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## *HAPLOCYCLOPS TORRESI* N. SP. AND *POTAMOCARIS ESTEVESI* REID, 1991 FROM BRAZIL, WITH A PROPOSAL FOR REVALIDATION OF THE GENUS *HAPLOCYCLOPS* KIEFER, 1952 (COPEPODA).


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## ABSTRACT

The cyclopid genus *Haplocyclops* Kiefer, 1952, generally considered as a subgenus of *Bryocyclops*, is revalidated, and its diagnosis emended. *Haplocyclops torresi* sp. n. is described from the Rio Doce, State of Minas Gerais, Brazil, the first record of this genus from the South American continent. Harpacticoids found in the same river were identified as *Potamocaris estevesi* Reid, 1991. The latter species is redescribed, the female described for the first time, and its distribution area is widened with new records in rivers of the southeastern part of Brazil. The mouthparts of *P. estevesi* are described for the first time.


## INTRODUCTION

Specimens of copepods collected during several limnological projects surveying different areas of the southern part of Brazil represent an undescribed species of *Haplocyclops*, a problematic group of cyclopid copepods of unclear taxonomic position, and *Potamocaris estevesi* Reid, 1991, a harpacticoid species previously recorded from Lagoa de Cima, State of Rio de Janeiro, Brazil. The new cyclopid is described and compared with its congeners. The description of *P. estevesi* is complemented, and the female is described for the first time.

## MATERIAL AND METHODS

Most of the material analyzed here was collected in stretch of the Middle Rio Doce affected by effluent from a papermill belonging to CENI-

BRA (Celulose Nipo Brasileira S/A), located in Belo Oriente, State of Minas Gerais (19 19'S 42 24'W). Copepods were sorted from subsurface horizontal plankton samples taken with a net of 58 µm mesh size. Other material was found in zooplankton samples, collected in rivers draining the Juréia Ecological Reserve, State of São Paulo, and nearby areas, as well as in the Rio Mogi Guassú, which is part of the Paraná Basin and is located in the same state. The samples were stained with rose bengal or phloxin to facilitate sorting.

Whole specimens were examined in temporary lactic acid mounts. Fragments of cover glass were used to support the cover glass of the preparations. By moving the cover glass slowly and carefully by hand, the whole animal or a particular appendage was placed in different positions, making possible the observation of morphological details. After examination, specimens were returned and preserved in 70% ethanol.

Whole and dissected specimens were examined for variation in the characters described as well as for preparing and checking the drawings. The figures were made using an oil immersion lens and a camera lucida on a Leitz Laborlux D phase-contrast microscope.

The material is deposited in the National Museum of Natural History, Smithsonian Institution, Washington (USNM), the Zoological Museum of Amsterdam (ZMA), the Museu de Zoologia, Universidade de São Paulo, São Paulo (MZUSP), and the Museu Nacional do Rio de Janeiro (MNRJ).

## TAXONOMY

Order Cyclopoida
Family Cyclopidae Burmeister, 1834
Genus *Haplocyclops* Kiefer, 1952

The genus *Haplocyclops* was erected by Kiefer (1952) to accommodate *H. gudrunae*, a species from Madagascar. Lindberg (1956) proposed to consider *Haplocyclops* as the sixth group of species of *Bryocyclops* Kiefer, 1927, because the structure of leg 5 of the former (three setae directly inserted on the edge of the thoracic somite) was also found in many species of the latter genus. Apparently, Kiefer hesitated in accepting Lind-berg's proposition since he included in the genus *Haplocyclops* two further new species (*H. pauliani* and *H. neuter*), twice described from Madagascar a few years later (Kiefer, 1955, 1956). Finally, Kiefer (1960a, b) accepted the transfer of *Haplo-cyclops* to *Bryocylops*, but maintained *Haplocyclops* as a subgenus. In the two latter articles, Kiefer described *Bryocyclops* (*Haplocyclops*) *monodi* from the bank of the Niger River, and replaced the name *Haplocyclops pauliani* Kiefer, 1955 with *Bryocyclops (Haplocyclops) correctus*, as the binomen *Bryocyclops pauliani* had already been used to designate another taxon. *Haplocyclops* was considered a subgenus of *Bryocyclops* by Dussart (1982) and Dussart & Defaye (1985).

Rocha & Bjornberg (1987) pointed out that the absence of the seta on the inner corner of the leg 4 basipod was the only feature still shared by all species of *Bryocyclops* at that time. The existence of this seta in both sexes of the new species described below (*H. torresi*) reveals that the totality of the diagnostic characters of *Bryocyclops* is variable, supporting the view that *Bryocyclops*, as it is presently defined, should be considered an artificial taxon. The complete subdivision of the genus *Bryocyclops* into several independent genera still cannot be proposed, because of deficiencies in descriptions of problematic species, namely *B. africanus* from the Ivory Coast (Kiefer, 1933), *B. travancoricus* and *B. constrictus* described by Lindberg (1947, 1950) from India, and *B. pauliani* recorded by Lindberg (1954) from Madagascar. However, for the reasons below we consider *Haplocyclops* a homogeneous, well characterized taxon, that can be kept separated from *Bryocyclops*. Reid (1993) also attributed the rank of genus to *Haplocyclops*.

Species allocated to *Haplocyclops* are unique within the family Cyclopidae in possessing the pores of the oviducts placed laterally at the distal third part of the double genital somite. The absence of the seta on the inner margin of the terminal segment of the antennule can be considered another *Haplocyclops apomorphy*. This character state was known only in *H. gudrunae*, *H. monodi*, and now is also observed in copepodids and adults of *H. torresi* described below, permitting the assumption that it is present in the other two species of the genus (*H. neuter* and *H. pauliani*) for which this character has not been described yet.

The exopod of leg 4 is unisegmented in females and bisegmented in males of *H. torresi*. The plane of former division between basal and terminal segments in females is marked by a thin and incomplete line observed only on the frontal surface of the exopod. Kiefer (1955) referred to the exopod of leg 4 in both sexes of *Haplocyclops pauliani* as bisegmented, but as "indistinctement biarticulée" in the description of the same species in 1956. According to Kiefer (1956, 1960a, b) *Haplocyclops gudrunae*, *H. monodi* and *H. neuter* possess an unisegmented exopod of leg 4. Thus, it seems that the condition observed in *H. torresi* is also present in all other species of the genus, the reference to the number of segments of the ramus by the authors depending on which surface they examined when preparing the descriptions of their taxa.

*Haplocyclops* can be separated from *Bryocyclops* by the spine formula on the terminal exopodal segment of legs 1 to 4 (2.3.3.2), the lateral caudal seta implanted dorsally at the anterior third of the ramus, and the innermost seta of leg 5 never passing the middle seta in length. Concerning this latter character, the middle seta is the shortest element of leg 5 in all species included in the subgenus *Bryocylops* (which we regard as representing the genus *Bryocyclops*); in the few remaining species of *Bryocyclops* the innermost element is spiniform.

Based on these considerations, and mainly on the external morphology of the new species described herein, we propose emendations to the genus diagnosis as follows:

Genus *Haplocyclops* Kiefer, 1952

*Diagnosis* (emended): Cyclopidae with pair of oviduct pores placed laterally on distal third of enlarged genital double somite; outer apical caudal seta subterminally inserted; dorsal caudal seta longer than outer apical caudal seta; lateral caudal seta implanted at proximal third; antennule of 11 segments, without seta on inner margin of terminal segment; aesthetasc at outer distal corner of penultimate segment of antennule remarkably reduced; antenna basipod without outer seta; mandibular palp consisting of short seta implanted directly on gnathobase; maxilla endopod bisegmented; maxilliped 4-segmented and armed with 1, 2, 1, 2 setae; legs 1-3 with bisegmented rami; leg 4 exopod unisegmented in females and bisegmented in males; leg 4 endopod unisegmented in both sexes; legs 1-4 spine formula: 2.3.3.2; leg 5 represented by 3 setae inserted on edge of somite, innermost seta as long as or shorter than middle seta; male leg 6 consisting of 2 setae.

*Type species: Haplocyclops gudrunae* Kiefer, 1952.

Other species: *H. pauliani* Kiefer, 1955 (= *Bryocyclops (Haplocyclops) correctus* Kiefer, 1960); *H. neuter* Kiefer, 1955; *H. monodi* (Kiefer, 1960); *H. torresi* n. sp.

*Distribution:* Madagascar, Ivory Coast, Iran and southeastern Brazil, respectively.

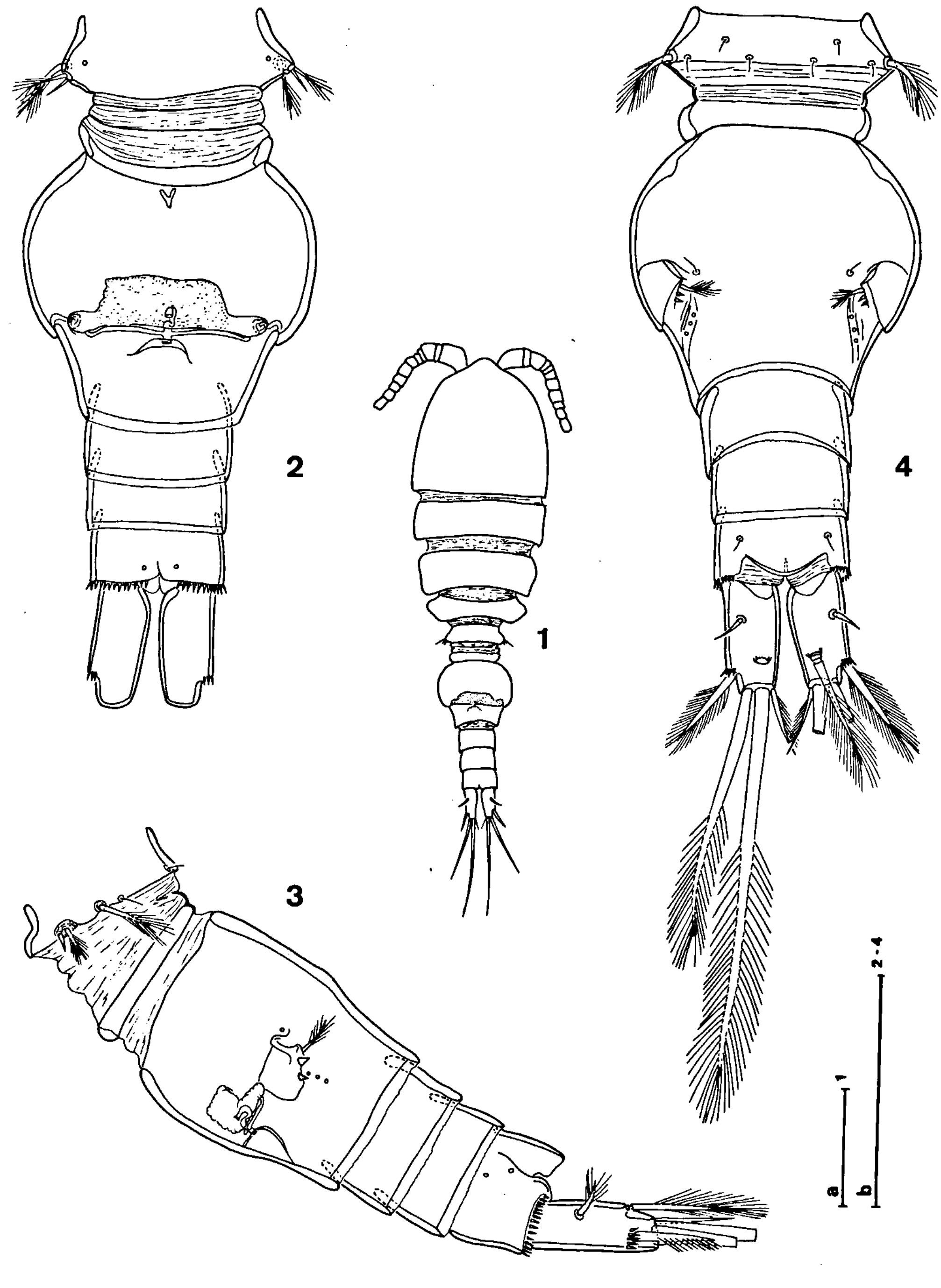
## **Haplocyclops torresi** sp. n. (Figs 1-18)

*Material examined*

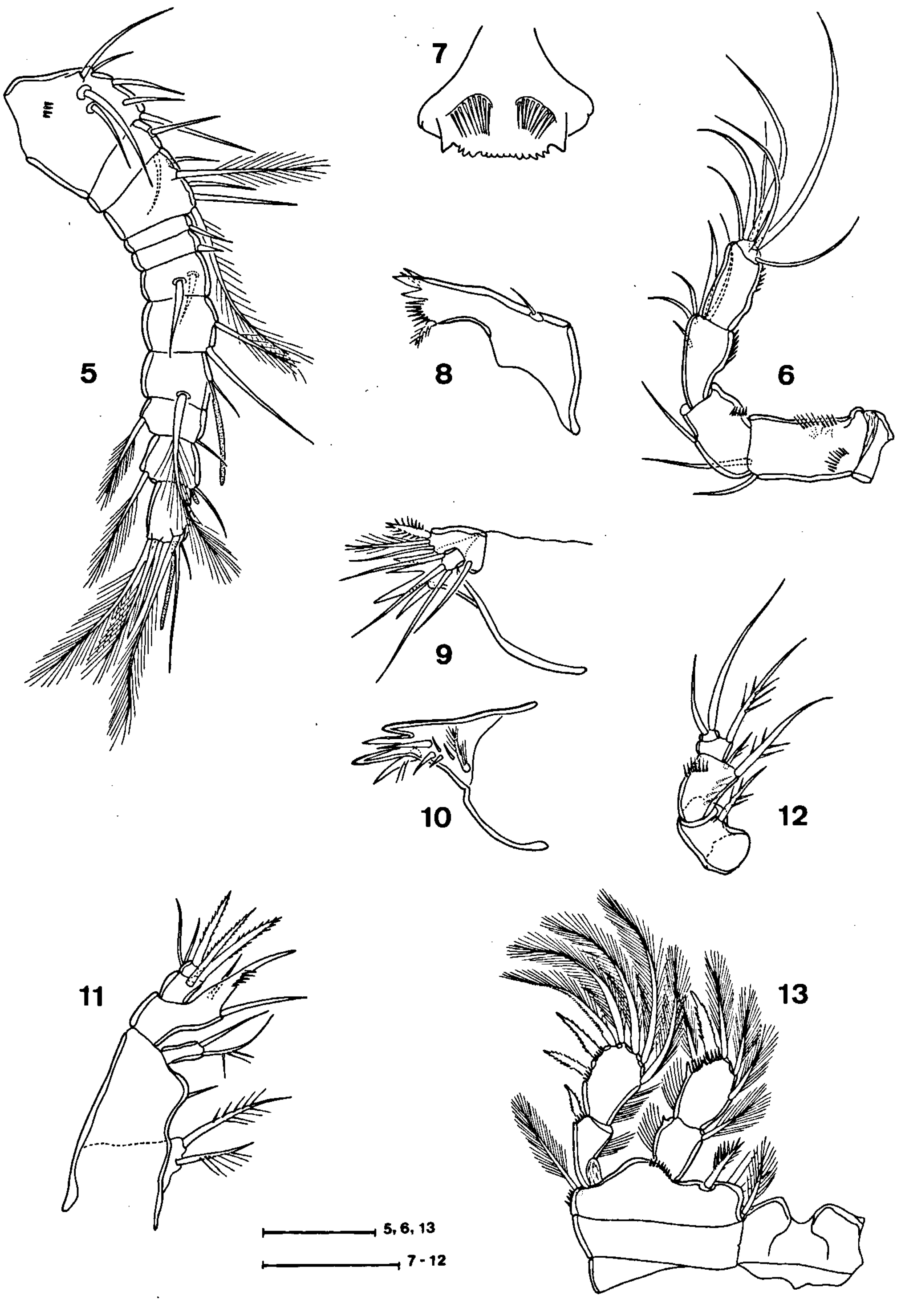
Six females and five males from plankton samples collected from Rio Doce (19 19'S 42 24'W), State of Minas Gerais, Brazil, 17 February 1994, Isabela C. Torres col. Female holotype (12318) and six paratypes (12319) in MZUSP; two paratypes (Co.203797) in ZMA; 2 female paratypes (264191, 264192) in USNM.

*Description*

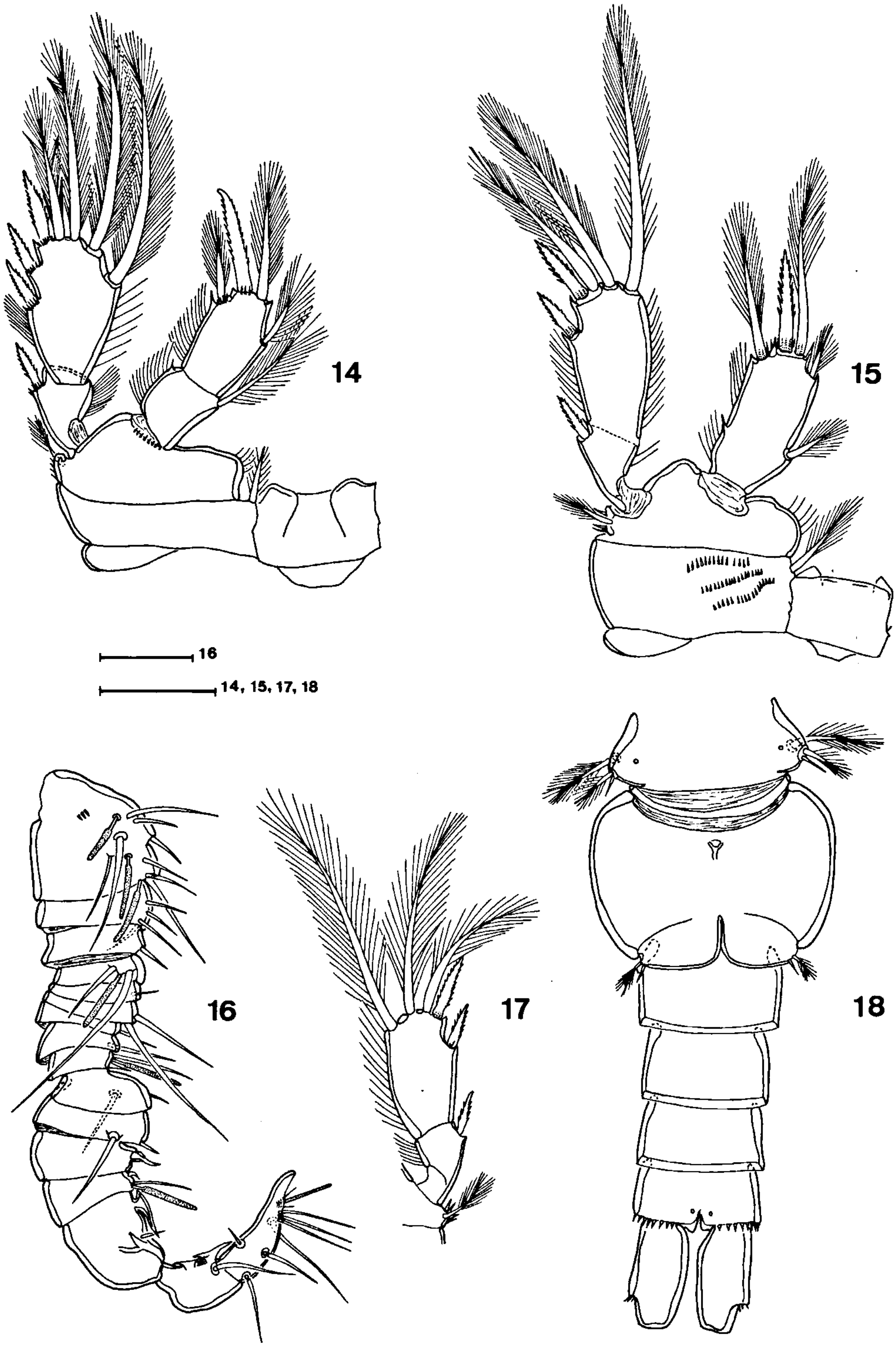
*Female*: Body length, excluding caudal setae, ranging from 310 to 380 µm (N = 3). Prosome: urosome ratio 1.38-1.75:1; all specimens curved and variably extended. Posterior borders of prosomites smooth (Fig. 1). Genital double somite (Figs. 2 and 4) expanded in anterior two-thirds. Copulatory pore located in external depressed area posterior to seminal receptacle. Copulatory duct (Fig. 3) bent three times before opening into seminal receptacle. Pair of transverse ducts connecting copulatory duct with each genital antrum. Seminal receptacle expanded anteriorly at median portion, and connected to lateral genital antra by short, broad receptacle ducts; posterior expansion of seminal receptacle absent. Posterior border of anal somite with ventrolateral row of spinules. Anal pseudoperculum (Figs. 3 - 4) convex and smooth, not reaching beyond limit of anal somite. Caudal rami (Fig. 4) about two times longer than wide. Lateral seta placed dorsolaterally on first third of ramus. Outermost apical seta subterminal, stout, and about 1.3




Figs. 1-4. *Haplocyclops torresi* sp. n. ♀: 1, habitus, dorsal; 2, urosome, ventral; 3, urosome, lateral; 4, urosome, dorsal. Figures 2 to 4 showing integumental pore patterns as visible in respective views. Scale bars: a = 100 μm; b = 50 μm.




Figs. 5-13. *Haplocyclops torresi* sp. n. ♀: 5, antennule, ventral; 6, antenna, anterior; 7, labrum, ventral; 8, mandible, inner; 9, maxillule, outer; 10, maxillule praecoxal arthrite, inner; 11, maxilla, posterior; 12, maxilliped, posterior; 13, leg 1, anterior. Scale bars = 20 μm.




Figs. 14-18. *Haplocyclops torresi* sp. n.: 14, ♀, leg 3, anterior; 15, ♀, leg 4, posterior; 16, ♂, urosome; 17, ♂, antennule, ventral; 18, ♂, leg 4 exopod, posterior. Scale bars = 20 μm.

times longer than innermost apical seta. Dorsal seta 1.3 times longer than outermost apical seta. Urosome with few integumental pores on pediger 5, genital double somite and anal somite only (Figs. 2 - 4).

Antennule (Fig. 5) of 11 segments and armed as follows: 7 + short row of spinules, 2, 5, 1, 1 spine, 2, 2, 2 + aesthetasc, 2, 2 + aesthetasc, 6 + aesthetasc. Aesthetasc of penultimate segment very short and difficult to see. Inner margin of last segment without seta.

Antenna (Fig. 6) 5-segmented. Coxa unarmed. Basis with longitudinal and transverse rows of spinules on frontal side and longitudinal row of spinules on caudal side; seta representing exopod absent; inner distal corner bearing 2 setae. Antennary endopod setation: 1, 5, 7.

Labrum (Fig. 7) with strong teeth on posterior margin and 2 groups of setules on frontal surface.

Mandible (Fig. 8) with palp represented by short seta implanted directly on coxal gnathobase.

Maxillule (Figs. 9, 10) comprised of wide praecoxa and 2-segmented palp. Praecoxa arthrite with 10 setae and spines. Proximal segment (basis) of palp armed with 3 inner setae and outer remnant seta of exopod. Terminal segment bearing 3 setae.

Maxilla (Fig. 11) 5-segmented. Praecoxa fused to coxa on posterior surface. Basis drawn out into claw with 4-5 teeth on inner margin. Seta formula: 2,3,2,2,3.

Maxilliped (Fig. 12) of 4 segments. Seta formula: 1,2,1,2.

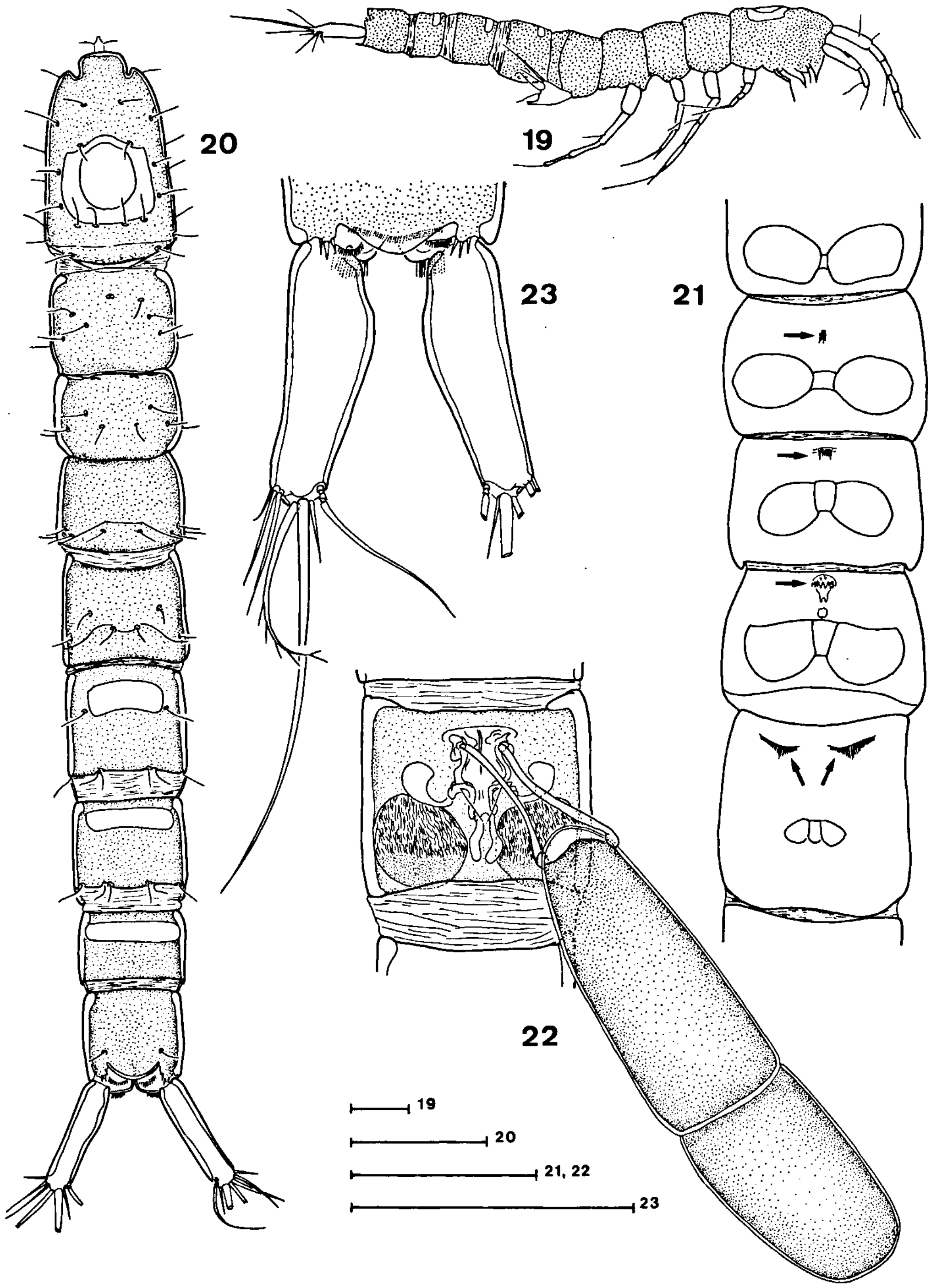
Legs 1-4 (Figs. 13 - 15) armed as in Table 1. Outer and inner setae of terminal endopodal segment of legs 2 and 3 reduced, being about half length of apical spine. Leg 4 with 3 rows of spinules on posterior surface of coxa. Exopod uniarticulate with transverse line on frontal surface indicating former articulation between basal and distal segments. Endopod of leg 4 consisting of only 1 segment about twice longer than broad. Spiniform process on outer margin of leg 4 endopod indicating site of former articulation, between lost segments 1 and 2. Apical inner seta of leg 4 endopod approximately twice longer than apical spine; both setae on inner margin reduced, proximalmost being 1/2 and distalmost 1/3 of apical spine length. Intercoxal sclerites of legs 1 to 3 with pair of rounded humps; each hump of intercoxal sclerite of leg 4 triangular, with rounded point.

Leg 5 (Fig. 3) coalesced with thoracic somite and consisting of 3 setae inserted directly on margin of somite. Dorsal remnant seta of basal segment plumose and separated from the other 2 setae by semicircular marginal expansion of somite. Pair of setae representing terminal segment closely implanted, dorsalmost being plumose and 1.5 times longer than ventralmost naked seta.

*Male*: Body length, excluding caudal setae, ranging from 290 to 360 μm. Antennule of 16 segments and armed as shown in Fig. 16. Exopod leg 4 (Fig. 17) biarticulate, armed as in female. Leg 5 (Fig. 18) similar to that of female. Leg 6 (Fig. 18) represented by plumose outer seta 1.5 times longer than smooth inner seta.

Table 1. Numbers of setae (Arabic numerals) and spines) (Roman numerals) per segment of legs 1-4 of *Haplocyclops torresi* n.sp

| | Coxa | Basis | Exopod | | Endopod | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 1 | 2 |
| Leg 1 | 0-1 | I-1 | I-0 | II, 2, 3 | 0-1 | 1, I+1, 2 |
| Leg 2 | 0-1 | 1-0 | I-0 | II, I+1, 3 | 0-1 | 1, I+1, 1 |
| Leg 3 | 0-1 | 1-0 | I-0 | II, I+1, 3 | 0-1 | 1, I+1, 1 |
| Leg 4 | 0-1 | 1-0 | II, I+1, 2 | | 1, I+1, 2 | |




Figs. 19-23. *Potamocaris estevesi* Reid, 1991, ♀: 19, habitus, lateral; 20, habitus, dorsal, showing integumental pore pattern; 21, ventral view of pedigers 1 to 5, showing ornamentation in front of each pair of legs; 22, genital field, with egg sac attached to gonopores by a pair of ligaments; 23, distal part of anal segment with pseudoperculum, and caudal rami, dorsal. Scale bars = 50 μm.

*Etymology*: The species name honors the late Dr Geraldo Eustáquio Tôrres, an eminent Brazilian freshwater ecologist and pioneer in studies of freshwater benthos focusing on mainly the Chironomidae. Dr. Tôrres' premature passing is deeply regretted by his colleagues and particularly by his students.

*Habitat:* In spite of being collected in the riverine plankton, the morphology of the specimens indicates that they must be benthic copepods, probably removed from their habitat by water currents. The other members of the genus have been recorded in psammic habitats.

*Differential diagnosis:* The new species is easily distinguished within the genus in possessing the endopod of leg 4 armed with 1 spine and 4 setae; the other four known species bear 2 apical spines and 3 setae on that ramus. *Haplocyclops torresi* is also the only species described until now in the genus with a seta at the inner corner of the coxa of legs 1 to 4. This seta is absent in all swimming legs in *H. gudrunae*, occurs only on leg 1 in *H. pauliani*, and on legs 1 to 3 in *H. monodi*. This character has not been described for *H. neuter*.

The seta formula of the terminal exopodal segment of legs 1 to 4 in *Haplocyclops torresi* is 5.4.4.3. The formula in *H. pauliani*, *H. gudrunae* and *H. neuter* is 3.4.4.3. Seta numbers for *H. monodi* were not provided.

Copepods of the genus *Haplocyclops* have been recorded from interstitial freshwater. The occurrence of *Haplocyclops torresi* in southeastern Brazil considerably widens the distribution of the genus. It was found together with harpacticoid copepods identified as *Potamocaris estevesi*, which is treated below.

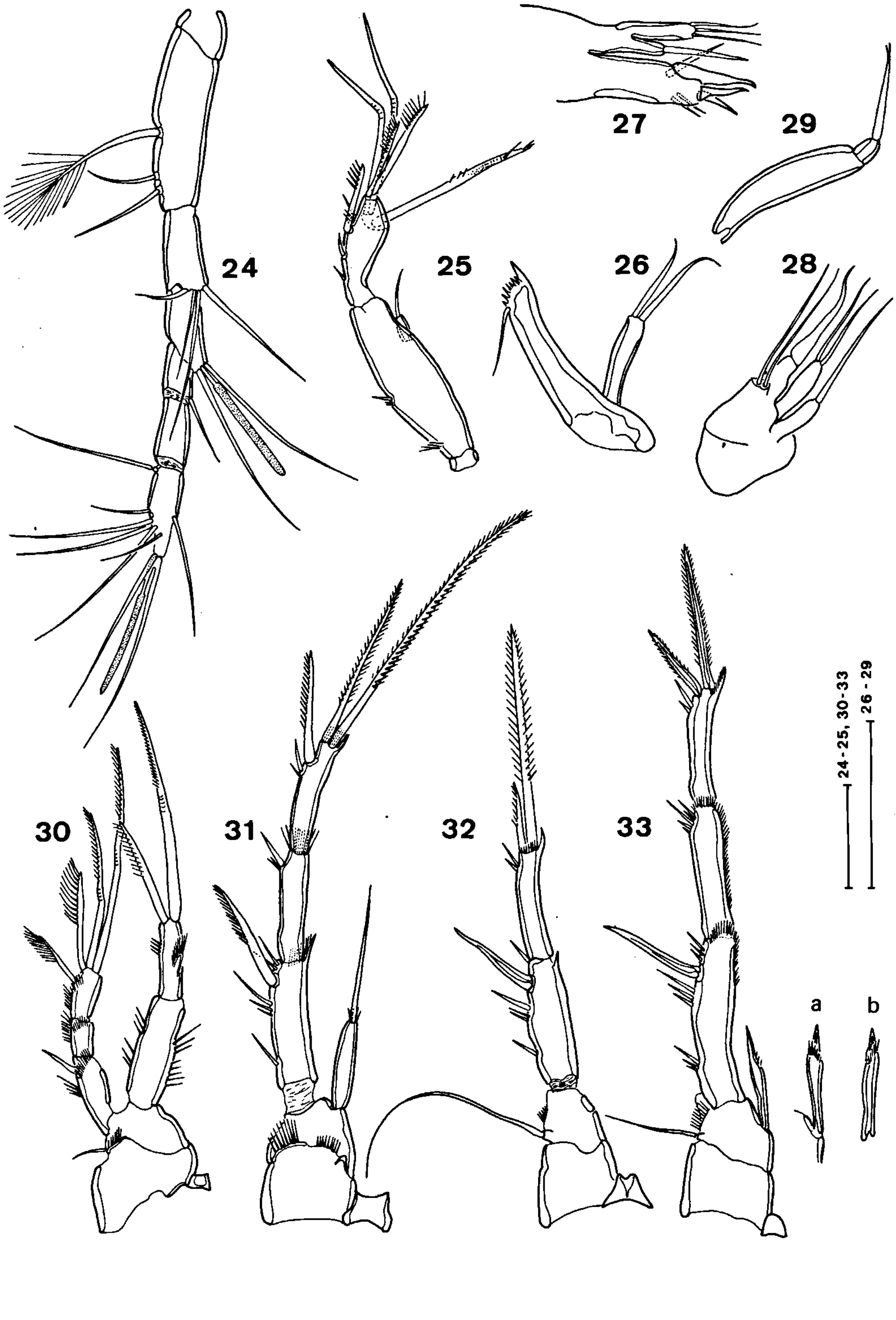
Order Harpacticoida
Family Parastenocarididae Chappuis, 1940

**Potamocaris estevesi** Reid, 1991
(Figs 19 - 44)

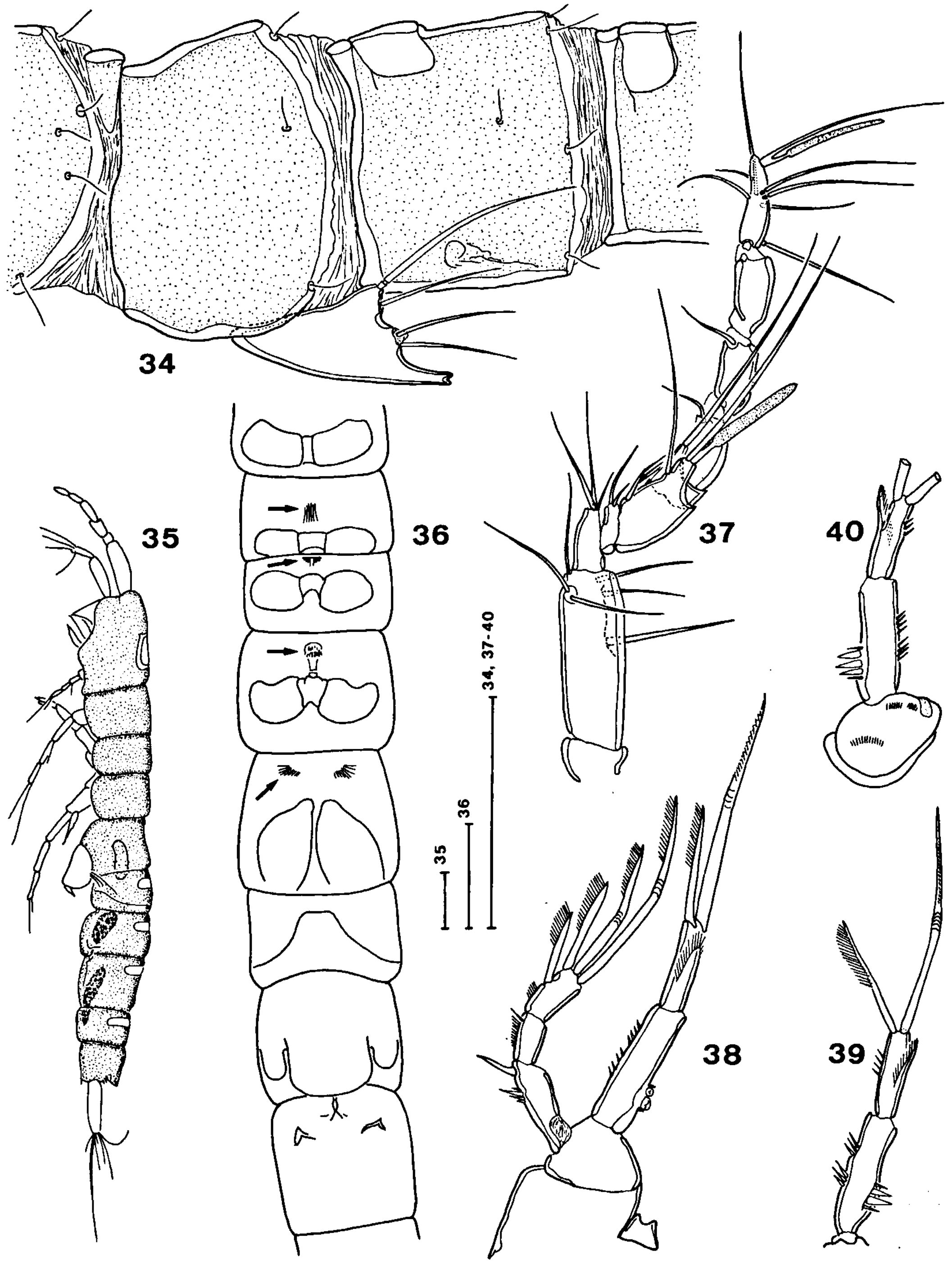
*Material examined*

Brazil, State of Minas Gerais, Isabela C. Torres leg.: Rio Doce, Belo Oriente near to CENIBRA (19 19'S 42 24'W), 17 February 1994, 27 females and 20 males divided in lots deposited in MZUSP (12320), MNRJ (11028) and ZMA (Co.203798); 23 March 1993, 9 females, 4 males; 8 July 1993, 16 females, 15 males and 4 copepodids; 16 September 1993, 1 female, 2 males, all deposited in USNM (264177 - 264190). State of São Paulo, Rio Ribeira de Iguape Basin, Carlos E. F. Rocha leg.: mouth of Rio Jacupiranga (24 36'50"S-47 44'30"W), 18 December 1985, 6 females, 4 males, 2 copepodids (MZUSP 12321); Lagoa Jipuvura (24 39'20"S-47 40'30"W), 18 December 1985, 2 females, 1 male (MZUSP 12322); mouth of River Una da Aldeia (24 38'12"S-47 34'10"W), 17 July 1985, 1 female (MZUSP 12323). Rio Mogi Guassú, Ana L. Brandimarte leg.: near Itapira, 14 November 1995, 4 females and 1 male (MZUSP 12324). Holotype (male) at MZUSP (10747).

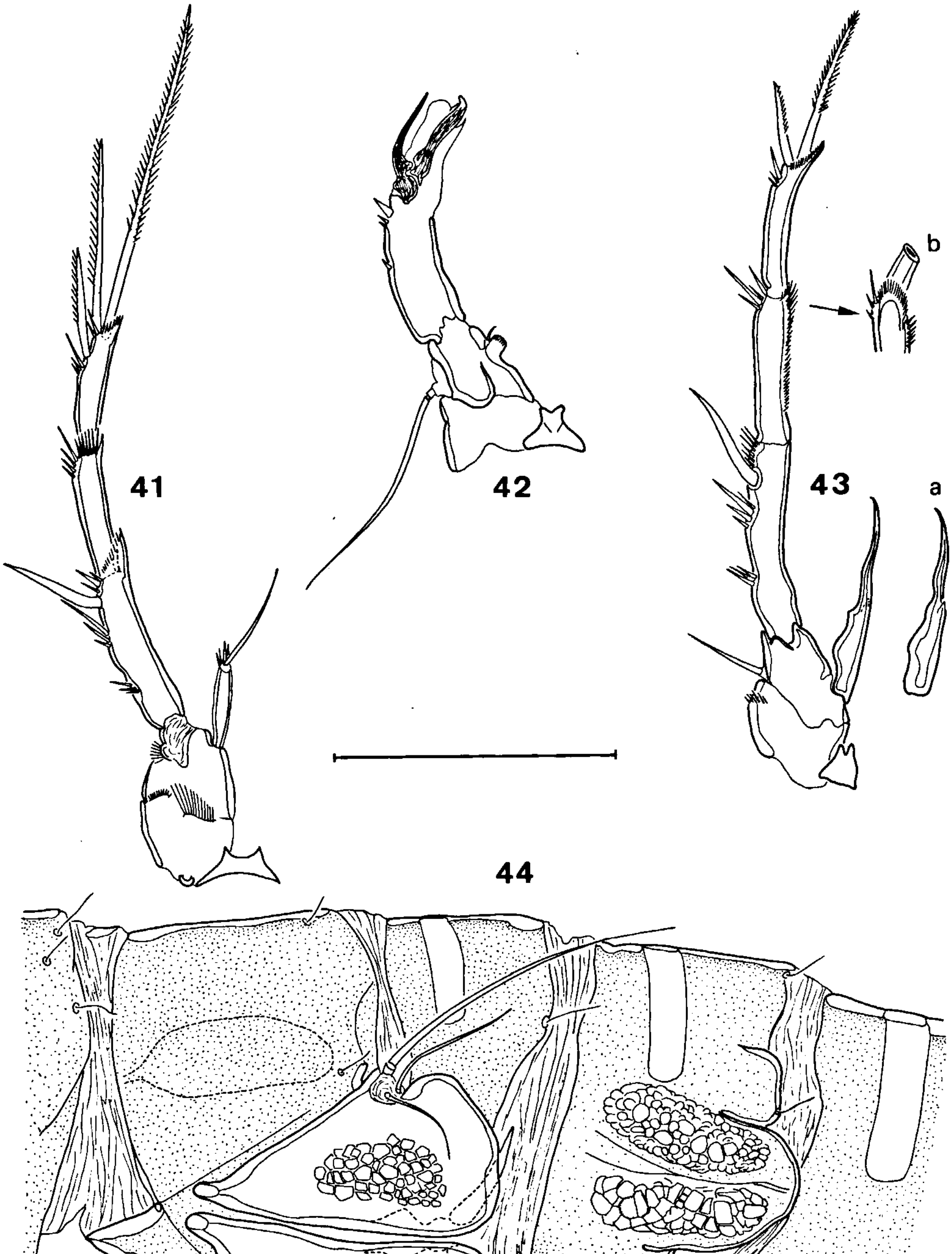
*Description of female:* Body length, excluding caudal setae, varying from 410 to 470 µm in 11 specimens measured. Body shape (Figs. 19-20) cylindrical, elongate and vermiform. Tergal plates of prosome and entire surface of urosomal somites with diminutive refractile points. Integumental sensilla pattern as shown in Fig. 20. Rostrum hyaline (Fig. 20) tapering toward tip after insertion of pair of hairlike sensilla. Integumental window occupying most of posterior half of cephalothoracic dorsal surface. Genital double somite and 2 subsequent somites each with transverse integumental window on anterior dorsal surface. Ventral surface of prosome (Fig. 21) with group of posteriorly curved setules on pediger 2 between legs 1 and 2, row of stiff setules on pediger 3 between legs 2 and 3, heavily sclerotized area with group of spinules on pediger 4 between legs 3 and 4, and, finally, paired row of setules near anterior edge of pediger 5. Genital field with cuticular thickenings forming design as shown in Fig. 22. Egg sac (Fig. 22) containing 2 eggs, directed toward left side in all three ovigerous females examined, and attached at each gonopore by solid hyaline ligament. Anal somite (Figs. 20, 23) longer than preceding somite, dorsally produced backwards into pseudoperculum, and bearing 3-4 spinules dorsally on each side of pseudoperculum. Anal area with dorsal transverse row of fine setules beneath pseudoperculum, and dorsal transverse lateral row of fine setules running above insertion area of each caudal ramus; ventral posterior edge of anal somite with pair of rows of long setules. Caudal ramus (Fig. 23) variously swollen in proximal half, 3 to 4 times longer than wide, and possessing 3 lateral setae, 3 terminal setae and dorsal seta around




Figs. 24-33. *Potamocaris estevesi* Reid, 1991, ♀: 24, antennule; 25, antenna; 26, mandible; 27, maxillule; 28, maxilla; 29, maxilliped; 30, leg 1, anterior; 31, leg. 2, posterior; 32, leg 3, posterior; 33, leg 4, anterior; a, leg 4 endopod, posterior; b, leg 4 endopod, medial. Scale bars = 20 μm.




Figs. 34-40. *Potamocaris estevesi* Reid, 1991, ♀: 34, proximal part of urosome, with leg 5, lateral. ♂ : 35, habitus, dorsal; 36, ventral view of pedigers 1 to 5 and urosomites 2 to 4, showing ornamentation; 37, antennule; 38, leg 1, posterior; 39, leg 1 endopod of specimen from River Doce in anteior view, showing the most frequent arrangement of spinules on inner margin of proximal segment; 40, leg 1 endopod of specimen from Rio Mogi Guassú, with exeptional number of spinules on inner margin of proximal segment. Scale bars = 50 μm




Figs. 41-44. *Potamocaris estevesi* Reid, 1991, ♂: 41, leg 2, anterior; 42, leg 3, posterior; 43, leg 4, posterior; a, endopod of leg 4, anterior, showing spiniform process; 44, proximal part of urosome, with leg 5. Scale bar = 50 μm.

apex; dorsal seta biarticulated at base.

Antennule (Fig. 24) of 7 segments armed with 0, 3, 4, 2, 1, 0 and 9 setae; aesthetasc on segments 4 and 7.

Antenna (Fig. 25) consisting of unarmed coxa, basis with 2 spinule groups, and 1-segmented endopod. Exopod represented by knob with seta. Endopod with 6 setae.

Mandible (Fig. 26) composed of coxal gnathobase with small teeth and long seta distomedially. Mandibular palp long, uniramous, cylindrical, with 2 apical setae.

Maxillule (Fig. 27) comprised of praecoxal arthrite with 6 spines and setae, and 2 lobes with 1 and 3 setae each.

Maxilla (Fig. 28) in part bisegmented, setal formula 1,2,1,2.

Maxilliped (Fig. 29) prehensile. Terminal segment reduced, with bifid seta at tip.

Legs 1, 2 and 4 biramous, with 3-segmented exopod armed as shown in Figs. 30, 31 and 33. Leg 3 (Fig. 32) uniramous, with 2-segmented exopod. Legs 1, 3 and 4 with outer seta on basis. Endopod leg 1 bisegmented, with rows of stiff setules along inner and outer margins of proximal segment, and tongue-like fringed hyaline integumental process on inner surface. Endopod leg 2 reduced to short cylindrical segment bearing seta and short spinules at apex. Endopod leg 4 unisegmented, acuminate, and with diagonal row of fine hyaline setules on swollen part of terminal third.

Leg 5 (Fig. 34) with shape of subtriangular plate extending backward into narrow medial process of bifid tip, and bearing 2 short expansions with 2 setae each; only outermost seta articulated at base.

*Redescription of male:* Body length, excluding caudal setae, 450 - 570 µm. Cephalothorax (Fig. 35) with large dorsal integumental window on posterior half. Four urosomal somites preceding anal somite with transverse integumental window each. Ornamentation of ventral surface of body between leg 1 and leg 5 (Fig. 36) differing from that of female only in having longer and more numerous elements in each group. Third urosomal somite with 3 ventral lobes; medialmost lobe remarkably wider and longer than lateral ones. Fourth urosomal somite bearing pair of spiniform projections directed forward.

Antennule of 10 segments and armed as shown in Fig. 37. Aesthetasc on segment 5 wider and more conspicuous than that on segment 10.

Proximal endopodal segment of leg 1 with 2 (Figs 38 - 39) or 3 (Fig. 40) thick spinules and 2 fine spinules in groove along inner margin of proximal half. Leg 2 (Fig. 41) as in female. Leg 3 exopod (Fig. 42) prehensile, unisegmented, with 2 groups of spinules on outer edge. Terminal clasping organ consisting of articulated claw with tooth-like process near base and flat process continuous with exopod, composed of cuticular thickening curved at tip, flanked by 2 hyaline lobes. Endopod represented by knob with 4 or 5 furrows, and small weak spinule, both elements turned forward; male paratype in MNHN with a second bulge on inner margin of basis (Janet Reid personal communication). Endopod leg 4 (Fig. 43) unisegmented, modified as sclerotized appendage with three expansions along outer margin, and ending in narrow, outwards curved pointed extension; spine-like process (Fig. 43 a) present on anterior surface of endopod between middle and distal expansion.

Leg 5 (Fig. 44) represented by subquadrate plate broadly curved posteriorly, with thick and outward curved spine inserted on dorsal surface of inner distal corner. Outer corner bearing 3 setae implanted on membrane; outermost seta articulated near base, and more than twice longer than other 2 setae.

*Remarks*

According to Reid (1991), the genus *Potamocaris* comprises six species: *P. bidens*, described by Noodt (1955) as a *Parastenocaris* species from Rio Paraíba, Brazil; *P. bifida*, *P. bidentata* and *P. tridentata* reported from Rio Paraná, Argentina (Dussart 1979, 1981); and *P. cuiabaensis* and *P. estevesi*, from Cuiabá and Lagoa de Cima, a freshwater lake in the State of Rio de Janeiro, Brazil, respectively (Reid, 1991).

Males examined herein approximate to those of *P. estevesi*, but several differences from the original description were apparent. The endopod 2 of leg 1 was referred as possessing 2 spinules at the same site where our specimens bear a medial fringed hyaline integumental process (such a process was illustrated as a setule for *P. bifida*, *P.*

*bidentata* and *P. tridentata*). The endopod of the leg 2 was reported as armed with 3 apical setae of different sizes instead of a seta and a group of spinules as described above. The knob-like expansion representing the endopod of leg 3 was mentioned to be bifurcate at tip, but appeared as a sulcate structure flanked by a curved hyaline spinule. Finally, there is no reference in the original description to the long seta of leg 5 observed here. Except for the difference on leg 5, all other ones were eliminated after the examination of the *P. estevesi* holotype (MZUSP 10747). Leg 5 of the holotype had no long seta discernible, probably because of the position of the urosome in the preparation; this seta is also absent in the paratype (J. Reid personal communication) allowing to consider the possibility that the seta broke off in both specimens. Despite this, the similarity in other characters warranted the identification of our material as pertaining to this species.

*P. estevesi* resembles *P. bidens* very closely. However, some differences could be found after comparison of our specimens with the redescription of the latter species provided by Ahnert (1994). The male leg 4 of *P. bidens* bears an endopod with an articulate apical spine, but this spine is fused to the endopod in *P. estevesi*. Males of these two species also differ in the shape of the distal spine as well as the length of the middle seta on the outer corner of leg 5. The male antennule of *P. bidens* consists of 8 segments, segment 3 corresponding to the segments 3 and 4, and segment 6 corresponding to the segments 7 and 8 of the 10-segmented antennules of *P. estevesi*. The penultimate and the last segments of the male antennule of *P. bidens* possess 1 seta and 9 setae plus aesthetasc, respectively, whereas in *P. estevesi* the penultimate segment has no seta, while the last segment is armed with 8. The female antennule of the two species share the same segmentation, but differences between them in the armament could be observed. Thus, the setae on the outer corner of antennular segments 2 and 6 of *P. bidens* are absent in *P. estevesi*.

The description of the female of *P. estevesi* contributed very little to the distinction of the species. Females of *Potamocaris* are remarkably similar to each other. Comparison of published descriptions of the females of *P. cuiabaensis*, *P. bidens*, *P. bifida* and *P. estevesi* showed them as very conservative animals in relation to the armament of legs 1 to 5. Differences concerning to presence or absence of integumental windows in the cephalothorax as well as the urosome are not entirely reliable because of the different level of accuracy of the descriptions. Also, these windows may be really difficult to see on some animals. The same problem could be detected in reference to the armament of caudal rami. *Potamocaris* females were described as possessing 5 (*P. cuiabaensis* and *P. bifida*), 6 (*P. bidens* in the original description) or 7 setae (*P. estevesi* and *P. bidens*, according to Ahnert, 1994). However, some of these setae are short and weak and may have been lost or not observed by authors. The anal pseudoperculum is triangular and well developed in *P. bifida*, but narrowly crescentic in the females of the remaining 3 species. On the other hand, the caudal ramus length ratio is 2.5:1 in *P. cuiabaensis* while the ratios found for *P. bidens* and *P. bifida* are within the range reported for *P. estevesi* in this study. For reasons mentioned above, authors should avoid establishing new taxa based only on females.

As females are very conservative and the species exibit a high level of sexual dimorphism, it becomes problematic to attribute females to males of a given species if they occur in different samples or sites. Perhaps the ventral ornamentation of the body between the legs 1 to 5 could be useful, as for some species of the poecilostomatoid genus *Ergasilus* (Rocha and Amado, unpublished data).

The most diagnostic characters in identifying *Potamocaris* species are in the legs 4 and 5 of males. The sclerotized endopod of leg 4 has a characteristic shape for each of the species known. Concerning leg 5, it may possess a spine on the inner margin as in *P. bifida* and *P. estevesi*, or this spine may be absent as in *P. bidentata* and *P. tridentata*. However, the use of the number of setae on the outer margin of this leg is problematic. Dussart (1979) figured the leg 5 of *P. bifida* with one seta, but with two when recording the species for the second time (Dussart, 1981). Two was also the number found in *P. bidentata*, *P. tridentata* and *P. estevesi*, but the correct number for the latter species is three, as discussed above, leading us to consider it necessary to check this character in the other species as well. The leg 3 could be helpful in characterizing species, since the clasping organ of this leg is apparently similar in *P. bidens*, *P. bifida*, *P. estevesi* and *P. tridentata*, but has a peculiar structure in *P. bidentata.*

Dussart (1979, 1981) gave importance to the number of spinules in the groove along the inner margin of the endopod 1 of leg 1 of males for separating two *Potamocaris* species, naming them according to the number of spinules that he could count in that position. Nevertheless, this number varied from two to three in our specimens of *P. estevesi*, posing questions as to the variability of the species of this little known genus.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