



On the genus *Anchistylis* (Crustacea, Cumacea) from the South-West Atlantic

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Abstract: *Anchistylis notus* is redescribed based on new material from Argentina. Besides, *Leptostylis robusta* from Magellan Strait and *Leptostylis elegans* from Rio de Janeiro are transferred to the genus *Anchistylis*, bringing the number of American species described so far to three.

Résumé : L'espèce *Anchistylis notus* est redécrite sur la base d'un matériel nouveau d'Argentine. De plus, les espèces *Leptostylis robusta* du Détroit de Magellan et *Leptostylis elegans* de Rio de Janeiro sont placées dans le genre *Anchistylis*. Le nombre d'espèces américaines connues est de ce fait porté à trois.

Keywords : Cumacea, *Anchistylis notus*, *Leptostylis robusta*, *Leptostylis elegans*, South-West Atlantic.

Introduction

Hale (1945) erected the genus *Anchistylis* to receive *Anchicolurus waitei* Hale, 1928 and two new species, *Anchistylis similis* and *A. longipes*, all of them from Southern Australia. More recently, Lomakina (1968) described *Anchistylis notus* based on material collected off the coast of the Buenos Aires Province.

The main generic distinction of *Anchistylis* is in the male's pleopods; these appendages depart from the usual type, i.e., they are uniramous and adapted to hold the long antennal flagella against the underside of the pleon when the antennae are in resting position. After examining the type material of *Leptostylis robusta* Zimmer, 1902 (Magellan Strait), *Leptostylis elegans* Petrescu & Băcescu, 1991 (off the coast of Rio de Janeiro) and *Anchistylis notus* Lomakina, 1968 (off the coast of Mar del Plata), I noticed that these species agree in general aspect and that their males have uniramous specialized pleopods. There is no doubt that

these three species form a natural group. I propose, therefore, to transfer the two *Leptostylis* species to the genus *Anchistylis*.

The taxonomic position of the above mentioned southwestern Atlantic species is confusing. Their descriptions are incomplete and a revision is badly needed. As a first step in the proper identification of these species, a redescription of *A. notus* is presented.

Material and methods

The following type material was borrowed from the Zoological Institute, St. Petersburg (ZI), the Muzeul de Istoric Naturală "Gr. Antipa", Bucharest (MINGA) and the Zoologisches Museum, Hamburg (ZMH):

Anchistylis notus Lomakina, 1968; off the coast of Mar del Plata; Soviet Antarctic Expedition, Sta. 484; 37°49'S, 56°35'W; 0-50 m; 18 June 1958: 1 marsupial ♀, 1 adult ♂ (paratypes, ZI N1/47343).

Leptostylis elegans Petrescu & Băcescu, 1991; near Cabo Frio, Rio de Janeiro; Geocosta Rio II Expedition, Sta. B12B; 35 m; 24 March 1986: 1 adult ♂ (holotype, MINGA

49465), 1 adult ♂, 2 marsupial ♀♀ (paratypes, MINGA 49467).

Leptostylis robusta Zimmer, 1902; Punta Arenas, Magellan Strait; 2 Fd; September 1892: 7 marsupial ♀♀, 6 preparatory ♀♀, 3 adult ♂♂, 2 preparatory ♂♂ (syntypes, ZMH 16063).

Other material and collecting data: additional specimens of *Leptostylis robusta* were collected by the author: Ushuaia, Beagle Channel; benthos 5 m; 27 August 1996; author's collection: 13 marsupial ♀♀, 5 preparatory ♀♀, 1 adult ♂, 4 preparatory ♂♂, 3 juveniles, 4 mancae.

The material of *Anchistylis notus* here described was collected at the following stations along the coast of Argentina:

IP 0063: 36°01'S, 56°09'W; plankton 18 m, 16 December 1979, 10 marsupial ♀♀, 20 adult ♂♂ deposited in the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires (MACN) under n° 34111; author's collection: 7 marsupial ♀♀, 10 preparatory ♀♀, 33 adult ♂♂, 8 preparatory ♂♂, 4 juveniles. *8501/L22*: 36°10'S, 56°14'W; benthos 18 m, 26 January 1985, author's collection: 1 preparatory ♀. *WHIII-924*: 37°02.6'S, 56°10'W; plankton 25 m, 27 September 1978, author's collection: 1 marsupial ♀, 2 adult ♂♂, 1 preparatory ♂, 4 juveniles. *AU02/93*: 12 stations off the coast of Bahía Blanca, 39°09.92'S - 40°09.94'S, 61°14.84'W - 61°50.01'W; plankton and benthos 15-23 m, 2-3 November 1993, author's collection: 29 marsupial ♀♀, 11 preparatory ♀♀, 3 adult ♂♂, 20 preparatory ♂♂, 111 juveniles, 13 mancae. *SMX-678*: 40°26'S, 61°34'W; plankton 33 m, 17 January 1979, author's collection: 1 preparatory ♀, 1 adult ♂. Playa Colombo (a wide beach southeast Pta. Pardelas), Península Valdés, Chubut; benthos less than 10 m deep, 22 January 1990, 20 marsupial ♀♀, 20 adult ♂♂, deposited in the MACN under n° 34112; author's collection: 44 marsupial ♀♀, 40 preparatory ♀♀, 21 adult ♂♂, 21 preparatory ♂♂, 3 juveniles. Playa Colombo, benthos 2 m, 3 November 1995, author's collection: 3 marsupial ♀♀, 1 preparatory ♀.

The samples *IP 0063* and *8501/L22* were gathered by the Instituto Nacional de Pesca (INAPE), Uruguay, the samples *WHIII-924* and *SMX-678* by the Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP), Mar del Plata, and the samples *AU02/93* by the Instituto Argentino de Oceanografía (IADO), Bahía Blanca. Finally, the samples from *Playa Colombo* were taken by amateur SCUBA divers.

The length of individuals was measured from the tip of the pseudorostrum to the end of the telson. Specimens and dissected parts were drawn with the help of a camera lucida. Drawings are based on the material collected in Playa Colombo, Península Valdés, Province of Chubut, Argentina, on January 22, 1990.

Description of Anchistylis notus Lomakina, 1968.

The adult female (Figs. 1-8)

Length: 3.6 - 4.7 mm. Cuticle thin and transparent.

Carapace (Figs. 1, 2): approximately 0.25 of total length (including telson); its width 0.75-0.80 of its length; with a transverse carina encircling the carapace, crossing dorsal surface at approximately 2/3 of carapace length and ending a little behind each antero-lateral antennal angle; ocular lobe wider than long, without lenses; pseudorostrum rounded when seen from above, approximately 1/3 as long as maximum frontal lobe width; antennal sinus shallow; antero-lateral angle rounded, with a few teeth behind it.

Thorax: longer than carapace; third and fourth segments strongly produced posteriorly, so that second and third peraeopods are widely separated from each other; fifth segment dorsal to fourth; anterior margin of first three segments rough and with minute plumose setae (Fig. 2a), posterior margin of last two segments with 2 plumose mid-dorsal setae.

Abdomen: shorter than cephalothorax; first five segments with 4-0-2-2-2 plumose setae on mid-dorsal surface, respectively, and 0-2-2-2-1 spines with sensory tips on each side of ventral surface, respectively.

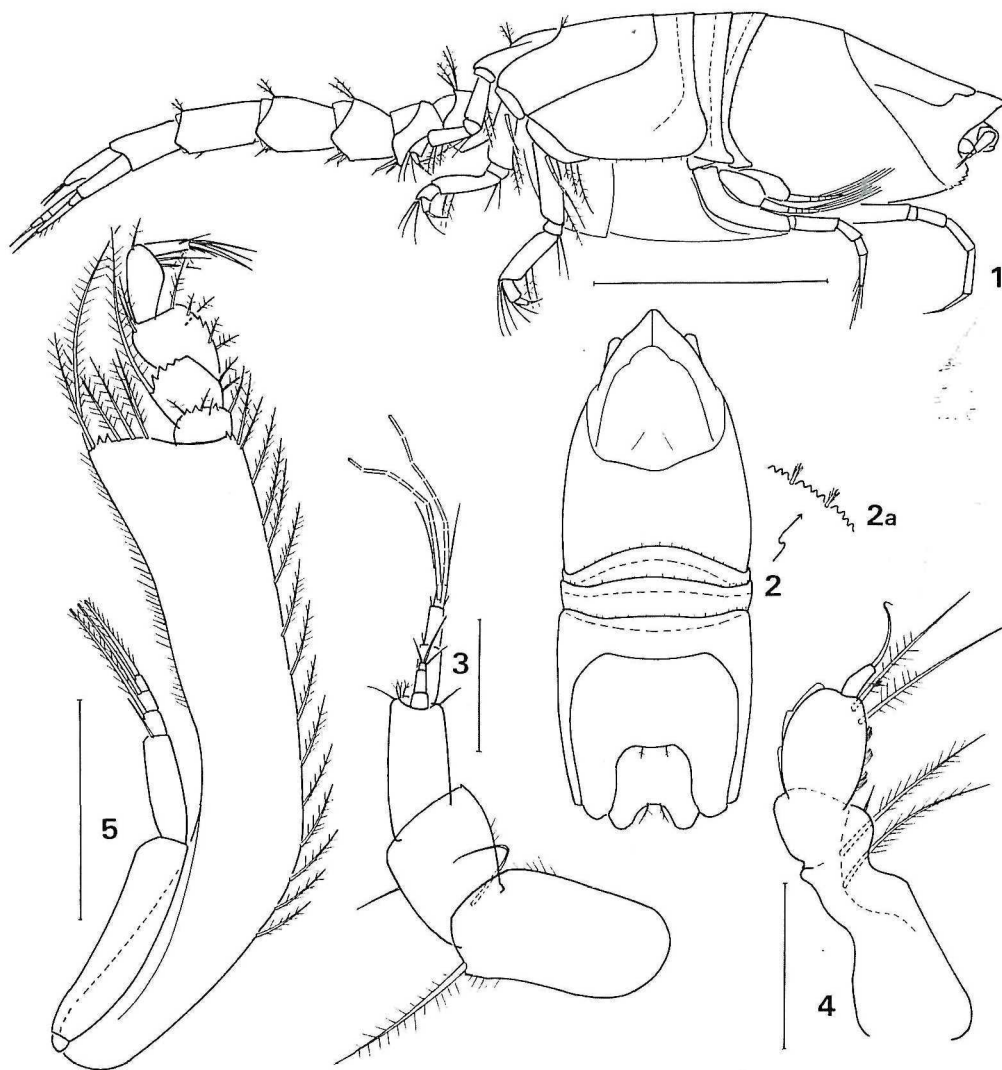
Telson (Fig. 8): slightly longer than last abdominal segment, extending as far as distal end of uropodal peduncle (northern Patagonian specimens) or ending a short distance before it (off Río de la Plata specimens), with 2 long apical spines, 2 small subapical spines, and 2 minute lateral setae (visible only under high magnification).

First antenna (Fig. 3): first article of peduncle shorter than second and third together; main flagellum 3-jointed, slightly shorter (off Río de la Plata specimens) or as long as (northern Patagonian specimens) third peduncular article, second and third articles with a aesthetasc each; accessory flagellum also 3-jointed, not reaching end of first article of main flagellum, with 3 simple short distal setae.

Second antenna (Fig. 4): 4-jointed, first and third articles with 2 plumose setae each, small fourth article with a simple distal seta.

Third maxilliped (Fig. 5): basis slightly more than twice as long as remaining articles together, external process scarcely produced carrying 6 long plumose setae, inner margin with a row of plumose setae; ischium with a plumose seta on inner margin and several shorter ones on ventral surface; merus with 1 plumose seta on outer margin, 2 on inner margin and 1 (not drawn) on dorsal surface; carpus with 5 plumose setae on, or near inner margin, and 2 on outer distal angle; propodus with 4 (only 2 drawn) scarcely plumose setae on distal inner angle and 1 on outer distal angle; exopod much shorter than basis.

First peraeopod (Fig. 6): basis slightly longer than remaining articles together, with plumose setae on both margins and on ventral surface; ischium with one small



Figures 1-5. *Anchistylis notus* Lomakina, 1968, marsupial female, length 4.0 mm. 1, habitus; 2, carapace and thorax in dorsal view; 2a, detail of the anterior margin of first thoracic segment; 3, first antenna; 4, second antenna; 5, third maxilliped. Scale bars: 1 mm (Figs. 1, 2); 0.3 mm (Fig. 5); 0.1 mm (Figs. 3, 4).

Figures 1-5. *Anchistylis notus* Lomakina, 1968, femelle ovigère de 4,0 mm. 1, habitus ; 2, carapace et thorax en vue dorsale ; 2a, détail du bord antérieur du premier segment thoracique ; 3, antennule ; 4, antenne ; 5, troisième maxillipède. Échelles : 1 mm (Figs. 1, 2) ; 0,3 mm (Fig. 5) ; 0,1 mm (Figs. 3, 4).

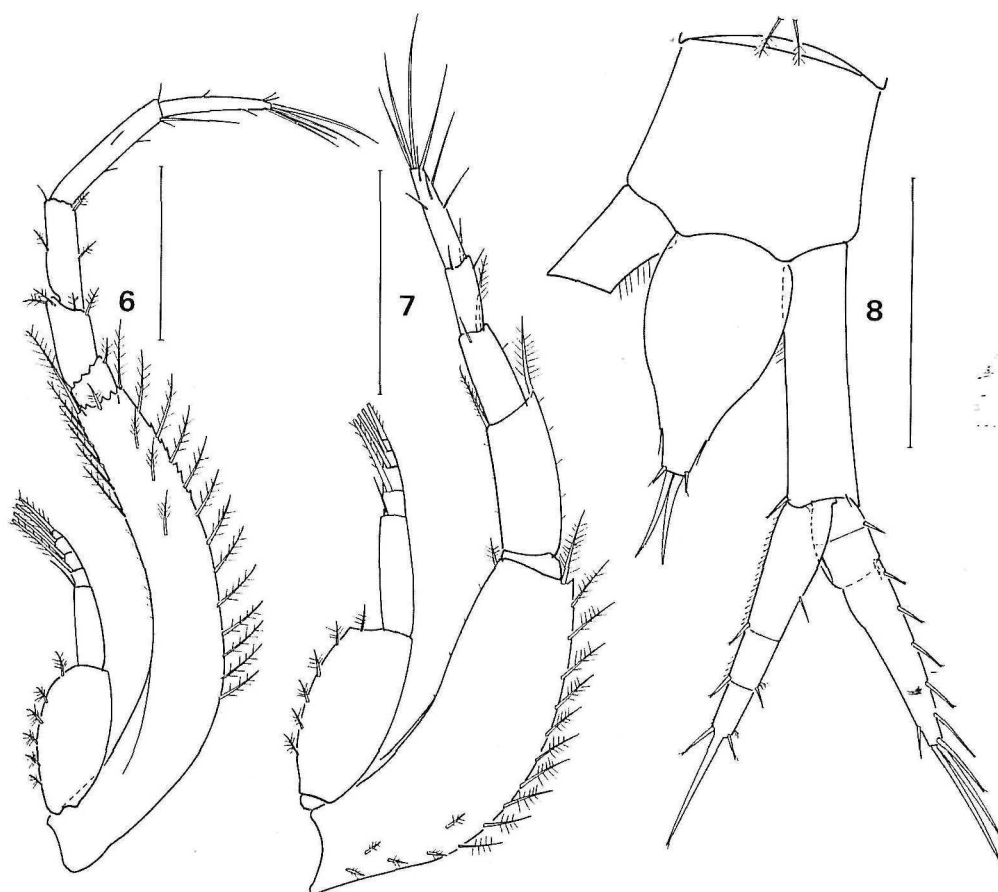
plumose seta on inner distal angle; merus with several small plumose setae distally; carpus with several small lateral and distal setae, either simple or plumose; dactylus 0.70-0.80 as long as propodus, both articles with simple setae.

Second pereopod (Fig. 7): basis slightly shorter than remaining articles together, with plumose setae on inner margin and distal end; merus, the strongest of distal articles, with 2 distal plumose setae; carpus approximately 0.70 (off Río de la Plata specimens) and 0.60 (northern Patagonian

specimens) as long as merus, with 2 unequal distal setae, the longer plumose; propodus with a few short simple setae; dactylus much shorter than carpus and propodus together, with simple distal setae.

Third and fourth pereopods with rudimentary exopods.

Uropod (Fig. 8): peduncle equal to (northern Patagonian specimens) or slightly longer (off Río de la Plata specimens) than exopod; distal end with a spine with sensory tip on inner margin, and another small spine with sensory tip -or a



Figures 6-8. *Anchistylis notus* Lomakina, 1968, marsupial female, length 4.0 mm. 6, first pereopod; 7, second pereopod; 8, last abdominal segment, telson, and right uropod. Scale bars: 0.3 mm.

Figures 6-8. *Anchistylis notus* Lomakina, 1968, femelle ovigère de 4,0 mm. 6, première patte ; 7, deuxième patte ; 8, dernier segment abdominal, telson, et uropode droit. Échelles : 0,3 mm.

small simple seta- on ventral surface (not drawn). Endopod 3-jointed; proximal article longer than the other two together, with 1 spine with sensory tip on inner distal angle and 2 small setae -or weak spines- on outer margin; medial article approximately as long as distal one, with 1 spine with sensory tip and 1 small seta -or weak spine- on inner and outer distal angles, respectively; distal article with 1 long apical spine with sensory tip, continuous (fused) with that article, and flanked by 2 short subapical spines with sensory tips; all these articles with a tiny seta (not drawn) on middle ventral surface. Exopod equal to, or slightly longer than endopod, proximal article with 2 spines with sensory tips on outer margin, distal article with 12-13 spines with sensory tips arranged on 2 rows on outer margin (only dorsal row drawn), 2 long apical spines with sensory tips and 1 short subapical seta -or weak spine- on inner margin.

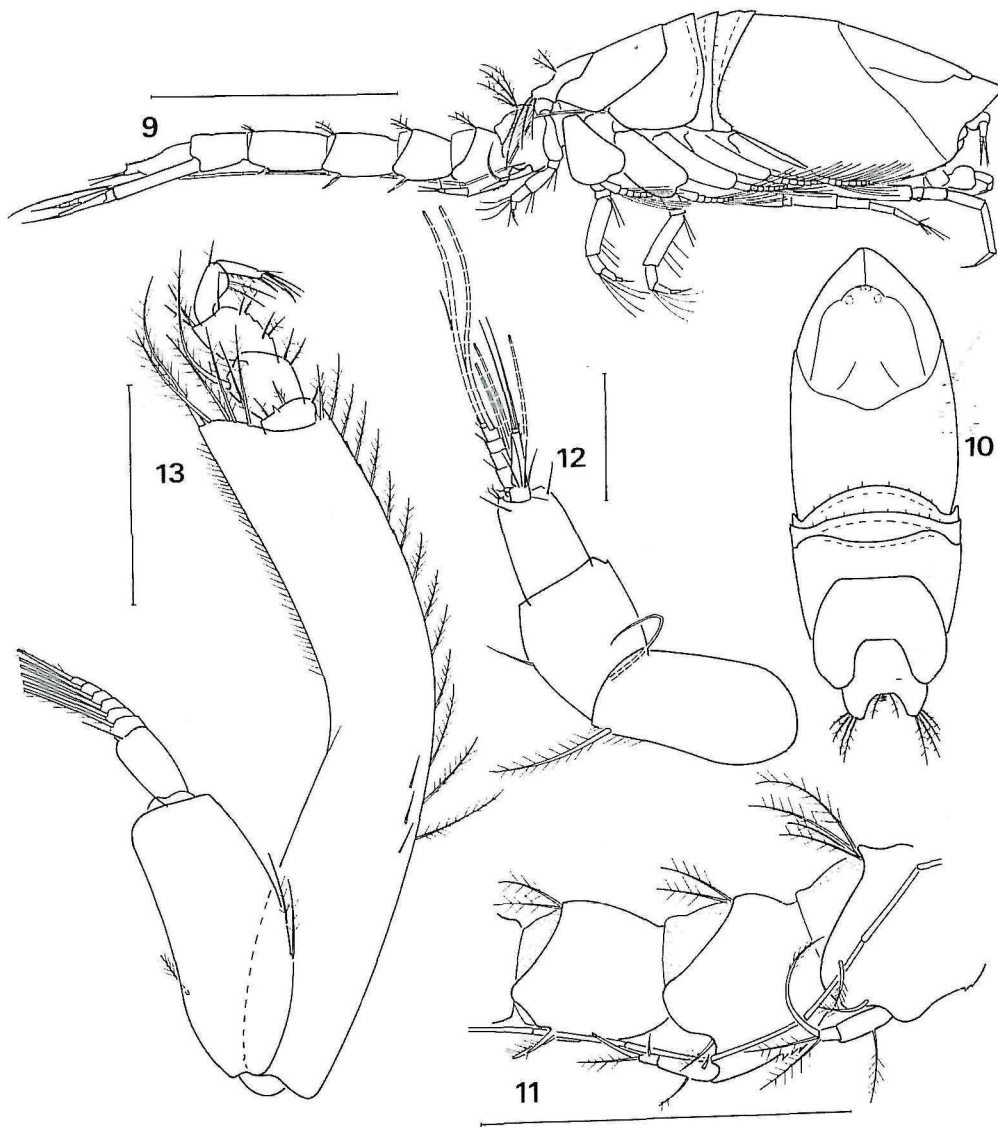
The adult male (Figs. 9-18)

It differs from the adult female in the following features:
Length: 3.3 - 3.9 mm.

Carapace (Figs. 9, 10): its width 0.66-0.72 of its length; ocular lobe usually without lenses, sometimes with 1-2 large lenses; antennal sinus and antero-lateral angle less marked than in female, teeth behind antero-lateral angle scarcely developed.

Thorax as long as carapace; second pereopod not widely separated from third; only first two segments with a rough anterior margin carrying minute plumose setae, and only last segment with mid-dorsal plumose setae.

Abdomen: first five segments with 4-2-2-2-2 mid-dorsal plumose setae, respectively; first segment (Fig. 11) with 2 short, curved, plumose setae on each side, one embracing the antennal lash from below and the other from above;

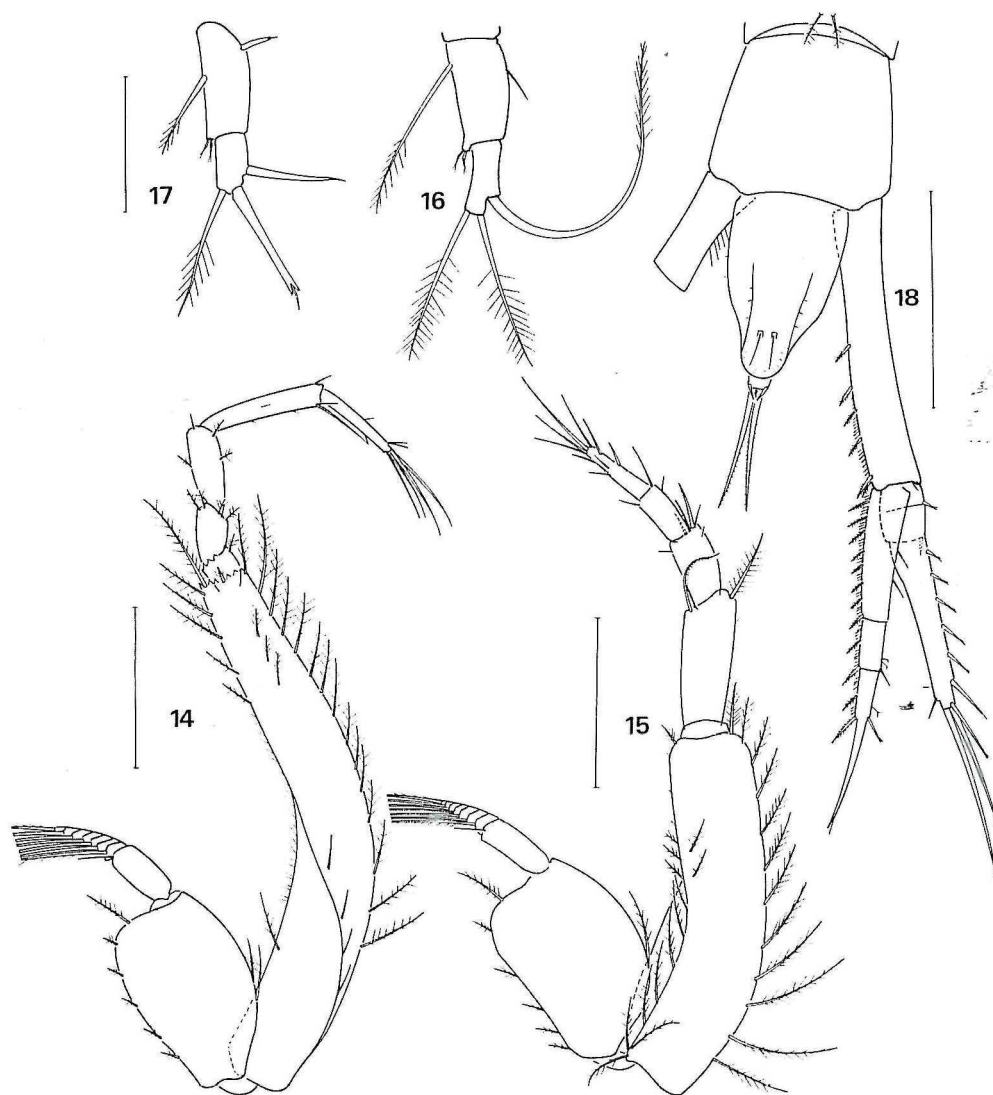


Figures 9-13. *Anchistylis notus* Lomakina, 1968, adult male, length 3.6 mm. 9, habitus; 10, carapace and thorax in dorsal view; 11, detail showing the anchoring of the second antennal flagellum by the pleopods; 12, first antenna; 13, third maxilliped. Scale bars: 1 mm (Figs. 9, 10); 0.3 mm (Figs. 11, 13); 0.1 mm (Fig. 12).

Figures 9-13. *Anchistylis notus* Lomakina, 1968, mâle adulte de 3,6 mm. 9, habitus ; 10, carapace et thorax en vue dorsale ; 11, détail montrant l'accrochage du flagelle antennaire sur les pléopodes ; 12, antenne ; 13, troisième maxillipède. Échelles : 1 mm (Figs. 9, 10) ; 0,3 mm (Figs. 11, 13) ; 0,1 mm (Fig. 12).

second segment with 1 short, curved, plumose seta on each side embracing the antennal lash from above, ventral surface armed with rows of teeth proximally and much more produced distally; third and fourth segments with 2 ventral spines with sensory tips on each side (longest spines furnished with setules), fifth segment with one ventral spine with sensory tip on each side.

Telson (Fig. 18): reaching approximately 2/3 of uropodal peduncle length, post-anal part forming a tongue-shaped lobe, having a sharp margin and a central depressed area with 2 minute setae. Distal end armed with 2 long spines (slightly longer than those of female) and 2 tiny spines (in females these spines are located slightly farther away from distal end and point outwards).



Figures 14-18. *Anchistylis notus* Lomakina, 1968, adult male, length 3.6 mm. 14, first pereopod; 15, second pereopod; 16, first pleopod; 17, second pleopod; 18, last abdominal segment, telson, and right uropod. Scale bars: 0.3 mm (Figs. 14, 15, 18); 0.1 mm (Figs. 16, 17).

Figures 14-18. *Anchistylis notus* Lomakina, 1968, mâle adulte de 3,6 mm. 14, première patte ; 15, deuxième patte ; 16, premier pléopode ; 17, deuxième pléopode ; 18, dernier segment abdominal, telson, et uropode droit. Échelles : 0,3 mm (Figs. 14, 15, 18) ; 0,1 mm (Figs. 16, 17).

First antenna (Fig. 12): main flagellum as long as third peduncular article, 4-6 jointed, first article with 4-6 aestetasc; accessory flagellum reaching penultimate (northern Patagonian specimens) or last (off Río de la Plata specimens) main flagellum article, with 1 minute and 2 long simple setae distally.

Second antenna: flagellum extending as far as end of uropods. In resting position the long antennal lash is held by both pairs of pleopods, abdominal setae and spines (Fig. 11).

Exopods of third maxilliped and first four pereopods all well developed and stouter than in female.

Third maxilliped (Fig. 13): basis approximately $2 \frac{1}{2}$ as long as remaining articles together. Setation as in female but basis with 2-3 simple setae proximally.

First pereopod (Fig. 14): basis much longer than remaining articles together. Setation as in female but basis with a proximal row of 4-6 simple -sometimes some of them plumose- setae.

Second peraeopod (Fig. 15): basis longer than remaining articles together, with plumose setae on both margins and distally, carpus with 3 unequal serrate spines distally and 1-2 plumose setae (absent in northern Patagonian specimens) on inner margin.

Pleopods (Figs. 16, 17): characteristic of the genus, i.e., uniramous and with a few spines and setae. First pleopod: basis, outer margin with 1 small simple seta, inner margin with 1 long plumose seta proximally and 2 tiny sensory setae distally; ramus with 2 plumose distal setae and 1 strong, curved subterminal plumose seta, that embraces the antennal flagellum. Second pleopod resembles first but some setae are shorter and others replaced by spines, i.e., basis, outer margin with 1 small spine with sensory tip, inner margin with 1 short barely plumose seta proximally and 2 tiny sensory setae distally (in the specimens collected off Río de la Plata the proximal inner seta is bare and slightly shorter); ramus with 1 strong distal spine with sensory tip, 1 plumose distal seta, and 1 simple subterminal seta.

Uropod (Fig. 18): peduncle distinctly longer than rami, with 3-7 pectinated spines with sensory tips on inner margin. Endopod approximately as long as exopod, inner margin of proximal, medial and distal articles with 7-8, 2 and 2 pectinated spines with sensory tips, respectively.

Re-examination of Leptostylis robusta Zimmer, 1902 and *L. elegans* Petrescu & Băcescu, 1991: transfer to the genus *Anchistylis*.

The genus *Anchistylis* is well defined and easily recognizable by the fact that the males have very characteristic uniramous pleopods with a few strong setae and spines (Hale, 1945). After examining the type material of *Leptostylis robusta* Zimmer, 1902 from the Magellan Strait and of *L. elegans* Petrescu & Băcescu, 1991 from Rio de Janeiro, I noticed that the males of these two species also have specialized uniramous pleopods. Therefore, these two American *Leptostylis* have been herein transferred to the genus *Anchistylis*.

Leptostylis robusta may be easily separated from *Leptostylis elegans* and *Anchistylis notus* by its larger size (marsupial ♀: 6.1-7.9 mm, adult ♂: 6.4-7.6 mm) and by having abdominal segments with a row of spines extending from the ventral to the lateral areas. These lateral spines are visible even in dorsal view (see Zimmer, 1902: fig. 22). Zimmer erroneously described two carinae on the expanded side of third and fourth thoracic segments (he might have misinterpreted the margins of the muscle bundles that are visible by transparency under the cuticle as carinae). These data are based on the examination of the type material and of additional specimens from Ushuaia (see Material and methods).

The type material of *Leptostylis elegans* examined is suspiciously similar to that of *A. notus*. The description of

L. elegans is incomplete and based on a few specimens from Rio de Janeiro. More specimens from new collections, covering a wide geographic range, are required to determine if these two names refer to the same species or to independent entities.

Discussion

Considering the two species herein transferred to *Anchistylis*, this genus now comprises of the following species: *A. waitei* (Hale, 1928); *A. similis* Hale, 1945; *A. longipes* Hale 1945; *A. notus* Lomakina, 1968; *A. robusta* (Zimmer, 1902); and *A. elegans* (Petrescu & Băcescu, 1991).

The males of the genus *Anchistylis* have uniramous pleopods adapted to hold the antennal flagellum. These appendages have a few strong setae and spines. Besides the fact that the males exhibit modified pleopods, the species of this genus share the following features: the carapace is smooth and crossed by a oblique carina on each side; the third and fourth thoracic segments are produced backwards, so that in the marsupial females the second and third peraeopods are widely separated from each other; the male antennae reach the end of body; the mandibles are boat-shaped; the third maxillipeds of both sexes have well developed exopods; the third and fourth peraeopods of the females have rudimentary exopods; the endopod of the uropod is 3-jointed; the telson is poorly armed, with 0-1 pair of terminal spines and 0-1 (rarely 2) pairs of short lateral spines.

The large number of features shared by these six species suggests that *Anchistylis* is a phylogenetically consistent genus rather than a merely convenient grouping of unrelated species.

The most striking difference between the pleopods of American and Australian species is that in the former the first pleopod has a long, curved seta embracing the antennal flagellum, whereas in the latter there are two strong hook-like setae holding down the antennal flagellum. The presence of a long curved seta was confirmed for the three American species after examining the type material; the couple of hook-like setae is shown by Hale (1945, fig. 24) for two of the three Australian species (the male of *A. longipes* is unknown). We must await further material to confirm if this difference in pleopod setation corresponds to a zoogeographic pattern.

The paratypes of *A. notus* examined in this study have the pleural plates of the third and fourth pedigerous somites strongly produced backwards, a carina encircling the carapace in the female, and a pair of subapical telsonic spinules in the male. All these features are shared by the new specimens from Argentina herein described and were overlooked by Lomakina (1968). The encircling carapace

carina was not visible in the paratype male examined, but this carina might have vanished in this badly preserved specimen. The lengths of these paratypes were 2.8 mm for the marsupial female and 3.3 mm for the adult male, that is smaller than those reported by Lomakina (1968) in the original description.

The paratypes of *A. notus* differ from the new material from Argentina studied here in that: (1) the abdominal dorsal setae are present only on the first segment, (2) the uropodal peduncle is slightly shorter than the rami, and the first article of the endopod is equal to the combined lengths of second and third articles, (3) the first pleopod setation is as illustrated by Lomakina (1968) in fig. 8, i.e., the plumose distal setae are shorter, and the curved seta arises slightly farther from the distal end. Lomakina (1968) omitted to mention the setation of the basal articles of first and second pleopods. This setation on the paratype agrees with that herein described for the specimens collected off the mouth of the Río de la Plata.

The differences mentioned above are minor, and therefore, I refer the specimens described in this paper to *A. notus*. However, other differences may have been overlooked due to the bad condition of the type material examined.

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