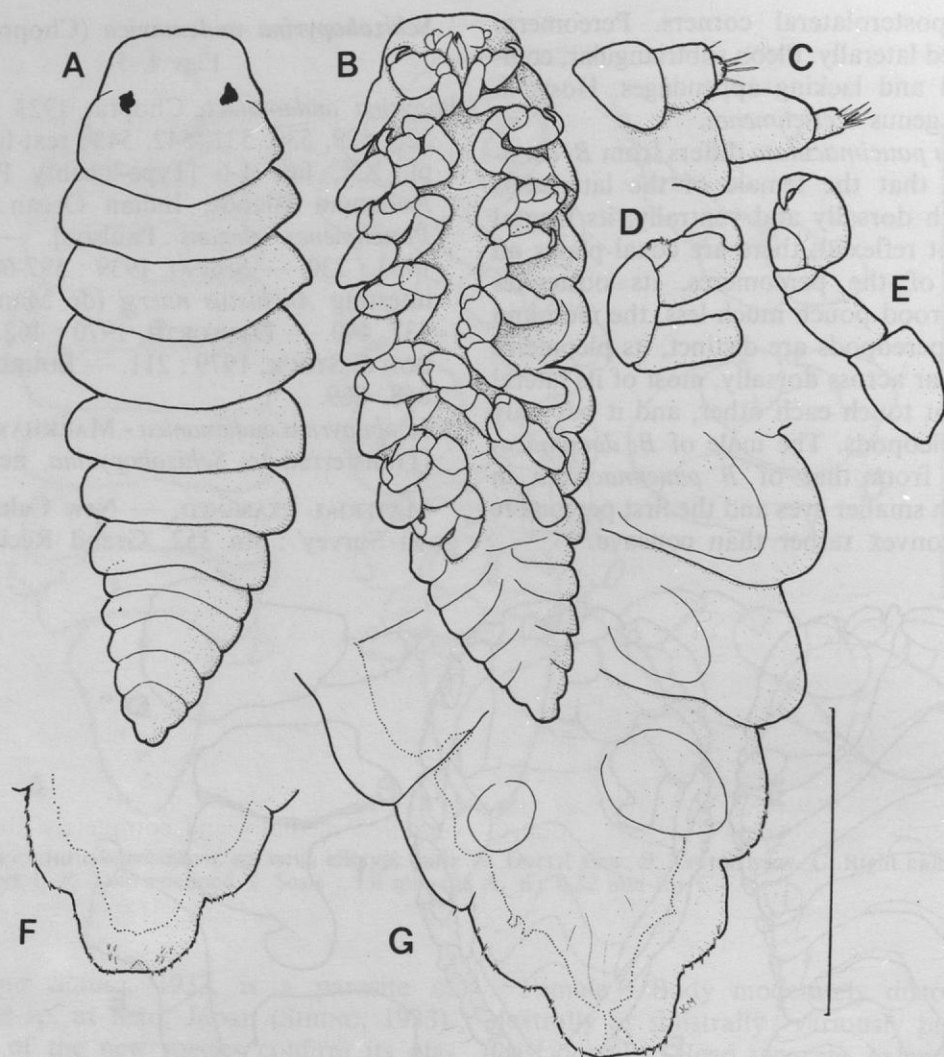


FIG. 5. — *Schizobopyrina andamanica* (Chopra, 1923), male. A. Dorsal view. B. Ventral view. C. Left antennae. D. Left pereopod 7. E. Left pereopod 1. F. Tip of pleon, dorsal view. G. Pleomeres 2-6, ventral view. Scale: 0.4 mm for A, B; 0.2 mm for D, F; 0.1 mm for C, E, G.

35.1' S, 166°59.5' E, 82 m, 29 November 1984. Infesting *Periclimenes* sp.¹, host det. A. J. BRUCE. B. RICHER DE FORGES coll.: 1 ♀, 1 ♂ (MNHN-EP 451).

MUSORSTOM 4: stn 146, 19°53.4' S, 163° 47.1' E, 33 m, 13 September 1985. Infesting *Periclimenaeus bidentatus* Bruce: 1 ♀, 1 ♂ (MNHN-EP 452).

DISCUSSION. — The specimens illustrated those infesting *Periclimenes* sp., agree very well with the types, in that the body shapes and proportions are the same in both sexes; the female's oostegites, maxilliped, barbula and distinctive posterior pleonal notch are diagnostic for the species; and

the male has the same patterns of eye pigmentation and segmentation as the type. Minor differences from the types are that this female is sinistral, its maxilliped palp is slightly more extended, its frontal lamina is better defined, its head is partly separated from the pereon, its first oostegites have more sharply curved posterolateral points, the lateral plates on its long side are distinctly reflexed, and some pleopods are biramous. The accompanying male differs from the type in having its head almost completely fused with the pereon, the distal article of each antenna reduced, and pleopods as indistinct sessile discoid scars (possibly also present but overlooked in the

1. New species being described by A. J. BRUCE.

type). The other female examined, also sinistral, has the head sharply separated from the pereon with large dark eyes near the anterolateral corners; a less strongly recurved oostegite 1; lateral plates 1-4 on the long side of the pleon with reflexed anterior margins, fifth lateral plate flat; and 4 pairs of regularly aligned, sharply pointed, uniramous pleopods. The male with it has scattered pigmentation dorsally and its head

demarcated from pereon by a convex suture; its pleopods are evidently completely absent, and the final pleomere is broader and shorter.

This discovery of *Schizobopyrina andamanica* considerably extends its range, from the eastern Indian Ocean and Japan, to New Caledonia. Its previous and present hosts, however, are all in the palaemonid subfamily Pontoniinae, and all but the *Periclimenaeus* in the genus *Periclimenes*.

SUBFAMILY HEMIARTHRIINAE Markham

Eriphrixus gen. nov.

DIAGNOSIS. — Body axis only moderately distorted, but brood pouch greatly extended laterally. Antennae as unsegmented flaps. On long side, pereopods 1-2 in front of head, pereopod 3 complete and far out on brood pouch, pereopod 4 as basal scar, others absent. Short side of pereon and both sides of pleon fringed by prominent, overlapping foliate coxal plates and lateral plates. Four pairs of uniramous foliate pleopods. Terminal (fifth) pleomere as globose knob. Male: Pereopods slender. Pleon extended, with undulate margins. Host: In genus *Periclimenes*.

ETYMOLOGY. — Prefix *Eri* meaning «dawn» to stress similarity to genus *Eophrixus* + generic stem *-phrixus*. Gender masculine.

TYPE SPECIES. — By present designation, *Eriphrixus obesus* sp. nov.

Eriphrixus obesus sp. nov.

Figs 6, 7

MATERIAL EXAMINED. — New Caledonia. BIOCAL: stn CP 78, 22°16' S, 167°15' E, 445-450 m, 5 September 1985. Infesting *Periclimenes vaubani* Bruce, host det. A. J. BRUCE: 1 ♀, holotype, 1 ♂, allotype (MNHN-EP 453).

DESCRIPTION. — Holotype female (Fig. 6). Length 2.39 mm, maximal width 4.35 mm, head length 0.92 mm, head width 0.67 mm, pleonal length 0.94 mm. Distortion dextral, 38°. Body outline broadly oval. Head and pleon distinct from pereon. No pigmentation (fig. 6A).

Head deeply set into pereon, with pereopods beyond anterior margin. Outline subrectangular with deep anterior concavity. Barbula (fig. 6B) with 1 very short projection on each side. First antennae indiscernible; unisegmented flaplike second antennae arching across front of head. Maxilliped (fig. 6C) long and slender, its anterior segment much larger than posterior one; no trace of palp.

Pereon greatly expanded on long side. Pereomeres distinct on short side, their separations obscured medially and completely absent opposite. Short side covered by foliate coxal plates (readily dislodged in handling). First oostegite on long side (fig. 6D, E) reniform, medially convex, its anterior segment somewhat longer than posterior one, both smoothly rounded, with entire internal ridge. On short side, pereopod 1 (fig. 6A, F) before head, smaller pereopods 2-7 (fig. 6G) spaced along side of pereon, all with enlarged flaplike bases. On long side, pereopods 1 and 2 before head, reduced but complete pereopod 3 on far edge of brood pouch, all three with shield-like coxal plates; pereopod 4 represented only by basal scar; other pereopods absent.

Pleon of 5 pleomeres, both sides completely covered by large, overlapping foliate uniramous lateral plates. Dorsal surface of pleon covered by 4 pairs of overlapping ovate foliate uniramous pleopods (fig. 6G). Final pleomere produced into globose pleotelson lacking appendages.

Allotype male (Fig. 7). Length 3.67 mm, maximal width 1.51 mm, head length 0.44 mm, head width 1.37 mm, pleonal length 0.98 mm, pleonal width 0.74 mm. All body regions distinct. Body outline wedgeshape. No eyes or other pigmentation (fig. 7A).

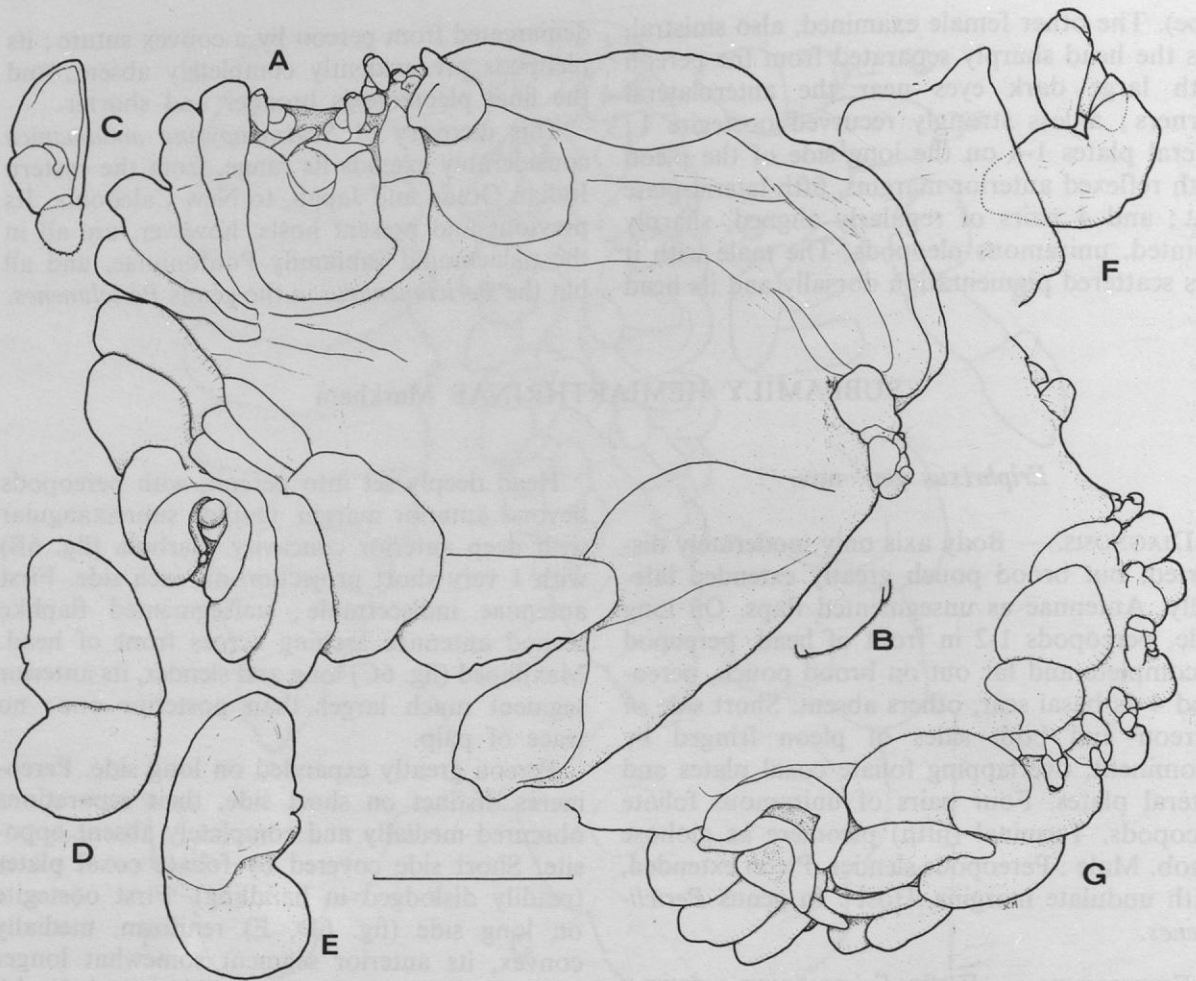


FIG. 6. — *Eriphirix obesus*, gen. nov., sp. nov., holotype female. A. Dorsal view. B. Barbula. C. Left maxilliped. D. Right oostegite 1, external view. E. Same, internal view. F. Left pereopod 1. G. Left side of pereon and pleon, ventral view. Scale : 1.0 mm for A-E, G ; 0.36 mm for F.

Head truncate anteriorly, obscurely reflexed ventrally. Antenna 1 (fig. 7B) of 3 articles, each setose distally ; antenna 2 (fig. 7C) of 6 articles, distal one and 2 others sparsely setose. Oral cone (fig. 7D) conspicuous.

Pereon with somewhat irregular margins. All pereomeres deeply separated by lateral indentations. Proportionately small pereopods (fig. 7E, F) with all articles present, their dactyli smaller and ischia longer posteriorly.

Pleon elongate, fused but with lateral indications of 5 or 6 pleomeres. Terminal pleomere slightly separated ventrally (fig. 7G). No appendages, but small posterior cuticular extension ventrally visible.

ETYMOLOGY. — The Latin word *obesus*, meaning "fat" or "obese", has been selected to

reflect the extreme lateral enlargement of the female of this species.

DISCUSSION. — It is quite possible that the designated allotype male is actually an incompletely metamorphosed late larva. This state is indicated by the unusual length of the second antenna, the slenderness of the pereopods and the traces of pleomeral separation. Thus, subsequent collection may render the above description and generic diagnosis invalid.

The female of *Eriphirix obesus* is very similar in overall appearance to one of the variants of the western Atlantic species *Eophrixus subcaudalis* (Hay) illustrated and described by MARKHAM (1985 : fig. 49), and the extended pleon of the male is also reminiscent of that species. For this reason, I at first considered it to be a new species

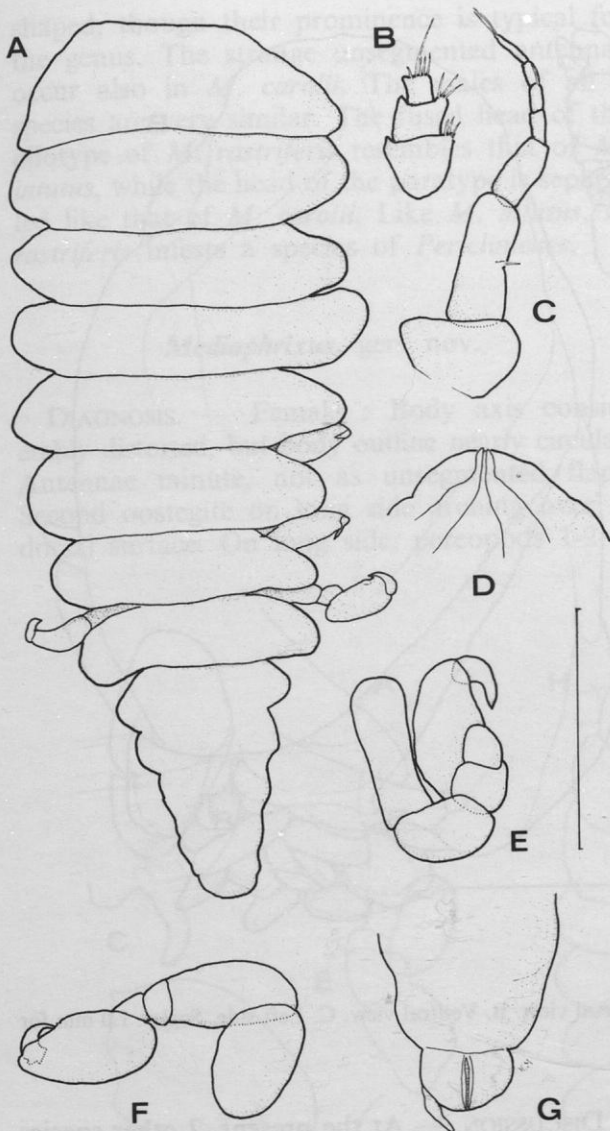


FIG. 7. — *Eriphrixus obesus*, gen. nov., sp. nov., allotype male. A. Dorsal view. B. Right antenna 1. C. Right antenna 2. D. Oral cone. E. Right pereopod. F. Right pereopod 7. G. End of pleon, ventral view. Scale: 0.2 mm for A; 0.1 mm for B-G.

of *Eophrixus*. Because the female has only 4 fully developed pereopods on the long side and uniramous pleopods, however, it is excluded from *Eophrixus* by 2 of the characters most important to the diagnosis of that genus.

Metaphrixus rastriferis sp. nov.

Figs 8, 9

MATERIAL EXAMINED. — New Caledonia. MUSORSTOM 4: stn 146, 19°53.4' S, 163°47.1' E, 33 m,

13 September 1985. Infesting *Periclimenes rastrifer* Bruce, clinging to right pleopod 2, host det. A. J. BRUCE: 1 ♀, holotype, 1 ♂, allotype (MNHN-EP 454); 1 ♀, 1 ♂, paratypes (MNHN-EP 455).

DESCRIPTION. — Holotype female (Figs 8, 9A-G). Length 2.41 mm, maximal width 1.55 mm, head length 0.37 mm, head width 0.40 mm, pleonal length 0.56 mm. Distortion dextral, 89°. Scattered small pigment splotches on dorsal surface (fig. 8A, B).

Head quadrangular, deeply set into pereon. Small dark eyes near anterolateral corners. Antenna 1 (fig. 9A) of 3 articles, distal two sparsely setose; antenna 2 (Fig. 9A) unsegmented flap lacking setation. Maxilliped (fig. 9C) suboval, with lateral notch separating articles; no palp or plectron. Barbula (fig. 9C) with slender falcate outer projection, short, blunt medial one.

Pereomeres separated only on short side, forming very irregular margin there. Oostegite 1 (fig. 9D) long and slender, tending to bend back on itself; other oostegites forming brood pouch incompletely fused and leaving gape. Pereopods 1 and 2 of both sides (fig. 9E) clustered in front of head, with all articles distinct; pereopods 3-7 of short side (fig. 8C) smaller than first two and tightly bunched on side of pereon; pereopod 3 on long side of only 3 articles; pereopods 4-7 of that side absent.

Pleon of 5 pleomeres. Large lobate lateral plates on both sides of pleomeres 1-4, that on short side of pleomere 1 extending nearly to end of pleon. Four pairs of uniramous foliate lanceolate pleopods covering ventral surface of pleon. Terminal pleomere (fig. 9G) subrectangular, straight across posterior margin, lacking uropods.

Allotype male (Fig. 9H-K). Length 0.60 mm, maximal width 0.28 mm, head length uncertain, head width 0.21 mm, pleonal length 0.16 mm, pleonal width 0.19 mm. Head fused with pereon, pleon separate. Traces of pigmentation scattered across dorsal surface (Fig. 9H, I).

Head extended from body, separated only at edges. Irregularly shaped relatively large dark eyes near posterolateral margins. Antennae (fig. 9J, K) of 2 or 3 articles, distally setose.

Pereon slightly broadest across pereomere 4, tapering gradually both ways from there. Pereopods all of nearly same size and with equally developed articles.

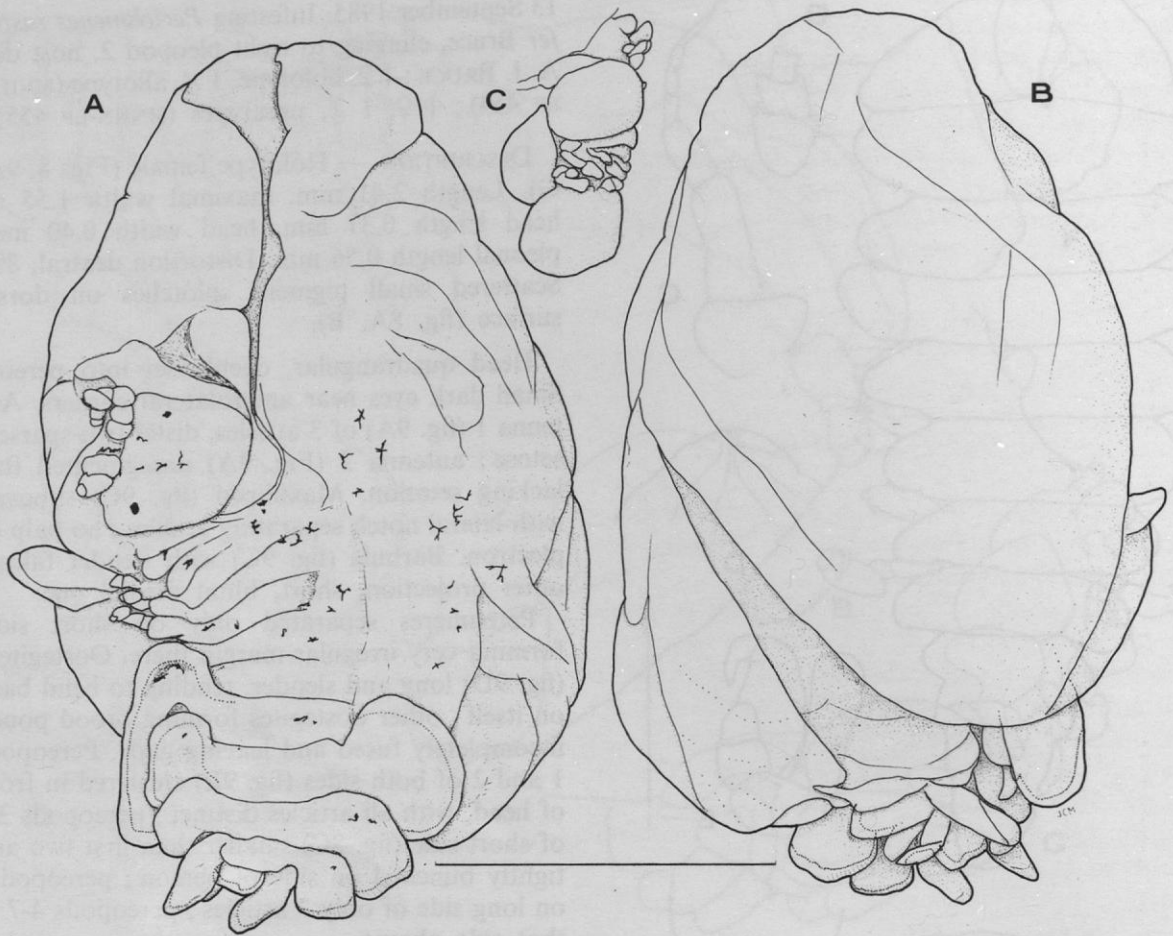


FIG. 8. — *Metaphrixus rastriferis* sp. nov., holotype female. A. Dorsal view. B. Ventral view. C. Left side. Scale : 1.0 mm for A, B; 0.56 mm for C.

Pleon quadrangular, tapering rapidly to blunt point posteriorly, completely lacking indications of appendages.

VARIATIONS. — The paratype female, also dextral, is 2.22 mm long, 1.39 mm broad, its head 0.36 mm long and as broad. It differs but little, lacking dorsal pigment spots, and having more regularly arranged pleopods. The paratype male's dimensions are length 0.68 mm, width 0.32 mm, head length 0.13 mm, head width 0.22 mm, pleonal length 0.18 mm. It, too, lacks all but eye pigmentation, and its head is distinctly separated from the pereon.

ETYMOLOGY. — The specific name *rastriferis* is the genitive of the specific name of the host, *Periclimenes rastrifer*.

DISCUSSION. — At the present, 2 other species are assigned to the genus *Metaphrixus* Nierstrasz & Brender à Brandis, 1931. These are the type-species, *M. carolii* Nierstrasz & Brender à Brandis, 1931, a parasite of *Hippolyte* spp. from Florida through the Caribbean Sea (MARKHAM, 1985, 1988); and *M. intutus* Bruce, 1965, a peculiarly dorsoabdominally attached parasite of species of *Palaemonella* and *Periclimenes*, in Zanzibar (BRUCE, 1965), Singapore (BRUCE, 1979) and Australia (BRUCE, 1986). A third species originally described in *Metaphrixus*, *M. bifidus* Bourdon, 1967, has since been reassigned to *Dicropleon* (MARKHAM, 1980). *M. rastriferis* conforms to the generic diagnosis given by MARKHAM (1985) except that the female's body is ovoid rather than nearly circular. The lateral plates of the female of the *M. rastriferis* are uniquely

shaped, though their prominence is typical for the genus. The strange unsegmented antennae occur also in *M. carolii*. The males of all 3 species are very similar. The fused head of the allotype of *M. rastriferis* resembles that of *M. intutus*, while the head of the paratype is separated like that of *M. carolii*. Like *M. intutus*, *L. rastriferis* infests a species of *Periclimenes*.

Mediophrixus, gen. nov.

DIAGNOSIS. — Female : Body axis considerably distorted, but body outline nearly circular. Antennae minute, not as unsegmented flaps. Second oostegite on long side arching over to dorsal surface. On long side, pereopods 1-2 in

front of head, pereopod 3 as basal scar far out on brood pouch, others absent ; opposite pereopods in 2 clusters, three near head and four near pleon. Four pleomeres, each with 1 pair of uniramous foliate pleopods.

Male : Very slender. Head and pleon both fused to pereon. Pereopods relatively large.

Host : In alpheid genus *Athanas*.

ETYMOLOGY. — *Medio-* meaning "middle" to indicate position of genus between advanced and primitive genera of subfamily Hemiarthrinae + generic stem *-phrixus*. Gender masculine.

TYPE-SPECIES. — By present designation, *Mediophrixus pinuum* sp. nov.

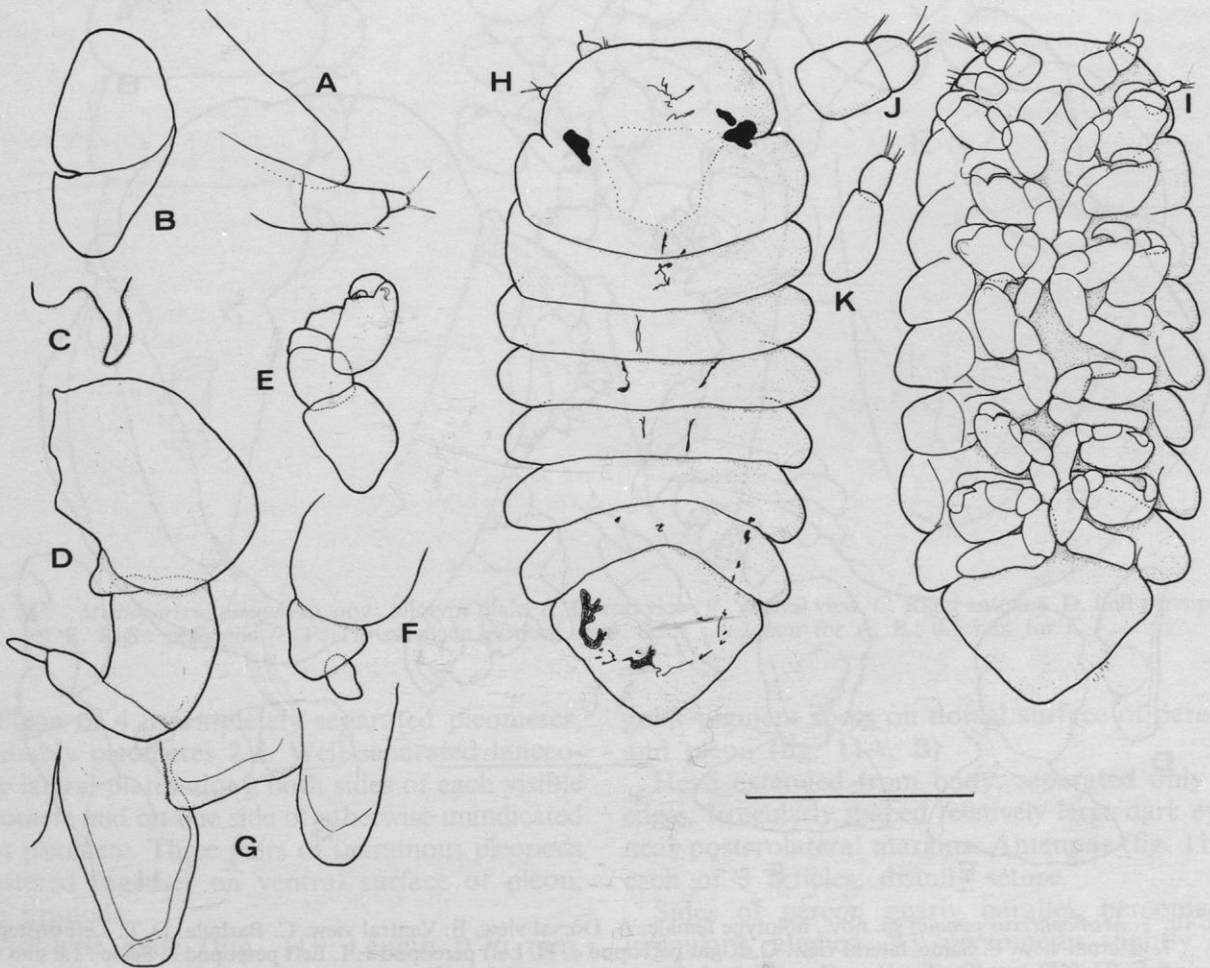


FIG. 9. — *Metaphrixus rastriferis* sp. nov., A-G, holotype female ; H-K, allotype male. A. Left antenna. B. Left maxilliped. C. Left side of barbula. D. Left oostegite 1, internal view. E. Left pereopod 1. F. Right pereopod 3. G. Tip of pleon, ventral view. H. Dorsal view. I. Ventral view. J. End of left antenna 1. K. End of left antenna 2. Scale : 0.40 mm for B-D ; 0.20 mm for E-I ; 0.10 mm for A, J, K.

Mediophrixus pinuum sp. nov.

Figs 10, 11

MATERIAL EXAMINED. — New Caledonia. Ile des Pins, T. M. ILIFFE coll., stn 88-051, 4 June 1988. Infesting *Athanas* sp.¹ ovigerous, on left pleopod 1, host det. A. J. BRUCE: 1 ♀, holotype, 1 ♂ allotype (MNHN-EP 321).

DESCRIPTION. — Holotype female (Fig. 10). Length 2.75 mm, maximal width 2.44 mm, head length 0.60 mm, head width 0.54, pleonal length 0.40 mm. Distortion sinistral, angle in head, 78°. Body outline subcircular (fig. 10A, B).

Head nearly trapezoidal in outline, deeply embedded in pereon; anterior margin slightly indented. Only single small eye visible. Antennae indiscernible. Barbula (fig. 10C) with only 1

small projection on each side. Maxilliped (fig. 10D) long, slender, incompletely segmented, lacking palp.

Pereomeres separated only on short side, first one largely overlapping second. First oostegites dimorphic, larger one (fig. 10E, F), with ovoid, outwardly swollen anterior segment, internal ridge entire except for single lateral notch, broad triangular posterior segment with truncate posterior edge. Oostegite 2 on long side extending far forward and overarching anterior of pereon to dorsal surface, its external surface strongly rugose. First 2 pereopods of long side and first 3 of short side tightly clustered in front of head; first one on each side (fig. 10G, H) of about same size and structure, with all articles distinct; pereopod 3 of long side (fig. 10I) represented only by basal scar on brood pouch.

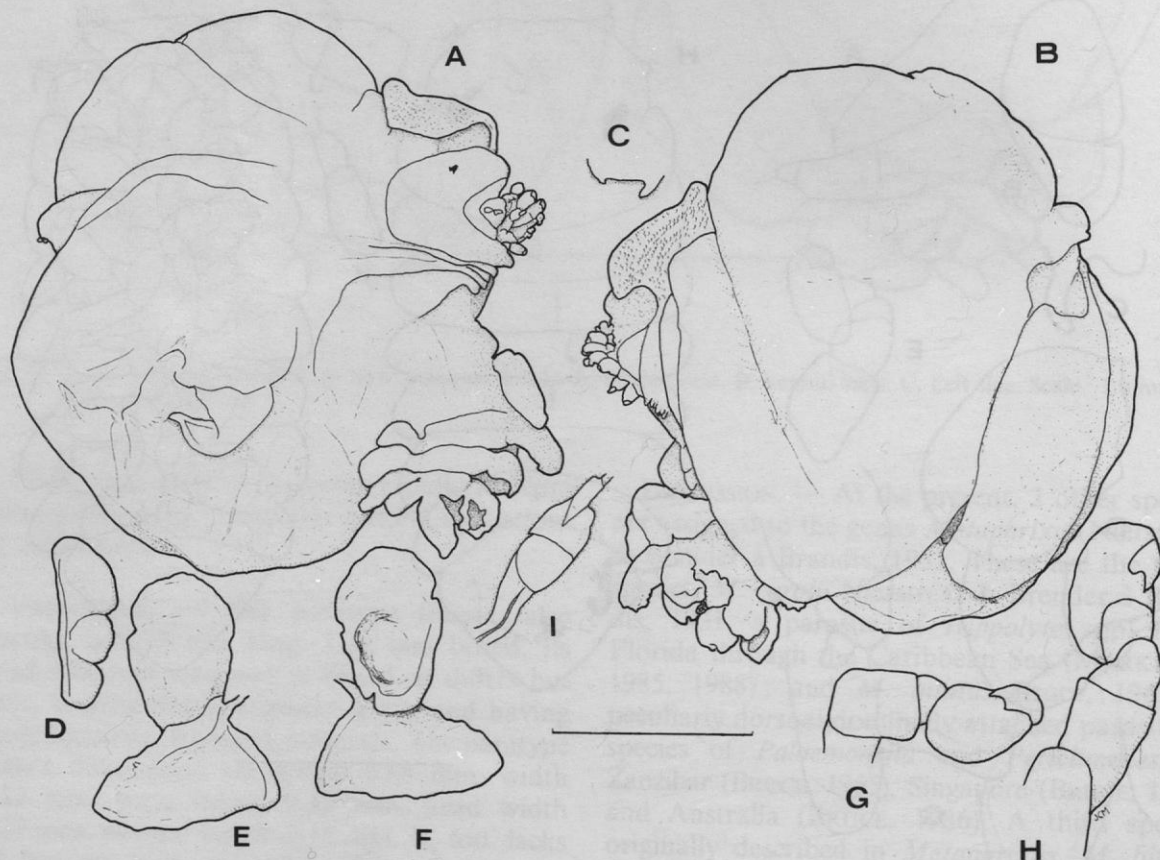


FIG. 10. — *Mediophrixus pinuum* sp. nov., holotype female. A. Dorsal view. B. Ventral view. C. Barbula. D, E. Left oostegite 1, external view. F. Same, lateral view. G. Right pereopod 1. H. Left pereopod 1. I. Left pereopod 3. Scale: 1.0 mm for A-F, I; 0.18 mm for G, H.

1. Fide SUZUKI (1979, *Sci. Rep. Yokohama nat. Univ.*, II, 17: 15), the host would be *Athanas* cf. *dorsalis* (Stimpson, 1861).

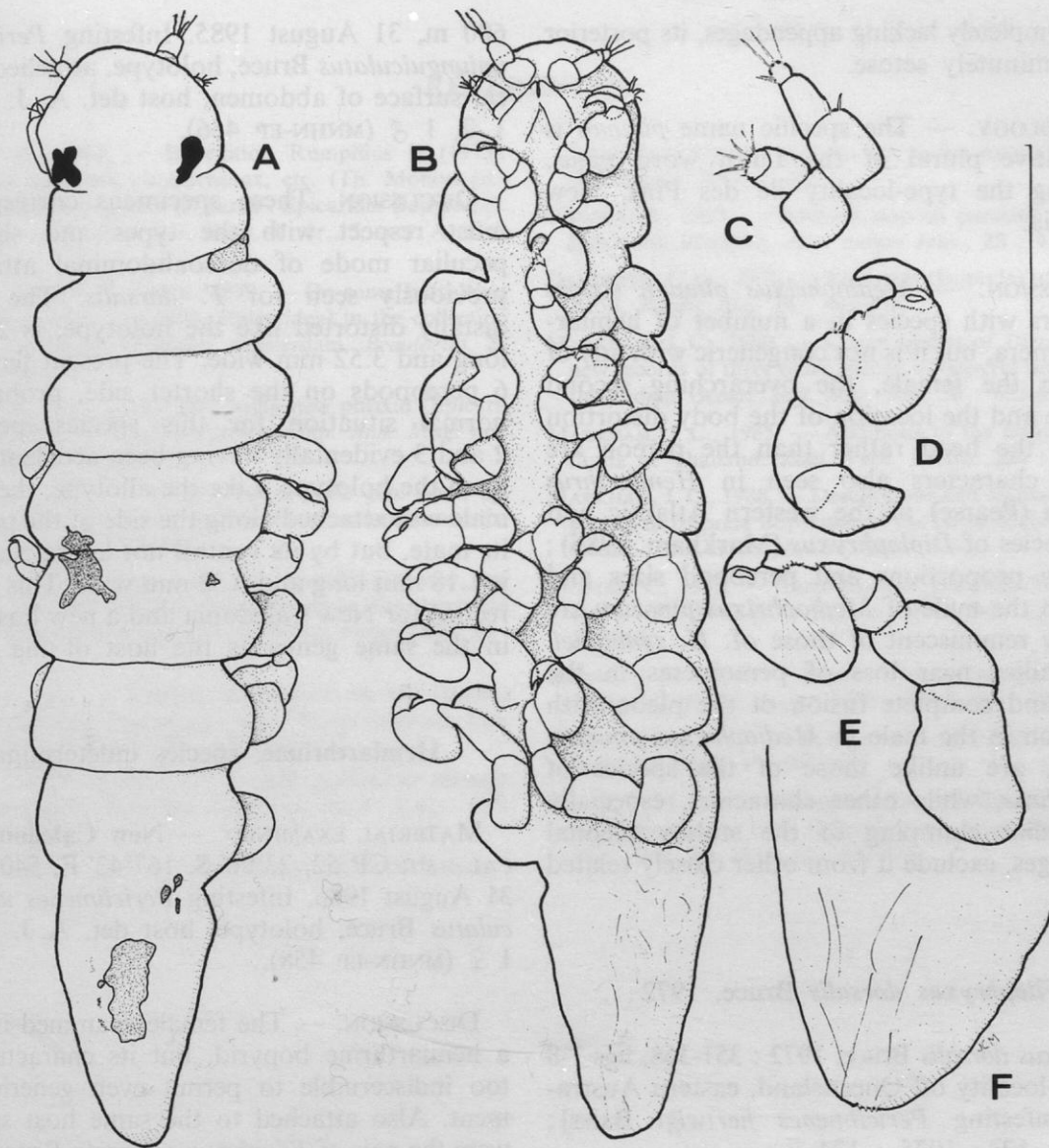


FIG. 11. — *Mediophrixus pinuum* sp. nov., allotype male. A. Dorsal view. B. Ventral view. C. Right antenna. D. Left pereopod 1. E. Right pereopod 7. F. Tip of pleon, ventral view. Scale : 0.2 mm for A, B; 0.1 mm for C-F.

Pleon of 4 incompletely separated pleomeres, probably pleomeres 2-5. Well separated lanceolate lateral plates along both sides of each visible pleomere and on one side of otherwise unindicated first pleomere. Three pairs of uniramous pleopods clustered together on ventral surface of pleon. No uropods.

Allotype male (Fig. 11). Length 0.76 mm, maximal width 0.11 mm, head length 0.10 mm, head width 0.13 mm, pleonal length about 0.18 mm, pleonal width 0.11 mm. Head medially fused with pereon, pleon completely fused. Irre-

gular pigment spots on dorsal surface of pereon and pleon (fig. 11A, B).

Head extended from body, separated only at edges. Irregularly shaped relatively large dark eyes near posterolateral margins. Antennae (fig. 11C) each of 3 articles, distally setose.

Sides of pereon nearly parallel, pereomeres irregularly aligned. All pereomeres slightly set apart laterally. Pereopods (fig. 11D, E) relatively large, all of about same size, with all articles discrete.

Pleon (fig. 11F) triangular, tapering to slender

point, completely lacking appendages, its posterior margin minutely setose.

ETYMOLOGY. — The specific name *pinuum* is the genitive plural of the Latin word *pinus*, indicating the type-locality île des Pins, New Caledonia.

DISCUSSION. — *Mediophryxus pinuum* shares characters with species in a number of hemiarthrine genera, but it is not congeneric with any of them. In the female, the overarching second oostegite and the location of the body distortion angle in the head rather than the pereon are unusual characters also seen in *Hemiarthrus synalpei* (Pearse) of the western Atlantic and some species of *Diplophryxus* (Markham, 1985); the body proportions and pereopod sizes and shapes in the male of *Mediophryxus pinorum* are also very reminiscent of those of *H. synalpei*. The peculiar near loss of pereomeres in the female, and complete fusion of the pleon with the pereon in the male in *Mediophryxus pinuum*, however, are unlike those of the species of *Hemiarthrus*, while other characters, especially the peculiar clumping of the stubby pleonal appendages, exclude it from other closely related genera.

Filophryxus dorsalis Bruce, 1972

Filophryxus dorsalis Bruce, 1972 : 351-358, figs 1-8 [Type-locality off Queensland, eastern Australia; infesting *Periclimenes hertwigi* Balss]; 1973 : 522; 1975 : 124.

MATERIAL EXAMINED. — **New Caledonia.** BIOCAL : stn CP 52, 23°06' S, 167°43' E, 540-

600 m, 31 August 1985. Infesting *Periclimenes uniunguiculatus* Bruce, holotype, attached to dorsal surface of abdomen, host det. A. J. BRUCE : 1 ♀, 1 ♂ (MNHN-EP 456).

DISCUSSION. These specimens correspond in most respect with the types and show the peculiar mode of dorsoabdominal attachment previously seen for *F. dorsalis*. The female, distally distorted like the holotype, is 2.68 mm long and 3.52 mm wide. The present female has 6 pereopods on the shorter side, probably the normal situation for this species, pereopods 2 and 3 evidently having been accidentally lost from the holotype. Like the allotype, the present male was attached along the side of the pereon of its mate, but by its ventral not lateral surface. It is 1.18 mm long and 0.32 mm wide. This is a new record for New Caledonia and a new host record in the same genus as the host of the types.

Hemiarthrinae, species indeterminate

MATERIAL EXAMINED. — **New Caledonia.** BIOCAL : stn CP 52, 23°06' S, 167°43' E, 540-600 m, 31 August 1985. Infesting *Periclimenes uniunguiculatus* Bruce, holotype, host det. A. J. BRUCE : 1 ♀ (MNHN-EP 458).

DISCUSSION. — The female examined is clearly a hemiarthrine bopyrid, but its characters were too indiscernible to permit even generic placement. Also attached to the same host specimen were the pair of *Filophryxus dorsalis* Bruce discussed above and two other smaller unidentifiable isopods. It is possible that the latter were incipient males of the same species as the larger female.

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REFERENCES

- BOURDON, R., 1983. — Expédition Rumphius II (1975). Crustacés parasites, commensaux, etc. (Th. Monod éd.) VIII. Crustacés Isopodes (3^e partie : Épicarides Bopyridae). *Bull. Mus. natn. Hist. nat. Paris*, 4^e sér., 5, sect. A, (3) : 845-869.
- BOURDON, R., & J. H. STOCK, 1979. — On some Indo-West Pacific Bopyridae, (Isopoda, Epicaridea) in the collection of the Zoölogisch Museum, Amsterdam. *Beaufortia*, 28 (351) : 205-218.
- BRUCE, A. J., 1965. — An interesting new phryxid (Epicaridea) parasitic on a pontoniid shrimp. *Ann. Mag. nat. Hist.*, (13) 8 : 385-390.
- BRUCE, A. J., 1972. — *Filophryxus dorsalis* gen. nov., sp. nov., an unusual bopyrid parasite from eastern Australia. *Parasitology*, 65 : 351-358.
- BRUCE, A. J., 1973. — *Mesophryxus ventralis* gen. nov., sp. nov., a phryxid bopyrid parasitic upon the pontonid shrimp *Harpiliopsis beaupresi* (AUDOUIN). *Parasitology*, 66 : 515-523.
- BRUCE, A., 1975. — Further information on the unusual bopyrid parasite *Orophryxus shiinoi* Bruce (Isopoda, Epicaridea). *Crustaceana*, 28 : 121-124.
- BRUCE, A., 1979. — Records of some pontoniine shrimps from the South China Sea. *Cah. Indo-Pacif.*, 1 (2) : 215-248.
- BRUCE, A., 1986. — *Metaphryxus intutus* Bruce (Crustacea : Isopoda), a bopyrid parasite new to the Australian fauna. *The Beagle*, 3 (1) : 213.
- CHOPRA, B., 1923. — Bopyrid isopods parasitic on Indian Decapoda Macrura. *Rec. Indian Mus.*, 25 : 411-550.
- DANFORTH, C. G., 1970. — Epicarids (Isopoda) of Eniwetok Atoll. *Pacific Sci.*, 24 : 462-471.
- MARKHAM, J. C., 1980. — A new species of *Dicropleon* and new records of three other species of bopyrid isopods from the Indian Ocean. *Bull. mar. Sci.*, 30 : 623-633.
- MARKHAM, J. C., 1985. — Additions to the bopyrid isopod fauna of Thailand. *Zool. Verh. Leiden*, 224 : 1-63.
- MARKHAM, J. C., 1988. — Descriptions and revisions of some species of Isopoda Bopyridae of the north western Atlantic Ocean. *Zool. Verh. Leiden*, 246 : 1-63.
- MONOD, T., 1933. — Tanaidacea et Isopoda. In : Mission Robert Ph. Dollfus en Egypte. *Mém. Inst. Egypte*, 21 : 161-264.
- SHIINO, S. M., 1933. — Bopyrids from Tanabe Bay. *Mem. Coll. Sci., Kyoto Imper. Univ.*, (B) 8 (3) : 249-300.
- SHIINO, S. M., 1939. — A bopyrid from Palao. *Palao trop. biol. Stn Stud.*, 1 : 597-601.
- SHIINO, S. M., 1942. — Bopyrids from the South Sea Islands with description of a hyperparasitic cryptoniscid. *Palao trop. biol. Stn Stud.*, 2 : 437-458.

