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TWO NEW MARINE PODOCOPIID SPECIES FROM HANSA BAY,
PAPUA NEW GUINEA (CRUSTACEA : OSTRACODA).

Léopold III Biological Station, Laing Island,
Contribution n° 17

BY

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(With 3 plates)

ABSTRACT

Two new marine podocopid ostracod species, *Bishopina vangoethemi* sp. nov. and *Actinocythereis laingensis* sp. nov. found off the Northern coast of Papua New Guinea are described. The validity of the genus *Bishopina* BONADUCE et al., 1976 is discussed, mainly in relation to the genus *Miocyprideis* KOLLMANN, 1958. Furthermore, the generic characteristics of *Actinocythereis* PURI, 1953 are discussed and are compared with those of the genus *Ponticythereis* MCKENZIE, 1967.

RESUME

Deux nouvelles espèces marines d'ostracodes Podocopida, *Bishopina vangoethemi* sp. nov. et *Actinocythereis laingensis* sp. nov., trouvées le long de la côte Nord de Papouasie Nouvelle-Guinée sont décrites. La validité du genre *Bishopina* BONADUCE et al., 1976 est discutée, surtout en relation avec le genre *Miocyprideis* KOLLMANN, 1958. En outre, les caractères génériques d'*Actinocythereis* PURI, 1953 sont discutés et comparés avec ceux du genre *Ponticythereis* MCKENZIE, 1967.

I. INTRODUCTION

The large amount of biological material collected during several expeditions, sponsored by the Léopold III Foundation and by the Ministry of National Education, to Laing Island, situated in the Hansa Bay (Madang Province, Papua New Guinea), yielded a rich ostracod fauna. This is an excellent starting point for the investigation of the ostracod fauna of Papua New Guinea, which as a whole, is only poorly known.

In the present paper two new species from this area are described. They are important not only because they are new to science, but also because of the generic implications involved.

II. MATERIAL

The material was collected by Dr. J. VAN GOETHEM and Mr. J. PIERRET in 1977 and 1978 by scuba-diving or by dredging. The samples, originally fixed in 5 % buffered formalin were washed in the laboratory, and the Ostracoda picked out. Specimens with soft parts were preserved in 75 % alcohol and empty valves housed in micropaleontological slides. The soft parts were dissected in euparal balsam.

Station PNG 77/243 : Laing Island, Hansa Bay (Madang Province, Papua New Guinea), lagoon, bottom sample, - 16 m; leg. : J. VAN GOETHEM, 30 May 1977.

Station PNG 77/367 : Karkar Island, Madang Province, N.W.-side of the island, bottom sample, - 25 m; leg. : J. VAN GOETHEM, 15 June 1977.

Station PNG 77/X : Duangit Reef, Hansa Bay, dredge sample, - 45 to - 50 m; leg. : J. PIERRET, May 1977.

Station PNG 78/19 : Hansa Bay, between Laing Island and Nubia Village, dredge sample, - 30 m, mud; leg. : J. PIERRET and J. VAN GOETHEM, 8 May 1978.

Station PNG 78/39 : Hansa Bay, off Awar, dredge sample, - 5 m, between seagrass; leg. : J. PIERRET and J. VAN GOETHEM, 9 May 1978.

The type-material of the two new species is deposited in the collections of the Recent Invertebrates Section of the 'Koninklijk Belgisch Instituut voor Natuurwetenschappen'.

III. SYSTEMATICS

Suborder P O D O C O P A SARS, 1866

Family CYTHERIDEIDAE SARS, 1925

Subfamily CYTHERIDEINAE SARS, 1925

Genus *Bishopina* BONADUCE, MASOLI and PUGLIESE, 1976*Bishopina vangoethemi* sp. nov.

(Pl. I, fig. 1-9; Pl. III, fig. 1a-1f)

Derivatio nominis. — In honour of Dr. J. VAN GOETHEM.

Type-locality. — Laing Island, Hansa Bay, Madang Province, Papua New Guinea, in the lagoon, at a depth of 16 m (station PNG 77/243).

Holotype. — A female, with valves (O.C. 1060a) and soft parts (O.C. 1060b).

Paratypes. — 8 females with soft parts, 21 adult valves, 30 adult carapaces, 11 juvenile valves and 7 juvenile carapaces (O.C. 1061 — O.C. 1076).

Description. — Valves rather small and subrectangular in lateral view; dorsal margin straight in the left valve and somewhat curved in the right one; distinct posterior cardinal angle in the left valve, no cardinal angles in the right valve; anterior margin evenly rounded, posterior margin somewhat truncate; ventral margin nearly straight; wedge-shaped in dorsal view, with blunt anterior and subtruncate posterior extremities; left valve overlapping right one, overlap sinuous in the ventral area. Ornamentation consists of deep, sharply delineated oblong, oval fossae, fossae lacking near the margins; valves characterized by a striking posterior transverse ridge, consisting of irregular thickenings; anterior margin fringed with about eleven thick and blunt marginal denticles, posterior margin with seven somewhat smaller denticles; striped lamellar chitinous selvage; three long posterior setae, a postero-dorsal one, with proximal bulbous thickening, and two very long postero-ventral ones, oriented obliquely downwards; the latter originate from a simple pore situated on the lateral surface, between the posterior transverse ridge and the posterior margin, and not from the posterior margin; these two large setae are in fact the two branches of a single, large bifurcate seta. Right valve with an anterior hinge element consisting of about eight toothlets, a median element consisting of about nine sockets and a posterior element consisting of about

eight toothlets; left valve hinge complementary. Muscle scar pattern with a vertical row of four slightly elongate adductor scars and two subcircular frontal scars; indistinct fulcral point. Inner lamella moderately wide anteriorly, narrower posteriorly and ventrally; line of concrescence and inner margin not coinciding anteriorly, forming a small vestibulum; posterior vestibulum absent; marginal pore canals straight, rarely bifurcating; lateral pores simple, single pores or sieve pores with subcentral pore; setae simple or branched.

Antennula composed of five segments; basal segment large and wide; second segment elongate, with proximal tuft of setae and distal hirsute margin; long ventro-distal seta; third segment with a distal claw; fourth segment with two median claws and two large distal claws; fifth segment with two claws, the dorsal one with a sense club. Antenna: spinneret bristle a long flagellum, reaching to the extremities of the terminal claws; antenna composed of four segments; first segment long, with a striking dorsal tuft of setae; second segment short, with postero-distal setae; third segment very long, with two antero-median setae of unequal length, a strong postero-median claw and two setae and a ventro-distal claw-like spine; third segment short, bearing two strong claws. Mandibular palp with three segments; for the implantation of setae, see Pl. I, fig. 3; palp of maxillula with two segments.

Maxilla, a walking leg (P I), with four segments; basal segment very large, with a long dorso-median seta, two strong segmented distal setae and a ventro-proximal segmented and pinnate seta; second segment with dorso-distal spine, long and slender terminal claw; P II smaller, with four segments; setae 1,1,1 on the first segment; second segment with dorso-distal spine; terminal claw slender and somewhat shorter; P III large with setae 1,1,1 on the first segment; dorso-distal seta of second segment long; fourth segment with spinules around the distal periphery; terminal claw very strong, curved, with hairy ventral margin. Furca reduced, with two small setae; abdominal extremity with elongate blade-like prolongation, bearing a stout distal spine.

Dimensions (in mm) :

Holotype : left valve, length 0.56; height 0.32.
right valve, length 0.55; height 0.29.

Paratypes : (N=number of specimens, M=mean, SD=standard deviation, OR=observed range)

	N	M	SD	OR
L	57	0.56	0.012	0.54 — 0.59
H	57	0.31	0.011	0.28 — 0.33

Occurrence. — The species has only been found at the type-locality.

Discussion

When BONADUCE, MASOLI and PUGLIESE (1976, p. 397) introduced the new genus *Bishopina*, they considered it to be a monotypic genus. *B. vangoethemi*, however, strongly resembles the type-species *B. mozarti* BONADUCE *et al.*, 1976, and for this reason the former is assigned to the genus *Bishopina*. Still other species can be considered to belong to *Bishopina*, such as *Cytheridea spinulosa* BRADY, 1868, *Cytheridea timorensis* FYAN, 1916, *Clithrocytheridea atjehensis* KINGMA, 1948 (see also GRAMANN, 1975), *Neocyprideis* ? sp. A *sensu* APOSTOLESCU, 1968 and *Miocyprideis lyubimovae* KHOSLA, 1978.

KOLLMANN (1958, p. 178) and several authors after him assigned the species *Cytheridea spinulosa* BRADY, 1868 and *Clithrocytheridea atjehensis* KINGMA, 1948 to the genus *Miocyprideis* KOLLMANN. The type-species of this genus, *Miocyprideis janoscheki* KOLLMANN, 1958, however, has only some general characteristics in common with the species of the genus *Bishopina*, but on the other hand, many differences can be seen. *Bishopina*-species are smaller, have a subrectangular shape instead of a rounded one, lack the postero-ventral right valve spine and have often thick, plate-like marginal denticles. Furthermore, the greatest width in dorsal view is situated in the posterior half, and some species show a very broad, subtruncate posterior extremity, often accentuated by a posterior transverse ridge consisting of irregular thickenings. The only important characteristic in common with *M. janoscheki* KOLLMANN, 1958, apart from the family characteristics, is the sinuous ventral overlapping. This characteristic can also be found for example in the genus *Eucytheridea* BRONSTEIN, 1930. Taking into account the differences between the species of the genus *Miocyprideis* and of the «*Cytheridea spinulosa*-group», i.e. of the genus *Bishopina*, we judge the sinuous overlapping to be a weak argument for considering the genus *Bishopina* a junior synonym of the genus *Miocyprideis*. As far as we can see now, the species of the genus *Bishopina* are not uncommon in the Indo-Pacific area, and are fully marine.

Our new species, *B. vangoethemi*, can be easily distinguished from known *Bishopina*-species by its striking posterior transverse ridge and by its deep and sharply delineated fossae. *B. mozarti* BONADUCE *et al.*, 1976 and *Bishopina timorensis* (FYAN, 1916) (new combination) are very closely related. They differ from our new species by the absence of fossae on the lateral surface and by the ridge-like ventro-lateral structure, passing into the posterior transverse ridge.

On the basis of the soft parts it can be concluded that the genus *Bishopina* is related to the genus *Cyprideis*. Because *B. vangoethemi* sp. nov.

so far is the only *Bishopina*-species of which the soft parts are known, it remains uncertain whether the extremely long setae in the postero-lateral area have more than a specific value.

Family TRACHYLEBERIDIDAE SYLVESTER-BRADLEY, 1948

Genus *Actinocythereis* PURI, 1953

Actinocythereis laingensis sp. nov.

(Pl. II, fig. 1-14; Pl. III, fig. 2a-2f)

Derivatio nominis. — After Laing Island, the type-locality.

Type-locality. — Laing Island, Hansa Bay, Madang Province, Papua New Guinea; in the lagoon, at a depth of 16 m (station PNG 77/243).

Holotype. — A male, with valves (O. C. 1077a) and soft parts (O. C. 1077b).

Paratypes. — 2 males and 4 females with soft parts, 27 adult carapaces, 51 adult valves and 4 juvenile valves (O. C. 1078 - O. C. 1096).

Description. — Valves in lateral view trachyleberidid shape, with straight dorsal and ventral margins, evenly rounded anterior margin and slightly truncate posterior extremity; dorsal and ventral margins taper towards the posterior, strongly in males, and somewhat less in females; carapace in dorsal view (without the spines) broadly spindle-shaped, with the greatest width in the middle. Valve surface smooth, but bearing several rows of spines; dorsal row consisting of five spines, a small one in the middle of the dorsal margin, followed by a row of three larger blade-like spines, and a small one, just in front of the posterior cardinal angle, which bears one or two smaller spines; the large and transparent eye-spot is preceded and immediately followed by blade-like spines; the median row with a large, double spine on the subcentral tubercle, three to four smaller spines in front of it and five to six large, blade-like spines behind it; the ventral row consisting of about eight large spines, the direct continuation of the anterior submarginal row, consisting of about seven spines which are sometimes grown together; anterior margin with about ten rather long denticles; ventral submarginal row consisting of about eleven blade-like spines; ventral margin bearing about eleven, somewhat smaller spines; posterior margin fringed with five smaller spines, few spines present between the three main rows. Inner lamella moderately wide; vestibula absent; marginal pore canals numerous, broad

and often with a bulbous enlargement near the middle; one or two pore canals visible in the posterior socket of the left valve. Right valve hinge with a stepped anterior tooth, an antero-median socket, a postero-median crenulated groove and a large posterior tooth; large ocular sinus. Muscle scar pattern consists of a row of four oblong adductor scars and a V-shaped frontal scar; lateral pores simple; setae very long and unbranched.

Antennula composed of six segments; basal segment large, medially hirsute and with a proximal tuft of setae; second segment elongate with ventral and dorsal proximal tufts of setae and a long ventro-distal seta; third segment with stout dorso-distal spine; fourth segment with a slender and a stout spine and a mesio-distal seta; fifth segment with two long dorso-distal spines and a ventro-distal long and fine seta; terminal segment with two setae and a sense club. Antenna : basal segment without setae; male exopod a very long flagellum, reaching over the extremities of the terminal claws; female exopod largely reduced; second segment bearing a strong and very long ventro-distal spine; third segment with a long dorso-distal seta, two ventro-distal spines and a sense club; fourth segment with a ventro-distal spine and seta; terminal segment with two strong claws. Mandibula : coxa with well developed teeth, palp large in relation to coxa and consisting of four segments; first segment (basis) with two ventro-distal setae and an epipod with two plumose setae; second segment with two large feather-like ventro-distal setae and a third, smaller one, plumose only at its ventral side; third segment with a small, ventrally plumose distal seta and a group of five slender setae; terminal segment long and narrow, with a ventrally plumose large seta and two smaller setae. Branchial setae of respiratory plate of maxillula all in the same direction. Maxilla, a walking leg (P I), with four segments; basal segment very large, with large ventro-proximal hairy seta and a tuft of setae; dorso-proximally and dorso-distally two setae; second segment with dorso-distal spine; third segment without setae; fourth segment with large terminal claw. P II as P I, but with only one dorso-distal seta on the first segment; P III with large basal segment; small ventro-proximal seta; one medio-dorsal and one dorso-distal seta; very long terminal claw. Abdominal extremity in females with a short spine; furca with two hairy setae of unequal length; copulatory appendage in males with a small basal and a larger lateral part; distal process broadly triangular with rounded apex; process on lateral part spindle-shaped; copulatory tube well developed with hook-like distal extremity.

D i m e n s i o n s (in mm) :

Holotype : left valve, length 0.60; height 0.31.
right valve, length 0.59; height 0.31.

Paratypes : (N = number of specimens, M = mean, SD = standard deviation, OR = observed range)

	N	M	SD	OR
L	78	0.60	0.020	0.56 — 0.67
H	78	0.33	0.018	0.30 — 0.37

Occurrence. — Laing Island (type-locality); Hansa Bay, between Laing Island and Nubia Village, off Awar and on Duangit Reef; Karkar Island.

Discussion

The genus *Actinocythereis* is based on the type-species *Cythere exanthemata* ULRICH and BASSLER, 1904, described from the Calvert Miocene of Maryland. The most important characteristics of the original diagnosis of the genus (PURI, 1953, p. 178) are : carapace oblong-subquadrate, posterior end obliquely rounded; surface of carapace ornamented with three distinct rows of vertically elongated spines. Some years later MCKENZIE (1967, p. 96) introduced the new genus *Ponticythereis* (type-species : *Cythereis militaris* BRADY, 1866), which shows close resemblance to the genus *Actinocythereis*. According to MCKENZIE (1967, p. 98), however, *Actinocythereis* is higher with respect to its length, has a thicker shell and is often ornamented with numerous tubercles. Furthermore, in *Ponticythereis* the radial pore canals show a tendency to group. On the basis of dimensions published by PURI (1953, p. 179-183 and 1960, p. 123) and by GARBETT and MADDOCKS (1979, p. 910) it can be calculated that the height/length-ratio of different *Actinocythereis*-species ranges from 0.40 to 0.61. In *Ponticythereis militaris* (BRADY), the H/L ratio ranges from 0.50 to 0.56 (after MCKENZIE, 1967, p. 97) and in our new species, closely resembling *P. militaris*, the H/L-ratio ranges from 0.51 to 0.60 (mean : 0.55, standard deviation : 0.024). *Ponticythereis decora* SWANSON, 1979 (p. 31) has a ratio of 0.63. From these data it can be concluded that at least in this particular case the H/L-ratio is not very relevant.

The presence of spines and nodes on the valves seems to be rather variable. The type-species of the genus *Actinocythereis*, namely *A. exanthemata* (ULRICH and BASSLER) is rather spiny, and *Ponticythereis decora* SWANSON is rather nodose. In *Actinocythereis scutigera costata* HARTMANN, 1978 the nodes are even grown together, forming ridges. HARTMANN (1978, p. 87) considers this characteristic to be of importance at the subspecies level only. As a whole, however, one can observe that the species, formerly assigned to the genus *Ponticythereis*, have large, often blade-like spines arranged in three rows; between the rows the valves are nearly smooth.

The presumed tendency for the radial pore canals to group is not apparent in our new species, although it is closely related to *Cythereis militaris* BRADY, 1866.

As far as the soft parts are concerned, *A. laingensis* sp. nov. strongly resembles *A. dampierensis* HARTMANN, 1978 which has a typical, nodose *Actinocythereis*-like valve.

All these elements are in agreement with the statement of HARTMANN (1980, p. 130) that it is very difficult to justify a differential diagnosis for the genus or subgenus *Ponticocythereis*. The actual state of knowledge does not permit a more detailed analysis, and further evidence is surely required.

A. laingensis sp. nov. differs from *A. militaris* (BRADY, 1866) (synonym: *Cythere clavigera* BRADY, 1880) by the position of the spines of the dorsal row. As already stressed by McKENZIE (1967, p. 97) the variation in the type and groupings of spines, particularly along the dorsal margin, seem to be diagnostic characters for species. *A. militaris* shows a row of five dorsal spines, preceded by a post-orbital spine and followed by a smaller posterior one. *A. laingensis* has a row of four dorsal spines, the anterior one being somewhat isolated. A postorbital spine is also present, but the posterior spine is very small. Although the degree of development of all these spines is variable, their position seems to be very constant. The soft parts of *A. militaris* (BRADY, 1866) are poorly known. From data given by McKENZIE (1967, fig. 10c), however, it appears that in this species the ventro-distal seta of the second segment of the antennula is much shorter than in *A. laingensis* sp. nov. where it reaches far beyond the distal extremity of the terminal segment.

IV. ACKNOWLEDGEMENTS

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EXPLANATION OF PLATES

PLATE I

Bishopina vangoethemi sp. nov., Laing Island, Hansa Bay, Papua New Guinea.

Fig. 1. — Right valve, internal view, holotype (O. C. 1060 a).

Fig. 2. — Left valve, anterior vestibulum, holotype (O. C. 1060 a).

Fig. 3. — Mandibula, paratype (O. C. 1062 c).

- Fig. 4. — Antenna, holotype (O. C. 1060 b).
Fig. 5. — Antennula, paratype (O. C. 1062 b).
Fig. 6. — Posterior extremity, paratype (O. C. 1063 b).
Fig. 7. — P II, paratype (O. C. 1064 c).
Fig. 8. — P I, paratype (O. C. 1064 c).
Fig. 9. — P III, paratype (O. C. 1064 c).

PLATE II

Actinocythereis laingensis sp. nov., Laing Island, Hansa Bay, Papua New Guinea.

- Fig. 1. — Left valve, internal view, male, holotype (O. C. 1077 a).
Fig. 2. — Left valve, anterior marginal area, male, holotype (O. C. 1077 a).
Fig. 3. — Left valve, posterior marginal area, male, holotype (O. C. 1077 a).
Fig. 4. — Posterior extremity, female, paratype (O. C. 1082 b).
Fig. 5. — Brush shaped organ, male, holotype (O. C. 1077 b).
Fig. 6. — P I, male, holotype (O. C. 1077 c).
Fig. 7. — P II, male, holotype (O. C. 1077 c).
Fig. 8. — P III, male, holotype (O. C. 1077 c).
Fig. 9. — Part of female antenna with exopod, paratype (O. C. 1079 b).
Fig. 10. — Antennula, male, paratype (O. C. 1078 b).
Fig. 11. — Mandibula, female, paratype (O. C. 1079 b).
Fig. 12. — Antenna, male, paratype (O. C. 1078 b).
Fig. 13. — Respiratory plate, male, holotype (O. C. 1077 b).
Fig. 14. — Copulatory organ, male, holotype (O. C. 1077 b).

PLATE III

Bishopina vangoethemi sp. nov., Laing Island, Hansa Bay, Papua New Guinea.

- Fig. 1 a. — Carapace, dorsal view, paratype (O. C. 1071), $\times 75$.
Fig. 1 b. — Left valve, lateral view, paratype (O. C. 1072), $\times 70$.
Fig. 1 c. — Right valve, lateral view, paratype (O. C. 1073), $\times 70$.
Fig. 1 d. — Right valve, internal view, paratype (O. C. 1074), $\times 70$.
Fig. 1 e. — Carapace, ventral view, paratype (O. C. 1075), $\times 70$.
Fig. 1 f. — Right valve, juvenile (A-1), lateral view, paratype (O. C. 1076), $\times 70$.

Actinocythereis laingensis sp. nov., Laing Island, Hansa Bay, Papua New Guinea.

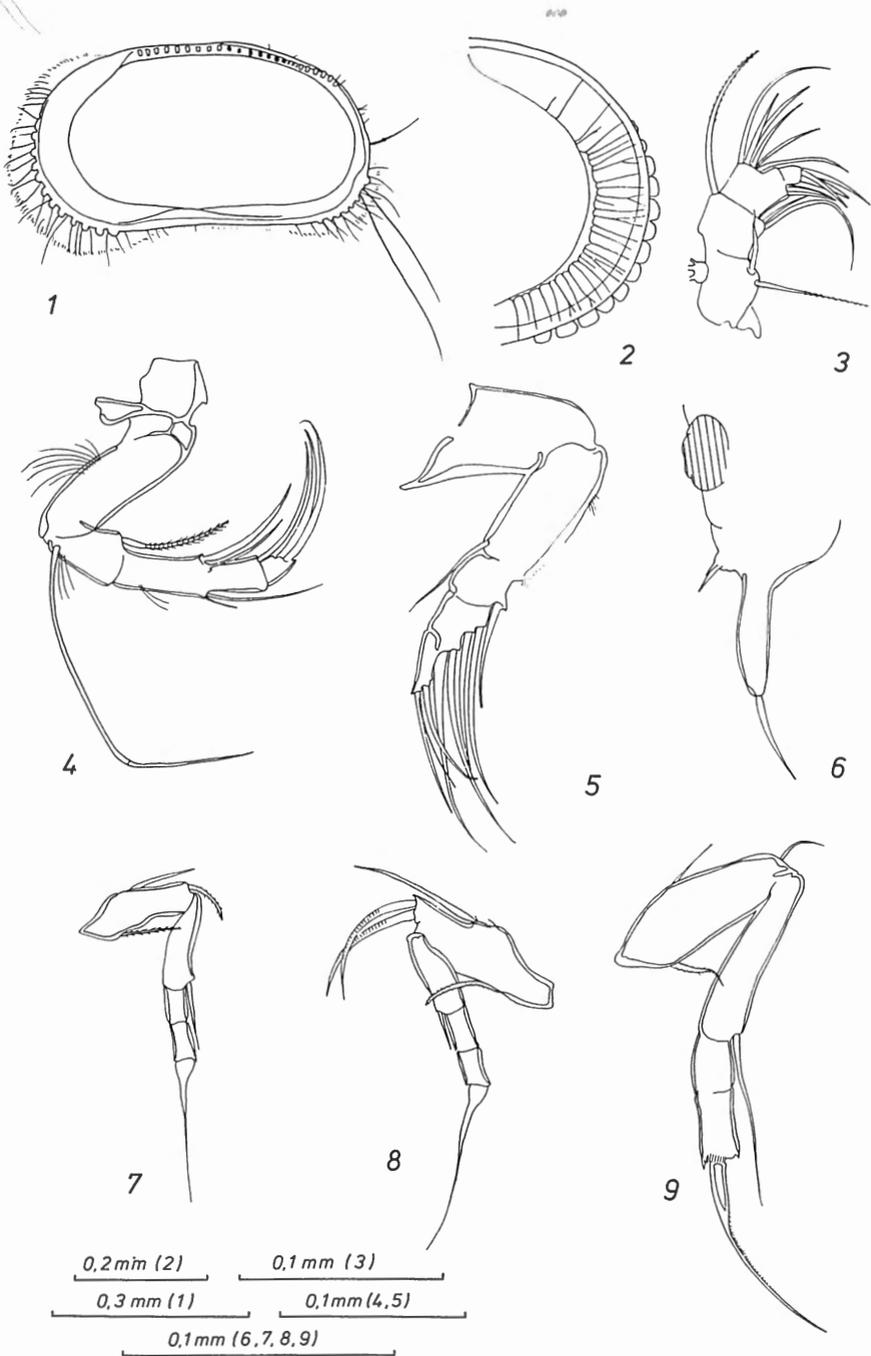
- Fig. 2 a. — Left valve, female, lateral view, paratype (O. C. 1091), $\times 70$.
Fig. 2 b. — Right valve, male, lateral view, paratype (O. C. 1092), $\times 75$.

Fig. 2 c. — Right valve, female, internal view, paratype (O. C. 1093), $\times 70$.

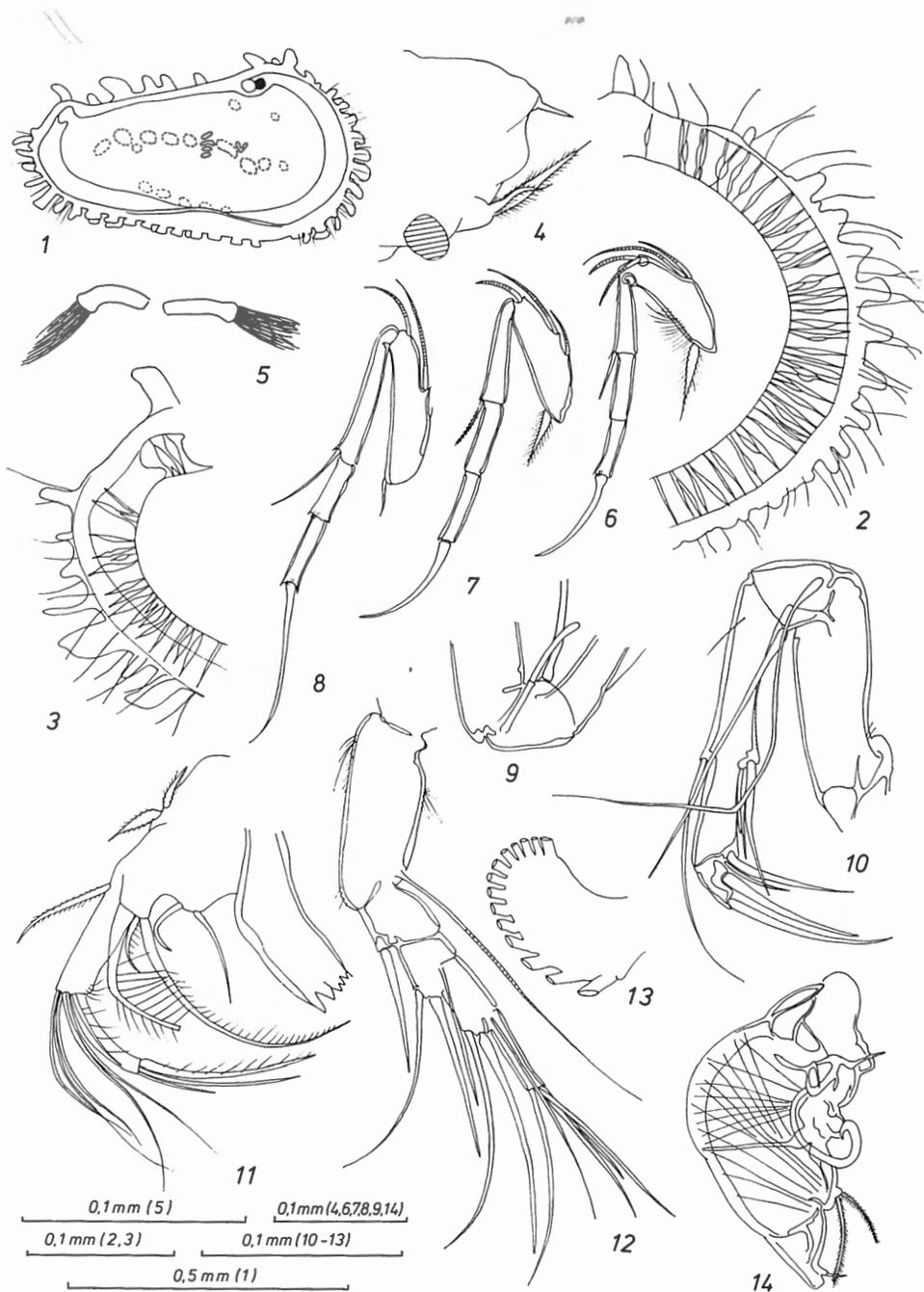
Fig. 2 d. — Carapace, male, dorsal view, paratype (O. C. 1094), $\times 70$.

Fig. 2 e. — Carapace, female, dorsal view, paratype (O. C. 1095), $\times 70$.

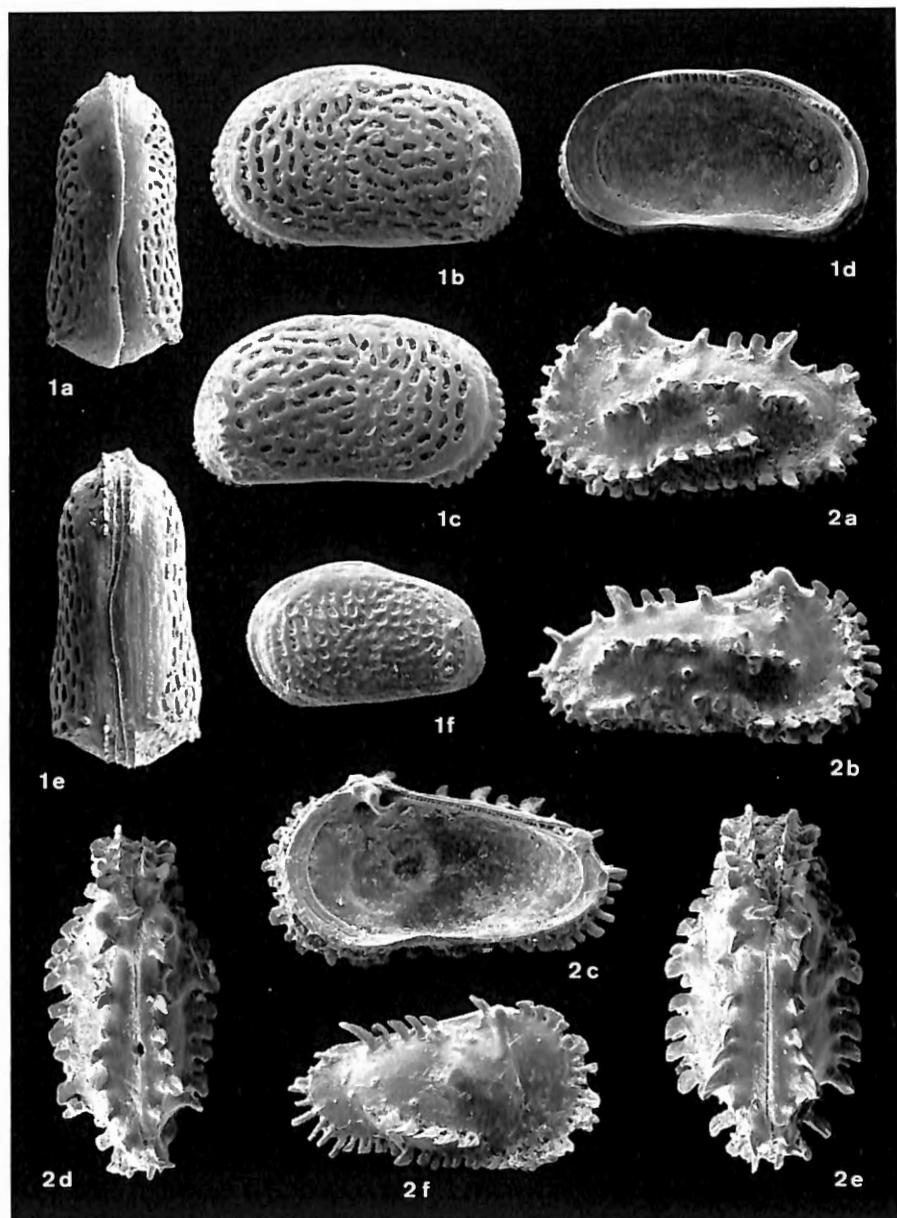
Fig. 2 f. — Right valve, juvenile (A-1), lateral view; paratype (O. C. 1096), $\times 70$.



K. WOUTERS. — Two new marine podocoid species from Hansa Bay, Papua New Guinea (Crustacea : Ostracoda)



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