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***Paramisophria variabilis*, a New Arietellid (Copepoda: Calanoida) from Hypersaline Waters of Shark Bay, Western Australia**

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ABSTRACT. Both sexes of *Paramisophria variabilis* n. sp. (Copepoda: Arietellidae) taken in plankton samples from hypersaline (50.00–56.5 ‰) waters of Shark Bay, Western Australia, are described. A key to differentiate the known species of the genus is presented,

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KEYWORDS: Copepoda, Arietellidae, *Paramisophria*, taxonomy, Western Australia, hypersaline waters.

The genus *Paramisophria* comprises three species, the type *Paramisophria cluthae* T. Scott, 1897, *P. spooneri* Krishnaswamy, 1959 and *P. ammophila* Fosshagen, 1968. *Paramisophria cluthae* is known from Scotland (T. Scott, 1897) and Norway (Sars, 1903, Matthews, 1967, Fosshagen, 1968). Fosshagen (1968) commented that Tanaka's (1966) record of *P. cluthae* from Japan may represent the first record of another species. *Paramisophria spooneri* was described from bottom fauna collections off Plymouth, U.K. (Krishnaswamy, 1959), and *P. ammophila* from shallow water collections in the northeastern Bahamas (Fosshagen, 1968).

This paper describes a fourth member of the genus, taken in plankton samples on the Fauré Sill, a region of high tidal flow on the seaward side of Hamelin Pool, the southernmost region of the eastern gulf of Shark Bay, Western Australia. We sampled repeatedly using a 150 µm plankton net suspended 2.0 m under the anchored boat for periods of 30 minutes, over an entire tidal cycle. Once obtained, samples were stained with

neutral red for 1 hour, then fixed in 10% formalin. Salinities ranged from 50.0‰–56.5 ‰.

We mounted specimens on microslides in polyvinyl lactophenol, and drew them using a Wild M20 phase contrast microscope and camera lucida. Further examination was made with an Olympus microscope with Nomarski optics.

Family Arietellidae Sars, 1902

Genus *Paramisophria* T. Scott, 1897

Type-species: *Paramisophria cluthae* T. Scott, 1897

The genus was established by T. Scott (1897) based on females only. Sars (1902) presented a description of both sexes of *P. cluthae* and a complete generic diagnosis. Fosshagen (1968) made several additional comments on the morphology of *P. cluthae*. Krishnaswamy (1959) altered the generic diagnosis to accommodate an endopod on the fifth leg of the male.

Key to Species of *Paramisophria*.

1. Exopod of antenna 2-segmented.....2
—Exopod of antenna with more than 2 segments.....3
2. Segments of antenna with 0, 4 setae respectively. Inner margin of female leg 5 coxa bifid, male (? right) leg 5 with a 1-segmented endopod extending from coxa to distal margin of 2nd exopod segment.....*P. spooneri*

- Segments of antenna with 4, 4 setae respectively. Inner marginal projection of female leg 5 coxa a distinct small spine. Males unknown... *P. cluthae* (sensu Tanaka)
3. Exopod of antenna 3- or 4-segmented. Male leg 5 with an endopod..... 4
- Exopod of antenna 6-segmented. Inner marginal projection of female leg 5 coxa a distinct small spine. Male leg 5 with no endopod..... *P. cluthae*
4. Exopod of antenna 3-segmented. Inner marginal projection of female leg 5 coxa a sharp point continuous with the segment. Male leg 5 with a 1-segmented endopod on left leg, about equal in length to half the outer margin of the first exopodite segment..... *P. variabilis*
- Exopod of antenna 4-segmented. Inner marginal projection of female leg 5 coxa a distinct small spine. Male leg with a 1-segmented endopod on left leg, about equal in length to the outer margin of the first exopodite segment..... *P. ammophila*

***Paramisophría variabilis* n. sp.**

Figs 1-2.

Material examined. Fifteen adult females, 17 adult males and 25 copepodids collected in plankton, Fauré Sill channel, Shark Bay, Western Australia (25° 58' S, 114° 03' E) between 2230 on 16 Jun. 1983 and 0630 on 17 Jun. 1983 by W.J. Kimmerer.

Type-material. Holotype female (Reg. No. P34778), allotype male (Reg. No. P34779) and 4 paratypes (Reg. No. P34780) of each sex deposited in the Australian Museum. The holotype, allotype, 2 paratype females (Reg. Nos. P34781, P34782) and 3 paratype males (Reg. Nos. P34783, P34784, P34785) dissected and mounted on microslides. An additional 2 paratypes of each sex deposited in Museum of Victoria (Reg. No. J3141) and Western Australian Museum (Reg. No. WAM44-84).

Description. FEMALE: body length, to end of furcal rami 1.64 mm. Prosoma (Fig. 1a, b) robust and ovoid in dorsal view, and deep in lateral view. Posterodorsal margins of 2nd and 3rd pedigers each produced into 2 lobes, symmetrical about the mid-line. Posterior margin of prosoma produced into a sharp dorsal projection on each side.

Rostrum (Fig. 1c) with 2 subequal, ventrally-directed filaments. Antennule 21-segmented, resembling that of type-species. Antenna (Fig. 1d) biramous, with 2-segmented basipod. Exopod 3-segmented; proximal segment bearing 3 setae on the distal margin; short middle segment bearing 1 seta; 3rd segment bearing 1 seta at about midpoint and 2 setae terminally. Terminal region of 3rd segment with a fold in the integument just proximal to insertion of terminal setae, giving impression of 4th segment. Endopod 2-segmented; proximal segment bearing a short lateral seta at about 80% of its length; distal segment with group of 3 setae at about 50% of its length, a short subterminal seta, and terminal group of 5 setae.

Mandible blade (Fig. 1e,f) of 4 large teeth, the outermost the largest and separated from other 3; 2 patches of denticles proximal to group of 3 teeth. Palp (Fig. 1e) 4-segmented; 2nd segment bearing 2 setae on outer distal margin; 3rd segment bearing flat projection

carrying a single seta; 4th segment with 1 marginal and 4 terminal setae.

Maxillule (Fig. 1g) with 4 thick spines on proximal endite, and a stout trinagular denticle at their base (Fig. 1h); endopod with 2 terminal setae; exopod with 3 terminal setae.

The maxilla, maxilliped and first 4 swimming legs resembling those of type-species. Swimming legs armature formula (outer margin first; Roman numerals spines, Arabic numerals setae):

Leg 1	coxa 0-1	basis 1-1	exopod I-1; I-1; II-I-4 endopod 0-1; 0-2; 1-2-2.
Leg 2	coxa 0-1	basis 0-0	exopod I-1; I-1; III-I-5 endopod 0-1; 0-2; 2-2-4
Leg 3	coxa 0-1	basis 0-0	exopod I-1; I-1; III-1-5 endopod 0-1; 0-2; 2-2-4
Leg 4	coxa 0-0	basis 1-0	exopod I-1; I-1; III-1-5 endopod 0-1; 0-2; 2-2-3

Leg 5 (Fig. 2b,c,d) uniramous, 3-segmented; inner distal margin of basis produced into a sharp point, just proximal to which is a large plumose seta; setae of each side slightly asymmetrical. Segment 3 (exopodite) bearing 3 stout outer spines, distal of which is smaller, plus 2 terminal spines, separated by a thorn, outermost larger.

MALE: Body length, to end of furcal rami, 1.42 mm. Form of body resembling female, but urosome 5-segmented (fig. 1i). Antennules 21-segmented, left with weakly geniculate terminal segment (Fig. 1j). Antennae, mouthparts and swimming legs resembling those of female.

Right 5th leg 5-segmented (Fig. 2e,i); 2nd segment (basis) bearing an outer seta; 3rd segment bearing an outer marginal spine; 4th segment with a spine on outer margin at about 60% of its length. Inner margin of 4th segment produced into a broad lamella, at distal margin of which is a patch of fine hairs. Terminal segment bearing 3 finger-like projections.

Left leg 5 (Fig. 2e,f) with an outer seta on the 2nd segment (basis) and bearing a 1-segmented vestigial endopod, different in shape in all animals examined (Figs 2e,f,g,h). Segment 3 with an outer distal spine;

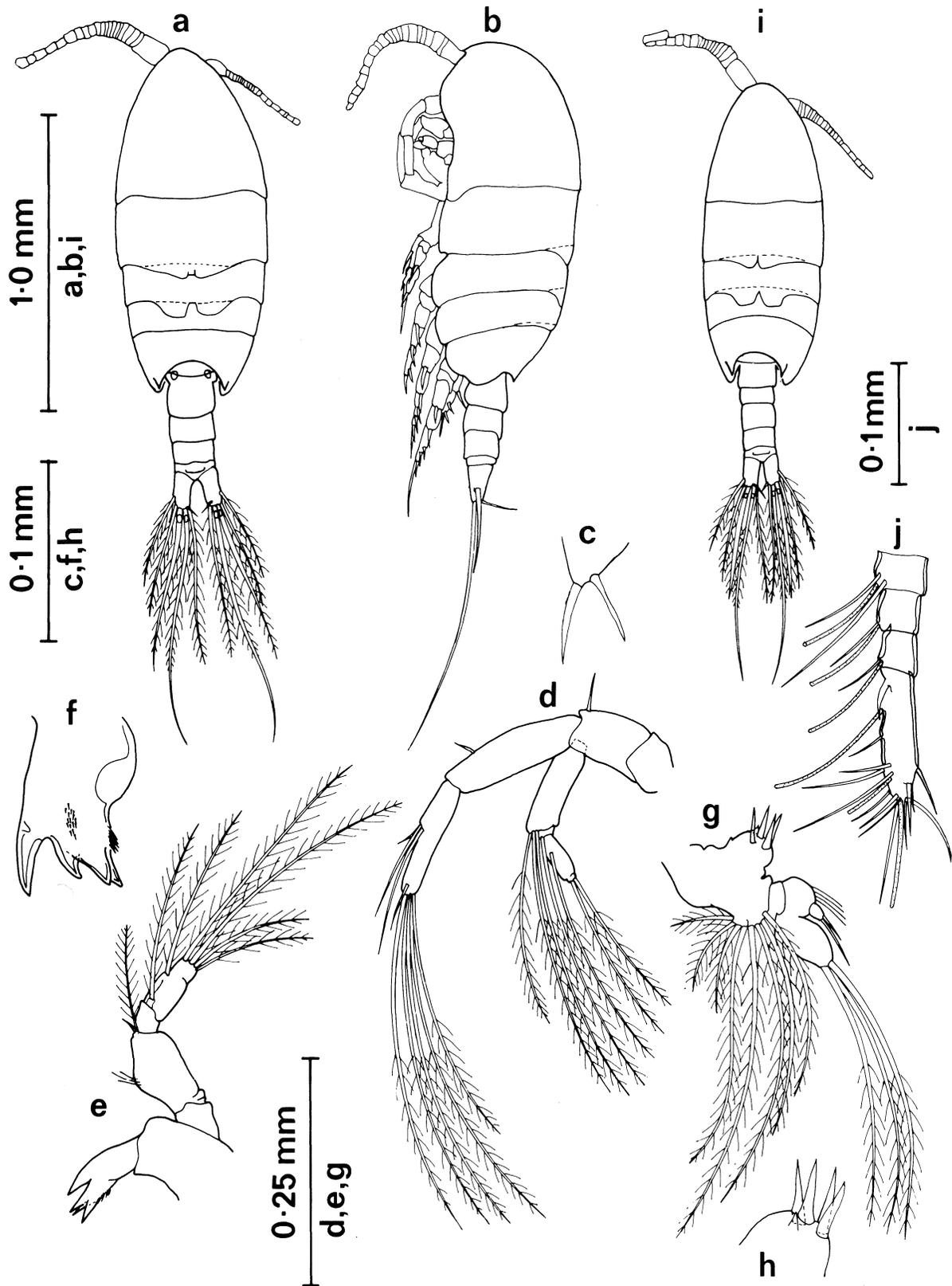


Fig. 1. Holotype female (a) dorsal, (b) lateral, (c) rostrum, (d) antenna, (e) mandible, (f) mandible blade, (g) maxillule, (h) proximal endite of maxillule. Allotype male (i) dorsal, (j) segments 15-18 of left antennule.

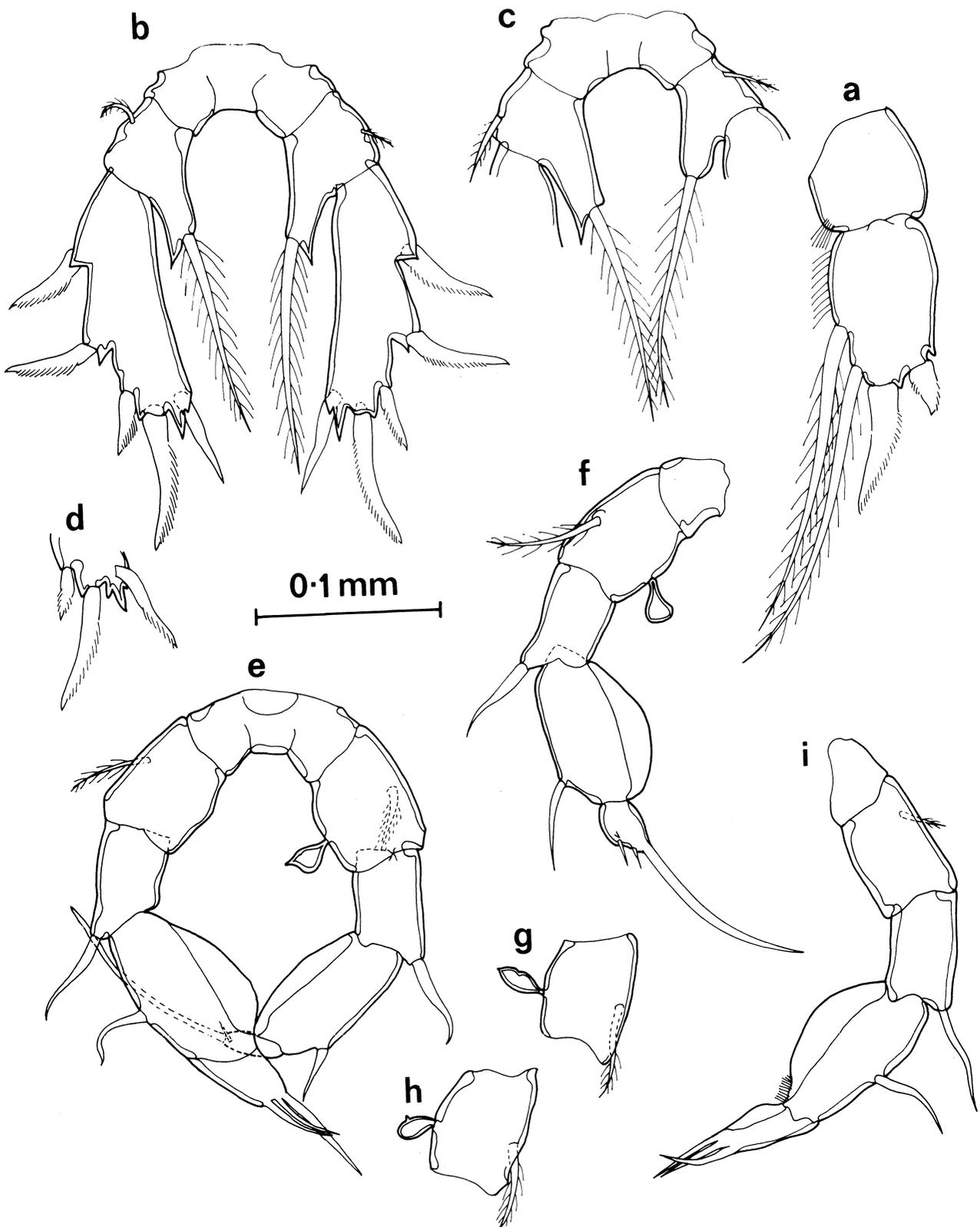


Fig. 2. (a) Abnormal leg 2 exopodite, paratype female (Reg. No. P34782); (b) leg 5, holotype female; (c) basal segments of leg 5, paratype female (Reg. No. P34782); (d) distal margin of right leg 5, paratype female (Reg. No. P34781); (e) leg 5, allotype male; (f) right leg 5 paratype male (Reg. No. P34785); (g), (h) basis and endopods of male paratypes (Reg. Nos P34784, P34783 respectively); (i) right leg 5 paratype male (Reg. No. P34785).

4th segment with an outer spine at about 75% length, produced on inner margin into a broad lamella. Terminal segment with a long, terminal spine-like projection, accounting for about 75% of its length, and 2 small spines on outer margin just proximal to base of projection.

Remarks. *Paramisophria variabilis* is named for the variability observed in its morphology, particularly in the endopod of the male leg 5. In addition, one female paratype (Reg. No. P34782) has an abnormal 2-segmented exopod on the 2nd leg (Fig. 2a) and asymmetrical coxae on leg 5 (Fig. 2c), the left of which is not produced into a sharp tip on the inner expansion of the coxa. Another female paratype (Reg. No. P34781) has an extra terminal thorn on the right exopodite of leg 5 (Fig. 2d).

Species of *Paramisophria* are similar in habitus, and the females are difficult to separate. The form of the male fifth leg provides the most distinctive feature. Dr A. Fosshagen (Blomsterdalen, Norway) is presently describing further species, one of which, from Midway Island, closely resembles *P. variabilis*. The male fifth leg of *P. variabilis* is most similar to *P. ammophila*, of the species described to date.

All species of *Paramisophria* are epibenthic. The Shark Bay material was collected in the plankton only because of the high turbulence in the area; the samples contained a lot of sediment and benthic animals. *Paramisophria variabilis* was not taken in any of the other 23 stations sampled along a transect from the Indian Ocean to Hamelin Pool (Kimmerer *et al.* in press). The present high salinity record implies considerable euryhalinity, however no salinity data is available for the other members of the genus.

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References

- Fosshagen, A., 1968. Marine biological investigations in the Bahamas. 8. Bottom-living Arietellidae (Copepoda, Calanoida) from the Bahamas with remarks on *Paramisophria cluthae* T. Scott. *Sarsia* 35: 57-64.
- Kimmerer, W.J., McKinnon, A.D., Atkinson M.J. & Kessell, J.A. (in press) Plankton spatial distributions in Shark Bay, Western Australia, June 1983. *Australian Journal of Marine and Freshwater Research* 36.
- Krishnaswamy, S., 1959. A new species of copepod from the Eddystone shell gravel. *Journal of the Marine Biological Association of the United Kingdom* 38: 543-546.
- Matthews, J.B.L., 1967. On the calanoid copepods of Raunefjorden, western Norway. *Sarsia* 29: 159-164.
- Sars, G.O., 1903. Copepoda, Calanoida. An Account of the Crustacea of Norway. Bergen Museum, Bergen 4: 1-171.
- Scott, T., 1897. The marine fishes and invertebrates of Loch Fyne. 15th Annual Report of the Fishery Board for Scotland 3: 107-174.
- Tanaka, O., 1966. Neritic Copepoda Calanoida from the north-west coast of Kyushu. Processings of the Symposium on Crustacea, Ernakulam, January 12-15, 1965, 1: 36-50. Marine Biological Association of India, Mandapam Camp.

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