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Harpacticoid copepods from Una do Prelado River (São Paulo, Brazil): genus *Schizopera*

Maria Paloma Jimenez Alvarez
Departamento de Zoologia Instituto de Biociências, Universidade de São Paulo, São Paulo – Brazil; Centro de Biologia Marinha, Universidade de São Paulo, São Paulo – Brazil

Abstract

The black water Una River is the biggest river of Juréia Ecological Reserve. The association of certain conditions such as high annual rainfall, the presence of washed-out humic substances, have given rise to a peculiar kind of environment with acid pH, poor in nutrients and unstable. In spite of these conditions eleven harpacticoid species were found, and the genus *Schizopera* is reported here. The material analysed was collected by Por *et al.* (1984). Two new species are described, *S. pori* n.sp. and *S. giselae* n.sp. The first species is the most common and abundant collected in the Una River.

Introduction

Although the Harpacticoida are one of the most important groups in the meiobenthos, they are poorly known from Brazil, especially those from the estuarine environment.

The material analysed here was collected by Por *et al.* (1984) in a preliminary hydrobiological study of a black water estuary of the Una do Prelado River (Juréia Ecological Reserve, São Paulo, Brazil).

The association of certain conditions such as high annual rainfall, the presence of washed-out humic substances resulting in acid pH and tidal influence along most of the river have given rise to a peculiar kind of environment in the Una River, poor in nutrients and unstable.

In spite of these conditions eleven harpacticoid species were found. The species of the genus *Schizopera* are examined on this occasion.

The predominantly freshwater genus *Schizopera* is widely distributed. The taxonomy of this enormous genus was confused until the recent revision by Apostolov (1982), who grouped the numerous species of this genus into three genera, one of them new. The genus *Schizopera* continued although divided into two subgenera, *Schizopera* and *Neoschizopera*, differentiated particularly by the number of segments the endopod of this first leg, exhibiting three or two segments respectively.

The presence of the genus *Schizopera* in Brazil was first reported by Marinoni (1964) from the littoral waters of Santa Catarina State, although the species were not identified. Recent information confirms that this material has been lost. Reid (1984) reported some specimens from Rio de Janeiro very similar to *S. vicina* Herbst.

Materials and methods

Six stations (1 to 6) were established on the lower Una River from the mouth to the superior limit of the mangrove swamp. Benthos from the river was sampled with a small Van Veen grab; river bank benthos was collected with a 75 μm (mesh)

handnet. Algae and fallen leaves caught in the roots of the mangrove trees were sampled and analysed for fauna. Several 1 m^2 samples were also taken on the intertidal mud flats. The material was preserved in 70% alcohol, mounted in glycerol and sealed with glyceel.

Family Diosaccidae

Genus Schizopera Sars, 1905
Schizopera pori n. sp.

Material: 20 females and 3 males collected on August, 2,1982 from the Una do Prelado River station 4 (Por *et al.*, 1984), Juréia Ecological Reserve, São Paulo, Brazil, in fallen leaves from mangrove trees.
Holotype: 1 adult female (whole) deposited in the Museu de Zoologia da Universidade de São Paulo.
Paratypes: 15 whole females and 4 dissected females, 1 whole and 2 dissected males.

Adult female (fig. 1a): body length 0.47 mm. Rostrum (Fig. 1b) somewhat curved. Genital area as in fig. 1c. Leg 6 with 2 setae, inner longest. Anal segment (Fig. 1d–e) with a ventrolateral row of spinules. Anal operculum with distal setules. Caudal rami longer than wide, armed with: 1 short, distal, inner seta; 1 well developed distal seta; 1 distal outer seta; 1 strong lateral spine; 1 slender lateral seta and 1 dorsolateral seta. Two egg sacs (Fig. 1-f), the eggs arranged in a row.

Antenna I (fig. 1g) 8-segmented. Armature elements as follows (A-Aesthetasc):

segment	1	2	3	4	5	6	7	8
number of setae	–	7	8	4 + A	1	2	2	8

Antenna II (fig. 1h) with allobasis. Exopod 2-segmented: segment I with 1 slender, long seta; segment II with 2 distal setae. Endopod with a row of spinules and 2 spines on the inner margin; 1 short seta on the outer margin; 1 strong spine, 3 geniculate setae and 1 long seta distally exhibiting a common base with a short straight seta and with 1 very thin seta at the common base of the last-mentioned setae.

Mandible (Fig. 2a): precoxa with three-dentate pars incisiva, several denticles and 1 slender seta. Coxa basis with 3 plumose, terminal setae, unequal in length. Exopod very small with a single seta. Endopod much larger than exopod, with 2 setae on proximal part of inner edge, and 4 setae distally.

Maxilla I (fig. 2b): precoxa with 9 spines and 1 slender, lateral seta. Coxa with 1 slender seta and 1 strong terminal seta. Basis with 6 setae. Exopod very small with 2 enlarged setae. Endopod rectangular with 3 setae.

Maxilla II (Fig. 2d): syncoxa with 3 endites each armed with 2 spiniform setae. Basis with 2 terminal spines. Endopod region with 7 slender setae.

Maxilliped (fig. 2d): basis with 1 inner lateral seta; 3 distal setae, and 3 rows of setules. Endopod 2-segmented: segment I with 2 inner setae; a row of spinules and some outer setules; segment II slender, with 1 terminal claw and a small slender seta.

Legs 1-4 (figs. 2e-h): coxa and basis armed as shown in the figures; endopod and exopod 3-segmented. Armature formula as follows:

	exopod	endopod
leg 1	0.0.0 2 2	1.0.1 1 1
leg 2	0.1.1 2 1	0.1.1 2 1
leg 3	0.1.1 2 1	1.1.1 2 1
leg 4	0.1.1 2 1	1.1.1 1 1

Leg 5 (fig. 2i): basendopod with 4 setae, 3 outer spinules, and 1 outer slender seta. Exopod with 6 setae: 1 long outer plumose seta, 2 short and 1 longer seta, 1 long seta and 1 inner seta, the last two setae with asymmetrical ornamentation.
Adult male (fig. 3): body length 0.8 mm. Antenna I haplocerate. Antenna II and oral parts as in female. Leg 1: basis with a thick spiniform, chitinous formation on inner edge. Leg 2: endopod transformed as shown in fig. 3e. Leg 3: segment III of the exopod with a broad hyaline, spine on inner edge. Armature formula of legs as in female. Leg 5 (fig. 3i): basendopod with 2 spiniform setae, inner plumose and the outer ornamented with spinules. Exopod with 5 setae: 1

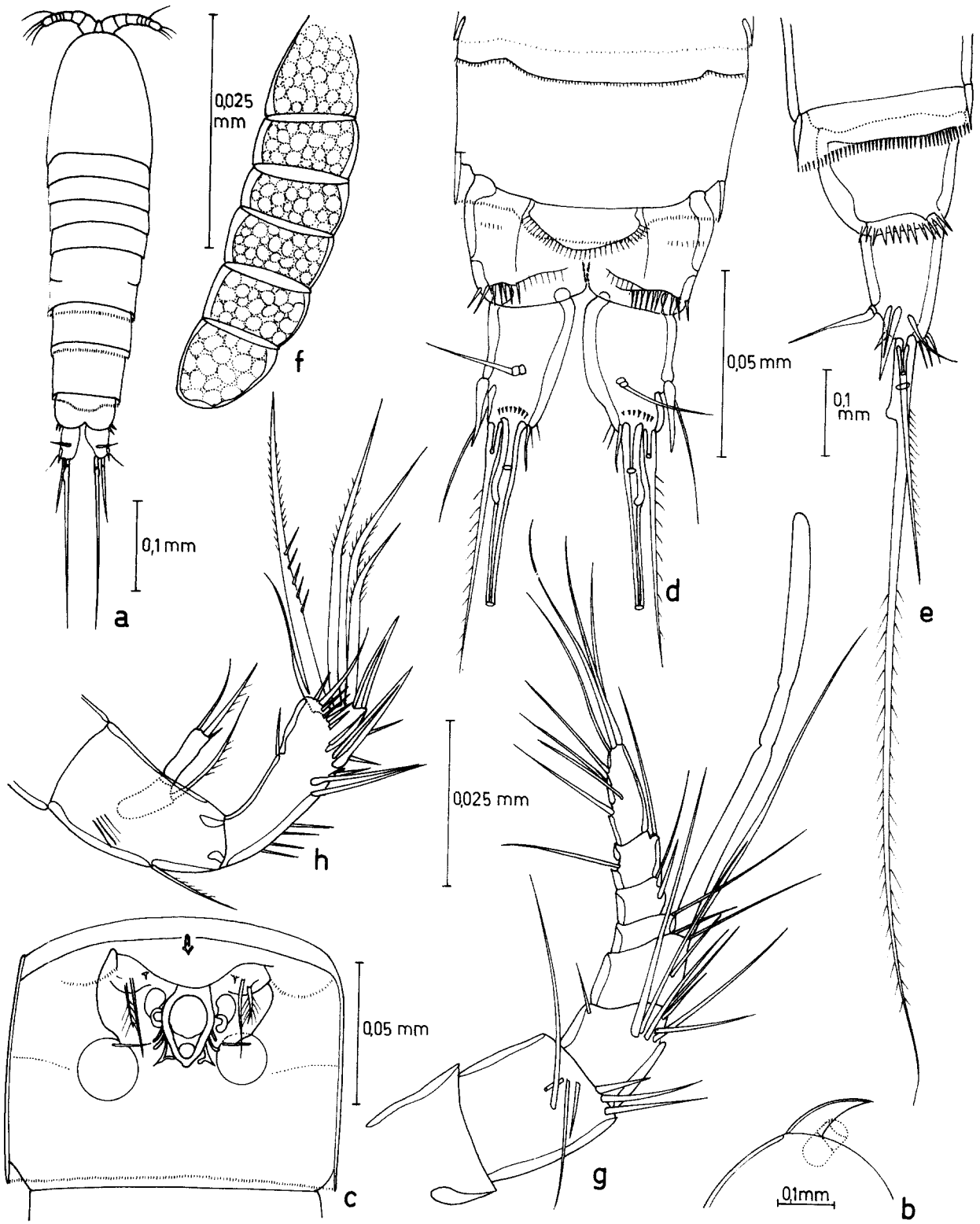

Fig. 1. Schizopera pori n.sp. female: a-habitus, dorsal; b-rostrum, lateral; c-genital area, ventral; d-urosome, dorsal; e-caudal rami, lateral; f-egg sac; g-antenna I; h-antenna II.

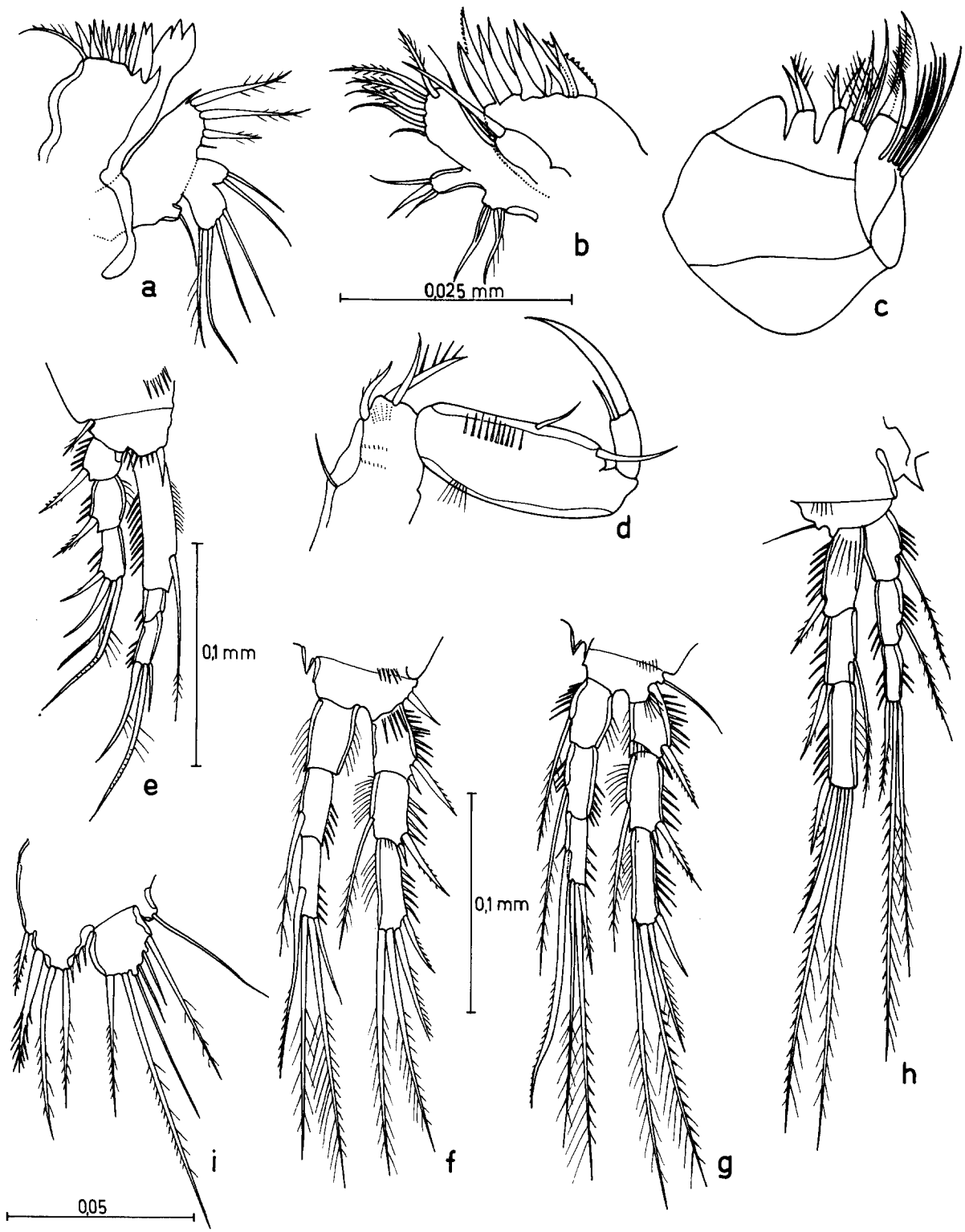

Fig. 2. Schizopera pori n.sp female: a-mandible; b-maxilla I; c-maxilla II; d-maxilliped; e-leg 1; f-leg 2; g-leg 3; h-leg 4; i-leg 5.

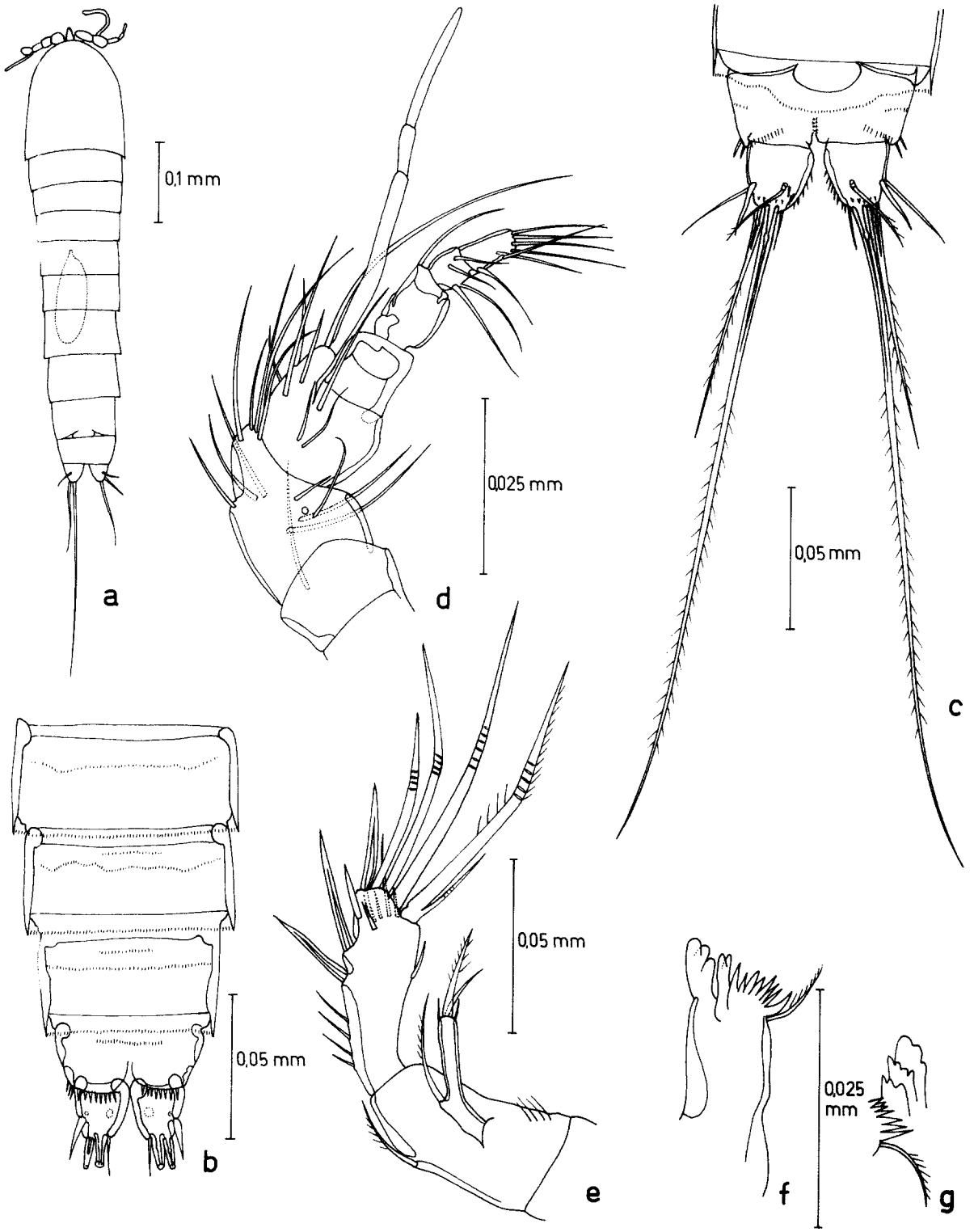

Fig. 3. Schizopera pori n.sp. male: a-habitus, dorsal; b-urosome, ventral; c-caudal rami, dorsal; d-antenna I; e-antenna II; f-g-mandible.

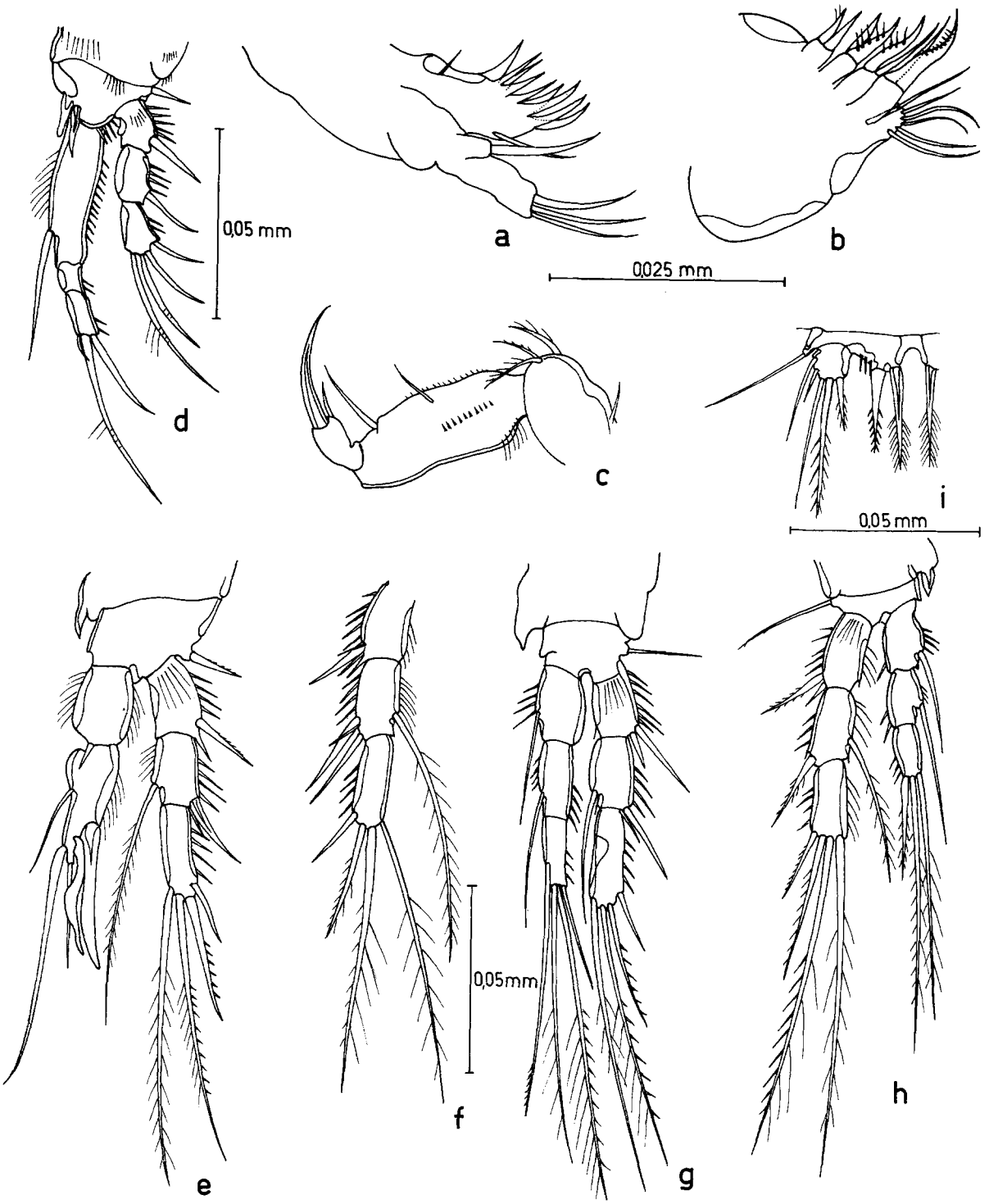

Fig. 4. Schizopera pori n.sp. male: a-maxilla I, partial view; b-maxilla II; c-maxilliped; d-leg 1; e-leg 2; f-leg 2 exopod with 2 outer spines in segment II; g-leg 3; h-leg 4; i-leg 5.

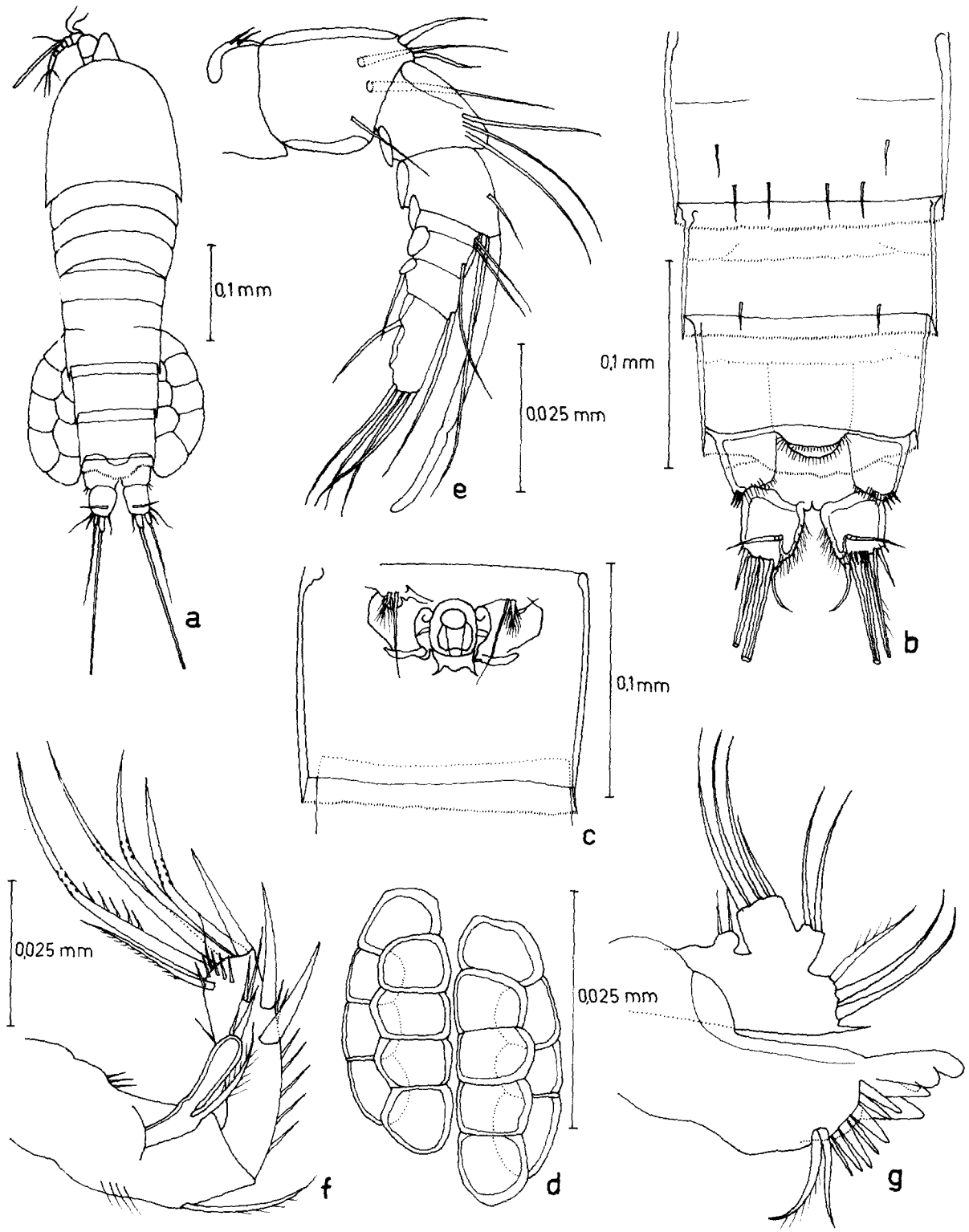

Fig. 5. Schizopera giselae n.sp. female: a-habitus, dorsal; b-urosome, dorsal; c-genital area, ventral; d-egg sacs; e-antenna I; f-antenna II; g-mandible.

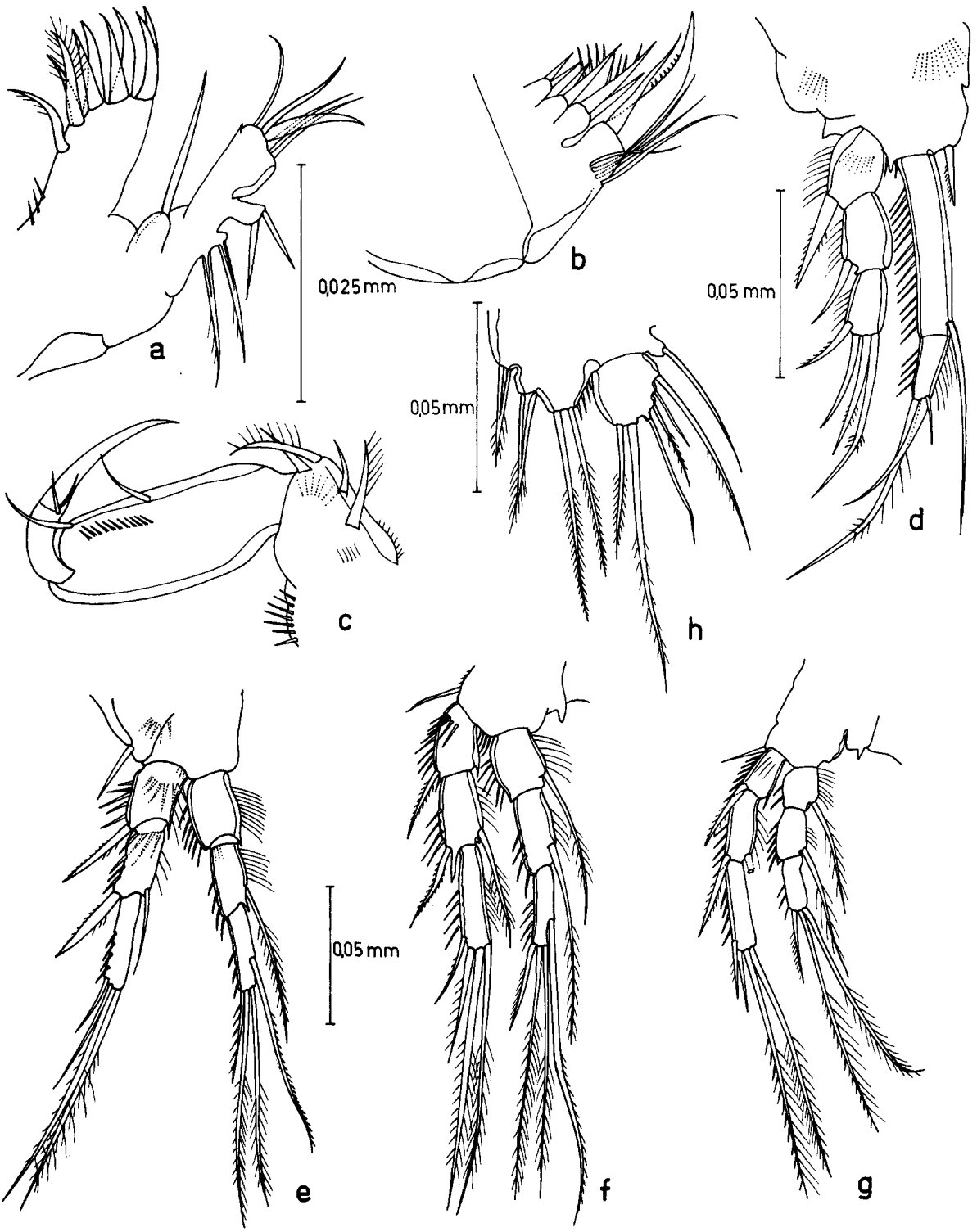

Fig. 6. Schizopera giselae n.sp. female: a-maxilla I; b-maxilla II; c-maxilliped; d-leg 1; e-leg 2; f-leg 3; g-leg 4; h-leg 5.

plumose spiniform seta; 2 long terminal setae, inner with asymmetrical ornamentation; 1 short and 1 long outer setae.

Etymology: the name of the species honours Prof. Francis Dov Por who enthusiastically devised and supervised the hyrdobiological studies at Juréia Ecological Reserve.

Remarks. Schizopera pori n.sp. is most similar to *S. vicina* Herbst, 1960, differing as to the inner spine of the basis of leg 1 which is short in the new species; the basendopod and exopod of leg 5 with setae of different length and ornamentation; the outer setae of the basendopod of leg 5 is longer in *S. pori* n. sp.; maxilliped with 4 setae on the basis and not 1 as in *S. vicina*; antenna II with different number of setae and spines, and the asymmetrical ornamentation of the middle setae of the legs 1–4.

Schizopera giselae n. sp.

Material: 3 adult females collected on August 17, 1982 from Una do Prelado River station 2, Juréia Ecological Reserve, São Paulo, Brazil, on intertidal mud flats in the mangrove swamp. Holotype: 1 adult female (whole) deposited in the Museu de Zoologia da Universidade de São Paulo. Paratypes: 2 dissected females.

Adult female (fig. 5a): body length 0.47 mm. Rostrum, prominent. Urosome (fig. 5b) 4-segmented. Genital area as in fig. 5c. Leg 6 with 2 setae, outer one shorter and plumose. Anal segment with a ventro-lateral row of spinules. Anal operculum with two rows of setules. Caudal rami short, armed with 1 short terminal inner seta, 1 well developed distal seta; 1 distal outer seta; 1 slender lateral spine, and 1 dorsolateral seta. Two egg sacs (fig. 5d) arranged each comprising two rows of eggs.

Antenna I (fig. 5e) 8-segmented. Armature elements as follows (A-Aesthetasc):

segment	1	2	3	4	5	6	7	8
number of setae	–	5	3	2 + A	2	1	2	5

Antenna II (fig. 5f) with allobasis. Exopod 2-segmented: segment I with 1 slender, plumose seta; segment II with 1 short slender seta and 1 short spiniform seta. Endopod with a row of spinules and 2 spines on the outer margin; 1 short seta on the inner margin; 1 strong spine, 4 geniculate setae and 1 plumose seta distally; 1 slender seta and a row of spinules near the basis of the terminal setae and 2 small setae near the outer spines.

Mandible (fig. 5g): precoxa with three-dentate pars incisiva, a row of denticles and 2 setae. Coxa basis with 3 terminal setae, unequal in length. Exopod very small with 2 short setae. Endopod with 2 setae on proximal part of inner edge, and 4 setae distally.

Maxilla I (fig. 6a): precoxa with 8 spines and 1 strong lateral seta. Coxa with 1 strong seta. Basis with 5 setae. Exopod very small with 2 long, thick setae. Endopod with 2 spiniform setae.

Maxilla II (fig. 6b): syncoxa with 3 lobes each armed with 2 spiniform setae. Basis with 1 strong claw and 1 spiniform seta. Endopod region with 4 setae.

Maxilliped (fig. 6c): syncoxa with 2 inner lateral setae, 2 distal setae and rows of setules and spines. Endopod 2-segmented; segment I with 2 inner short setae and a row of spinules; segment II with 1 claw and 2 short setae.

Leg 1 (fig. 6d): endopod 2-segmented, segment I armed with a long seta. Exopod 3-segmented.

Legs 2-4 (figs. 6e–g): endopod and exopod 3-segmented. Armature formula as follows:

	exopod	endopod
leg 1	0.0.0 2 2	1.1 1 1
leg 2	0.1.0 2 2	0.1.1 2 1
leg 3	0.1.0 2 2	1.1.1 2 1
leg 4	0.1.0 2 2	1.1.0 2 1

Leg 5 (fig. 6h): similar to *S. pori* differing in the symmetrical ornamentation of the setae and in the 2 inner setae of the basendopod which are thicker in *S. giselae*.

Male: not known.

Etymology: the name of the species is in honour of Dr. Gisela Y. Schimizu who collected the material.

Remarks. Among the species grouped by Apostolov (1982) in the subgenus *Neoschizopera*, the most similar to *S. giselae* n.sp. is *S. pratensis* Noodt, 1958.

Although the setal formula is equivalent, the inner lateral setae of the third segment of the endopod of legs 2 and 3 are longer and curved in the new species. In leg 3 this seta is notably longer than the plumose terminal setae. In *S. giselae* n.sp., there are two inner spines of equal length on the last segment of the exopod of leg 4 and one spine and one slender plumose seta in *S. pratensis*. In leg 1, the first segment of the endopod is more slender and the second segment shorter than in *S. pratensis*. Further, in leg 1 there is only one long terminal seta to the last segment of the exopod, shorter than that in *S. pratensis*. In leg 5, the exopod is less elongate, separated from the basendopod in *S. giselae* n.sp.; the lengths of the setae are different. In the basendopod of leg 5 there are two plumose inner spiniform setae, much thicker than in *S. pratensis*.

General considerations

In the harpacticoid copepod fauna of the Una do Prelado River the most numerous and frequent species collected was *Schizopera pori* n.sp. This species was recorded from almost all stations in samples of algae, in the river benthos, and in reduced number from the intertidal mangrove mud flat, as well as in fallen leaves from which the type material comes. *Schizopera giselae* n.sp., was only collected on a single occasion. However, the second most abundant species registered from the Una River was *Darcythompsonia radans* Por although this material was always obtained in fallen leaves.

Specimens of the families Ameiridae and Laophontidae were also collected in small numbers and will be treated separately.

Acknowledgements

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