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# A New Species of *Acantholochus* (Copepoda: Bomolochidae) Parasitic on *Centropomus undecimalis* (Osteichthyes: Centropomidae) from the Coastal Zone of the State of Rio de Janeiro, Brazil

Luiz ER Tavares<sup>++</sup>, José L Luque<sup>+</sup>

Curso de Pós-Graduação em Ciências Veterinárias, Departamento de Parasitologia Animal, Universidade Federal Rural do Rio de Janeiro, Caixa Postal 74508, 23851-970 Seropédica, RJ, Brasil

*A new species of Acantholochus Cressey, 1984 (Copepoda: Bomolochidae) parasitic on the gills of common snook, Centropomus undecimalis, from the coastal zone of the State of Rio de Janeiro, Brazil, is described and illustrated. The new species differs from all other species of Acantholochus by the presence of only one inner seta on middle segment of the second and third endopods.*

Key words: Copepoda - Bomolochidae - *Acantholochus* - *Centropomus undecimalis* - Rio de Janeiro - Brazil

*Acantholochus* Cressey, 1984 was proposed to include bomolochid species with rostral hooks, with heavily sclerotized spines on the third exopod segments and without modified setae on antennule. According to Cressey (1984) this genus included five species, *A. asperatus* (Cressey & Cressey, 1980), *A. crevalleus* (Cressey, 1981), *A. divaricatus* (Cressey & Cressey, 1980) (designated as the type species), *A. nasus* Cressey, 1984 and *A. nudiusculus* (Cressey & Cressey, 1980). Later, Luque and Bruno (1990) described two additional species, *A. galeichthys* and *A. paralabracis* from the gills and inner surface of the opercula from Peruvian marine fishes. Only two species, *A. asperatus* and *A. divaricatus* were recorded from the Brazilian coastal zone (Boxshall & Montú 1997).

During a parasitological survey of Brazilian marine fishes, specimens of an undescribed species of *Acantholochus* were collected from the gills of *Centropomus undecimalis* (Bloch, 1792). The new species is described, illustrated and compared with the related species of this genus.

## MATERIALS AND METHODS

The copepods studied are part of the material collected from 79 specimens of *C. undecimalis* from Angra dos Reis, coastal zone of the State of Rio de Janeiro (23°01'S, 44°19'W), Brazil, during April and December 2000. Hosts were identified according to Rivas (1986). The copepods were removed from the gills of hosts with a 1:4000 formalin solution, and fixed and stored in 70°GL ethanol. Some entire specimens and their appendages were dissected and cleared with lactic acid. Measurements were made in

micrometers (µm), the mean is followed by the range. The illustrations were made with the aid of a drawing tube mounted on a Hund Wetzlar H-600 phase contrast microscope. Values of mean abundance and prevalence of infestation were according to Bush et al. (1997). The holotype and paratypes were deposited in the Coleção Carcinológica do Museu Nacional do Rio de Janeiro, Brazil (MNRJ), and some paratypes in the Coleção Helmintológica do Instituto Oswaldo Cruz, Brazil (CHIOC). Host voucher specimens were deposited in the Coleção Ictiológica do Museu Nacional, do Rio de Janeiro, Brazil.

## RESULTS

Copepoda Edwards, 1840  
Poecilostomatoida Thorell, 1859  
Bomolochidae Claus, 1871  
*Acantholochus* Cressey, 1984  
*Acantholochus unisagittatus* sp. nov.  
(Figs 1-13)

*Description:* female (Fig. 1) (based on 21 specimens). Total length 1.24 (1.02-1.38) mm (excluding antennule and caudal rami setae). Greatest width 614.2 (540.6-690.1). Cephalothorax wider than long, antennule visible in dorsal view. Genital complex 132.8 (90.7-172.5) long, 182.4 (130.4-198.4) wide. Abdomen (Fig. 2) 3-segmented, first segment 63.7 (51-73.7) long, 86.4 (73.7-90.7) wide; second segment 54.5 (51-56.7) long, 79.4 (62.3-96.3) wide, third segment 62.3 (51-90.7) long, 75.1 (68-90.7) wide. Ventral surface of second and third abdominal segments with spinules. Caudal rami (Fig. 2), longer than wide, 73.4 (68-85) long, 34.7 (34-39.7) wide, bearing 6 setae, longest seta 88.5 (68-107.7), ventral surface with lateral patch of spinules. Antennule (Fig. 3) 7-segmented, armature of segments from proximal to distal segment: 4, 5, 6, 8 (6 pinnate + 2 naked setae), 3, 2 + 1 aesthete, 5 + 1 aesthete. Antenna (Fig. 4) with 2-segmented sympod, proximal segment with naked, slender seta and patch of shorter naked setae, distal segment with robust, naked seta; first endopod segment bearing 7 rows of spinules, slender spiniform seta continuing along margin of lamelliform pro-

<sup>+</sup>Corresponding author and CNPq researcher. Fax: +55-21-2682.1617. E-mail: jlluque@ufrj.br.

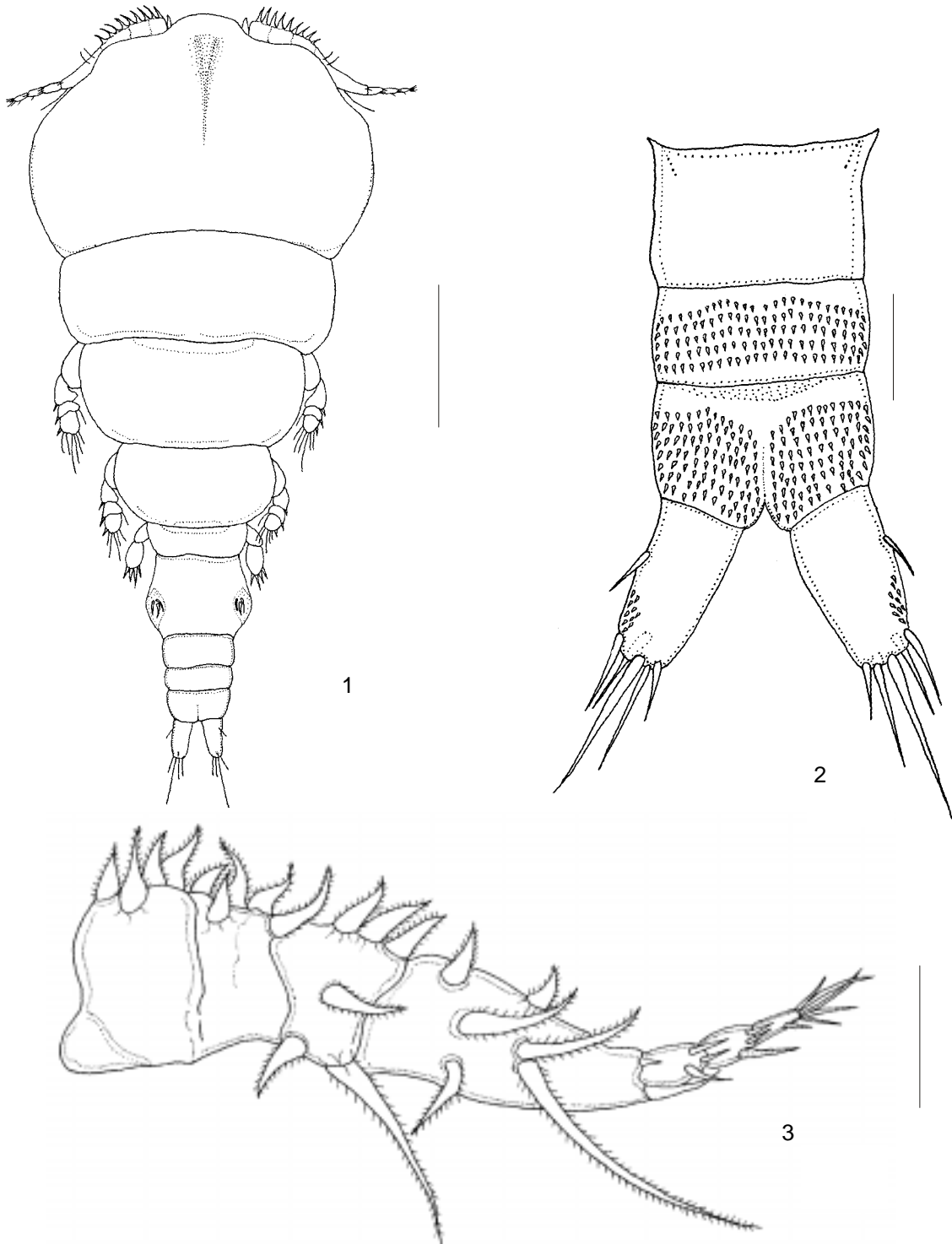
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cess, distal segment with 4 articulated spines and 2 slender naked seta. Rostral area (Fig. 5) between bases of antennule, with 2 ventral hooks and lateral papilliform processes. Mandible (Fig. 6a) with flat rounded proximal segment bearing slender naked seta at distal margin; rectangular unarmed middle segment; distal segment is a short

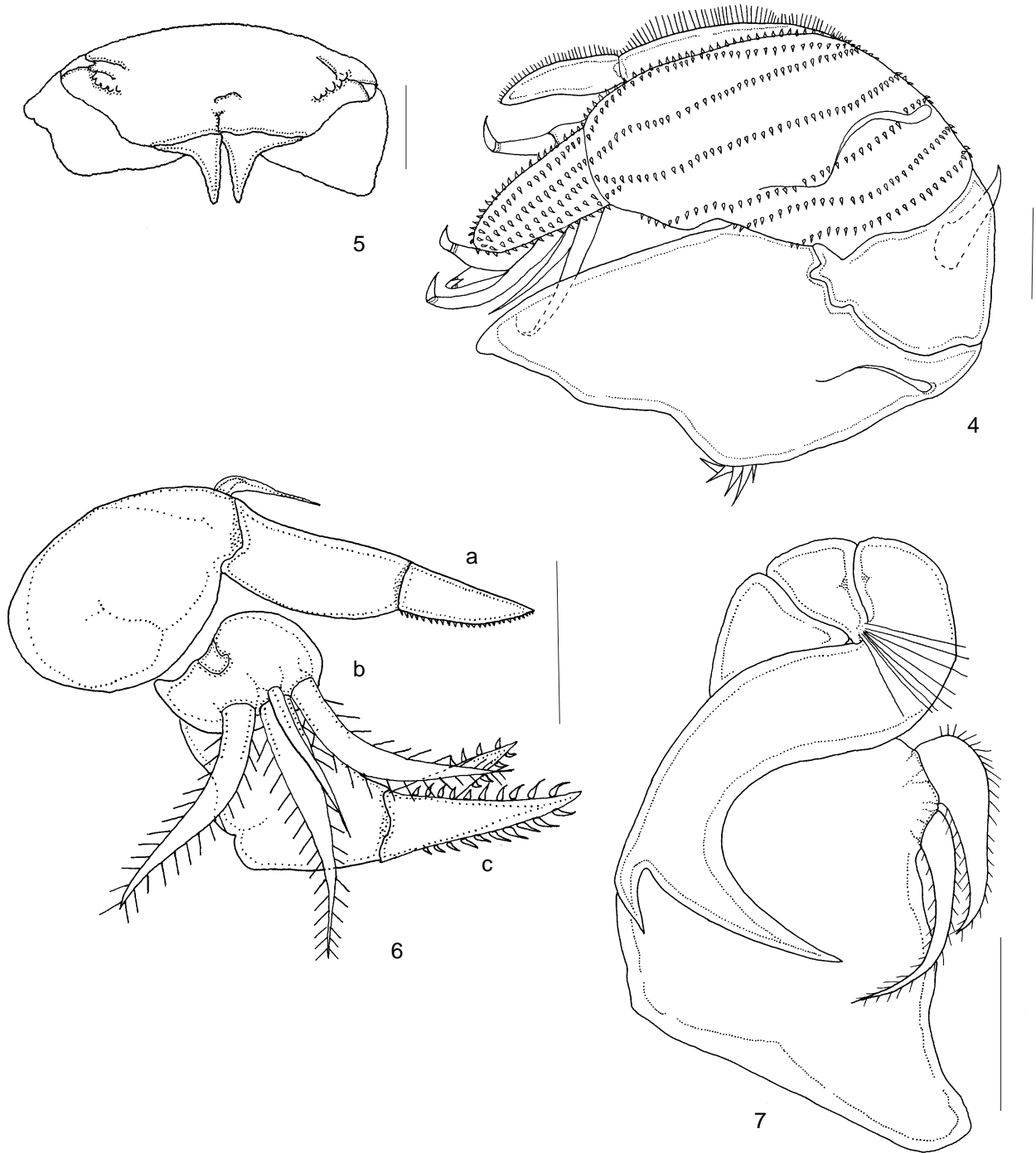
terminal blade with serrations along inferior margin. Maxillule (Fig. 6b) rounded, with 3 stout pinnate setae and 1 shorter naked seta. Maxilla (Fig. 6c) with broad proximal part and subcylindrical distal part with 2 unequal terminal spiniform processes. Maxilliped (Fig. 7) proximal segment with 2 inner pinnate setae, inner margin of middle



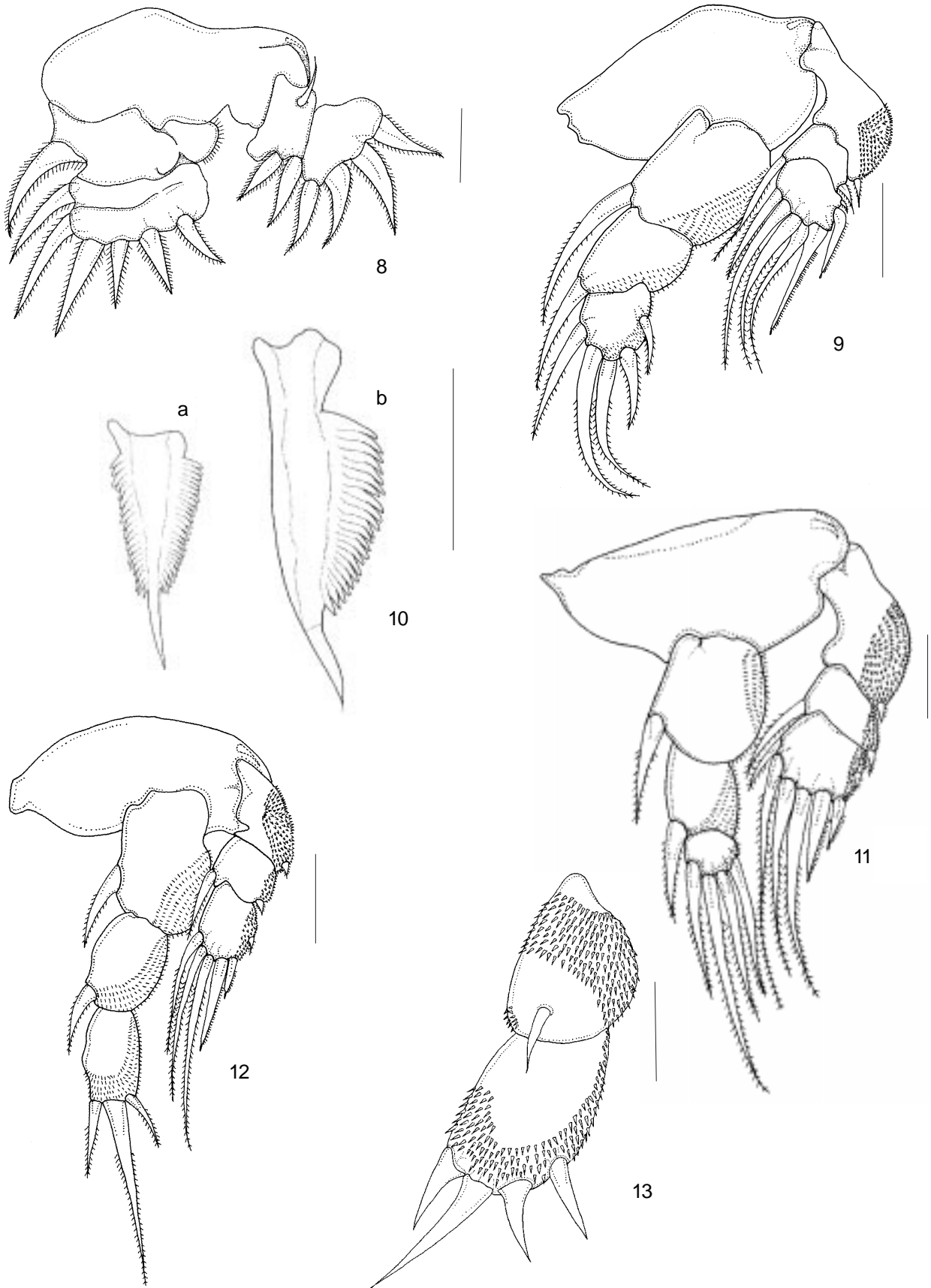
*Acantholochus unisagittatus* sp. nov., female. Fig. 1: holotype, dorsal view. Fig. 2: abdominal segments and caudal rami, ventral. Fig. 3: antennule. Bars: 250  $\mu$ m (Fig. 1) and 50  $\mu$ m (Figs 2, 3)

segment with pilosity, distal segment with terminal curved claw bearing accessory process. First to fourth legs biramous, unsegmented sympods with outer naked seta near to exopod. First leg (Fig. 8) exopod 2-segmented, proximal segment with 2 inner pinnate setae and outer naked seta, distal segment bearing 4 pinnate setae; endopod 3-segmented, proximal segment bearing inner pinnate seta and pilosity on outer margin, middle and distal segments par-

tially fused with 1, 5 pinnate setae, respectively. Second leg (Fig. 9), exopod proximal segment with patch of spinules and outer serrated spine bearing terminal flagellum (Fig. 10a), middle segment with inner pinnate seta and outer spine similar than proximal segment, distal segment with 4 pinnate setae and 3 outer spines, 1 smaller serrated (Fig. 10a) and 2 serrated on outer margin only (Fig. 10b); endopod with the outer surface of the three segments



*Acantholochus unisagittatus* sp. nov., female. Fig. 4: antenna. Fig. 5: rostral area. Fig. 6 a: mandible; b: maxillule; c: maxilla. Fig. 7: maxilliped. Bars: 25  $\mu$ m



*Acantholochus unisagittatus* sp. nov., female. Fig. 8: first leg. Fig. 9: second leg. Fig. 10 a: spine with serrations on inner and outer margins; b: spine with serrations on outer margin. Fig. 11: third leg. Fig. 12: fourth leg. Fig. 13: fifth leg. Bars: 50  $\mu$ m and 10  $\mu$ m (Fig. 10a, b)

covered by pilosity, proximal and middle segments with inner pinnate seta, distal segment bearing 5 pinnate setae. Third leg (Fig. 11), outer surface of endopod segments covered by pilosity, and exopod covered by spinules; exopod proximal segment with outer serrated spine, middle segment with outer similar spine and inner pinnate seta, distal segment with 4 pinnate setae and 3 outer spines, 1 smaller with serrations on margins (Fig. 10a) and 2 with serrations in outer margin (Fig. 10b); endopod proximal and middle segments with inner pinnate seta, distal segment with 4 pinnate setae. Fourth leg (Fig. 12), outer surface of endopod covered by pilosity, and exopod covered by spinules; exopod proximal segment with outer spine, middle segment with outer spine with serrations on margins and inner pinnate seta, distal segment with 3 pinnate setae and 3 outer spines, 1 smaller with serrations on margins (Fig. 10a) and 2 with serrations in outer margin (Fig. 10b); endopod proximal and middle segments with inner pinnate seta, distal segment with 3 pinnate setae, one longer than others. Fifth leg (Fig. 13) uniramous, 2-segmented, proximal segment shorter, partially covered by spinules and with naked ventral seta; distal segment with patch of spinules and 4 naked setae, one longer than others. Sixth leg reduced to 3 pinnate setae on area of egg sac attachment.

Male: unknown

*Type host*: *Centropomus undecimalis* (Bloch, 1792) (Osteichthyes: Centropomidae)

*Site of infestation*: gills

*Type locality*: Angra dos Reis, RJ, Brazil (23°01'S, 44°19'W)

*Prevalence of infestation*: 53.2%

*Mean abundance of infestation*:  $3.3 \pm 4.7$

*Type specimens*: Holotype MNRJ 17886; Paratypes MNRJ 17887 (10 females); CHIOC 34819 (10 females)

*Etymology*: the specific name is from Latin (*uni* = one +

*sagitta* = seta) and refers to the inner seta on middle segment of the second and third endopods.

*Remarks*: the new species can be separated from all known species of *Acantholochus* by the presence of inner seta at middle segment of the second and third endopods. All previously known species have the middle segment of second and third endopods with two inner setae. Additionally, *A. unisagittatus* sp. nov. can be separated from *A. divaricatus*, *A. crevalleus*, *A. galeichthys*, *A. nudiusculus* and *A. paralabraxis* by the number of segments of antennule (7 in the new species, 5 in the others); from *A. asperatus* by the spines of third leg, in *A. asperatus* without serrations and with serrations on new species, and from *A. nasus* by the shape of the maxilliped (with curved claw bearing accessory process on the new species, without accessory process in *A. nasus*) (Cressey & Cressey 1980, Cressey 1981, 1984, Luque & Bruno 1990).

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