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CLETOCAMPTUS CUBAENSIS N. SP. (HARPACTICOIDA, CANTHOCAMPTIDAE) FROM CUBA WITH TAXONOMIC NOTES ON THE SPECIES

BY

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ABSTRACT

A new species of harpacticoid copepod, *Cletocamptus cubaensis* n. sp., from a marine aquarium in Cuba, previously identified with the highly polymorphic *Cletocamptus deitersi* (Richard, 1897), is described herein. A revision of the Cuban material showed that, despite the morphological similarity to *Cletocamptus deitersi*, there are significant interspecific differences in several microcharacters that were not taken into account in the previous species determination, such as integumental sensilla and pores, and ornamentation of segments, mouthparts, swimming legs, prosome, and urosome. Additionally, some other differences were observed in the relative length and shape of the apophysis of the endopod of P_3 in males, the armature complement of the second segment of endopod P_2 in males (with four setae instead of three), the ornamentation and length of the caudal rami in both sexes, and the ornamentation of the anal operculum (with 8 spinules). Similarity to other species is discussed, along with brief comments on the morphological similarities and differences between the new species from Cuba and *Cletocamptus nudus* Gómez, 2005 recorded from Brazil and Colombia, *C. schmidti* Mielke, 2000 known from the Galapagos archipelago, and *C. samariensis* Fuentes-Reinés, Zoppi de Roa & Torres, 2015 from Colombia.

Key words. — *Cletocamptus*, new species, Cuba

RÉSUMÉ

Une nouvelle espèce de copépode harpacticoïde, *Cletocamptus cubaensis* n. sp., d'un aquarium marin à Cuba, précédemment identifié comme le très polymorphe *Cletocamptus deitersi* (Richard, 1897), est décrit ici. Une révision du matériel cubain a montré que, malgré la similitude morphologique avec *Cletocamptus deitersi*, il existe des différences interspécifiques significatives dans plusieurs microcaractères, qui n'ont pas été pris en compte dans la détermination précédente de

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l'espèce, tels que les sensilles et les pores tégumentaires, et l'ornementation des segments, pièces buccales, pattes natatoires, prosome et urosome. De plus, d'autres différences ont été observées dans la longueur et la forme relatives de l'apophyse de l'endopodite de P_3 chez les mâles, le complément d'armature du deuxième article de l'endopodite de P_2 chez les mâles (avec quatre soies au lieu de trois), l'ornementation et la longueur des branches furcales chez les deux sexes, et ornementation de l'opercule anal (avec 8 spinules). La similitude avec d'autres espèces est discutée avec de brefs commentaires sur les similitudes et les différences morphologiques entre la nouvelle espèce de Cuba et *Cletocamptus nudus* (Gómez, 2005) enregistré au Brésil et en Colombie, *C. schmidti* Mielke, 2000 connu des Galápagos, et *C. samariensis* Fuentes-Reinés, Zoppi de Roa & Torres, 2015 de Colombie.

Mots clés. — *Cletocamptus*, nouvelle espèce, Cuba

INTRODUCTION

The genus *Cletocamptus* Schmankevitsch, 1875 was established for *C. retrogressus* Schmankevitsch, 1875 and referred to the family Cletodidae. Later, however, Por (1986) moved the genus from the Cletodidae and relocated it to Canthocamptidae 'incertae sedis'. As Gómez & Yáñez-Rivera (2022) indicated, the taxonomy of the Canthocamptidae is extremely complicated, which has necessitated the creation of separate subfamilies and species groups. Gómez & Yáñez-Rivera (2022) proposed a new subfamily, Cletocamptinae for *Cletocamptus* Schmankevitsch, 1875, *Amphibiperita* Fiers & Rutledge, 1990, and *Cletocamptoides* Gómez & Yáñez-Rivera, 2022. The new subfamily is justified by the synapomorphic subdistal ventral spinules of the rostrum (Gómez & Yáñez-Rivera, 2022).

Morphological variations are well known within *Cletocamptus* (Lang, 1948). According to Wells & McKenzie (1973) and Yeatman (1963), such variation occurs both within local populations and within individual specimens. The morphological and molecular studies carried out have shown a high degree of polymorphism within and between populations, as well as morphological differences, which has led to erroneous identification of species from different geographical areas. The high polymorphism in *Cletocamptus* is a prerequisite for the presence of morphologically indistinguishable sibling species (Dexter, 1995; Suárez-Morales et al., 1996; Mielke, 2000, 2001). Gee (1999) goes further in reasoning that it is possible that *Cletocamptus* includes species from different genera. Gómez et al. (2004) noted that intraspecific variation in the genus *Cletocamptus* is undoubtedly under genetic control, and the resulting morphological variation is different for each species. The polymorphism in *Cletocamptus* is the reason for the erroneous identification of specimens attributed to *C. deitersi* (Richard, 1897), which was assumed to be a cosmopolitan species (Fleeger, 1980; Mielke, 2000; Gómez et al., 2004; Gómez, 2005; Gómez et al., 2007). The particularly variable morphology of

C. deitersi as diagnosed by Lang (1948) was noted earlier by Löffler (1963) and Yeatman (1963).

There already is ample evidence to support the hypothesis that all records of *C. deitersi* outside Argentina belong to separate species (Rocha-Olivares et al., 2001; Castro-Longoria et al., 2003). Mielke (2000) noted that *C. deitersi* has a wide geographic distribution, making it morphologically variable and suggested that many of the species described as *C. deitersi* may be morphologically indistinguishable sibling species. Similar is the opinion of Fleeger (1980), Dexter (1995) and Suárez-Morales et al. (1996) for morphologically indistinguishable sister species in the genus *Cletocamptus*. This idea is supported by the presence of two forms, *C. axi* Mielke, 2000 and *C. schmidti* Mielke, 2000, described from the Galapagos Islands, which excludes the existence of local forms of *C. deitersi* (cf. Mielke, 2000). Modern taxonomy uses DNA as well as geometric morphology to separate different species. Thanks to these methods, sympatrical or parapatrical co-existence of copepod congeners has been confirmed (Karanovic & Cooper, 2012; Karanovic & Kim, 2014; Karanovic, 2020).

At present, 25 out of 38 described species of *Cletocamptus* are considered valid. Some species such as *C. helobius* Fleeger, 1980 and *C. merbokensis* Gee, 1999 were removed to the recently described genus *Cletocamptoides* (Gómez & Yáñez-Rivera, 2022). Other species such as *Cletocamptus axi* Mielke, 2000; *C. bermudae* Willey, 1930; *C. bicolor* (Wilson C.B., 1932); *C. brevicaudatus* (Herrick, 1894); *C. croisicensis* (Labbé, 1927); *C. dadayi* (Delachaux, 1918); *C. deitersi* (Richard, 1897); *C. gabrieli* Löffler, 1961; and *C. racovitzae* (Labbé, 1926), were regarded as uncertain records — taxa inquirenda of *C. deitersi* by Wells (2007).

Gómez et al. (2004) considered as doubtful records of *C. deitersi* specimens identified as such by Brehm (1936, 1965), Chappuis (1936), Ringuelet (1958a, b, 1960, 1962); Ringuelet et al. (1965); Oliveira & Miranda (1971), Apostolov (1984), Ruber et al. (1994), and Loftus & Reid (2000). According to Gómez (pers. commun.), all records of *C. deitersi* away from the Naposta Grande River should be considered doubtful records of this species and are most likely new species morphologically similar to *C. deitersi*. This author's opinion (Gómez, 2005) is that the distribution of genuine *C. deitersi* is, in all probability, limited to the Bahía Blanca region, with probable extensions into the Province of Buenos Aires and La Pampa (Argentina).

As noted above, specimens of *C. deitersi* described by Apostolov (1984) from a marine aquarium in Cuba have been included in the group of doubtful records of *C. deitersi*, with unclear affiliation. This prompted me to re-examine the morphological characters of the Cuban specimens and to determine their exact taxonomic affiliation. The use of modern techniques has made it possible to study the morphology of the Cuban specimens in detail. *Cletocamptus cubaensis* n. sp.

is a new name for the material earlier described and illustrated from Cuba as *Cletocamptus deitersi* (Richard, 1897) by Apostolov (1984).

MATERIAL AND METHODS

The description of the new species is based on material collected from a marine aquarium in Cuba by Prof. M. Bacescu (then Director of the Natural History Museum "Grigore Antipa" in Bucharest), provided to me through Dr. T. Marinov from Varna. The material was collected in September 1978 and contained 12 specimens, of which 8 were females and 4 males. Copepods were fixed and stored in 4% buffered formalin and later transferred to 70% ethanol. In the initial description of the Cuban material as *C. deitersi*, selected copepods were transferred to glycerine and their dissected body parts mounted on glass slides in glycerine. The remaining specimens, preserved in 70% ethanol, were returned to the collection of Dr. T. Marinov at the Institute of Fish Resources, Varna, Bulgaria. Because of the uncertainty, in 1984, about the actual variation of *C. deitersi* throughout its allegedly wide area of distribution, as mentioned above, one of those specimens, a female, had already provisionally been marked as "Holotype". However, as a result of damage caused by repair work on the building, today this material, including the specimen marked "Holotype ♀", must be considered lost.

The present revision of the Cuban specimens was made on the basis of the preserved preparations in the author's collection. Observations and illustrations were prepared using a microscope equipped with an eyepiece 10×, an objective 100× oil immersion, and a drawing apparatus. Morphological observations and drawings were made from dissected specimens. Intraspecific variability in the armature formulae of P_1-P_5 was assessed from cut specimens only. This means that all figures of female body parts herein, have been taken from the same female specimen originally designated as a paratype, but now, through the loss of the original "holotype", has been given holotype status, and is marked as such on the only remaining female slide. The figures of the male specimen as on the following pages have been prepared from the available, preserved allotype slide.

The descriptive terminology is adopted from Huys & Boxshall (1991), albeit that herein "cephalothorax" (not explicitly defined by Huys & Boxshall, 1991) is considered equivalent to "cephalosome + pedigerous somite 1". The terminology of Karanovic (2019, 2020) is adopted for the spelling of some appendages: A_1, antennula; A_2, antenna; Md, mandibula; Mxl, maxillula; Mx, maxilla (instead of antennule, mandible, maxillule).

Abbreviations used in the text and figure legends follow the conventional ones frequently used in the taxonomy of copepods: ac, acrothek (composed of one aesthetasc and two setae fused basally); ae, aesthetasc; apo, apophysis; Mxp, maxilliped; BENP, baseoendopod; ENP, Endopod; EXP, Exopod; EXP (ENP) 1, 2, 3, first, second, third exopodal (endopodal) segment; P_1-P_6 first to sixth legs.

SYSTEMATIC PART

Family CANTHOCAMPTIDAE Brady, 1880
Subfamily CLETOCAMPTINAE Gómez & Yáñez-Rivera, 2022
Genus *Cletocamptus* Schmankevitsch, 1875

Cletocamptus cubaensis n. sp.
(figs. 1-7)

Synonymy.—
Cletocamptus deitersi (Richard, 1897) — Apostolov (1984): 7, figs. 1-2.

Material examined.— Holotype, one female specimen, as designated here out of necessity, as a consequence of the loss of the specimen originally (1984) marked as such (as explained above). The slide with this newly designated holotype female specimen will be deposited in the collections of the Institute of Fish Resources at the Academy of Agriculture, Varna, Bulgaria, in due course. Also one male allotype. Two more female paratypes and one male allotype, however, were subsequently lost during repair work, as described above. All collected from the type locality in September 1978, leg. Prof. M. Băcescu.

Type locality.— National Marine Aquarium in Havana, Cuba.

Etymology.— The specific name of the new species comes from the name of the island of Cuba, where it was firstly found. The name is a geographical adjective, agreeing in gender with the (masculine) generic name.

Descriptions

Female (based on holotype and one allotype).— Total body length of holotype, measured from anterior tip of rostrum to posterior margin of caudal rami (excluding caudal setae), 0.62 mm.

Body (fig. 1A, B) semi-cylindrical, progressively tapering posteriorly, without clear demarcation between prosome and urosome. Integument of all somites generally smooth, without cuticular formations. Body length/width ratio about 4. Nauplius eye absent. Body composed of prosome and urosome.

Rostrum (fig. 2D) well-developed, triangular, not fused to cephalothorax, defined at its broad base, 1.4 times as long as wide, narrowing anteriorly in dorsal view, anterior tip reaching distal margin of first antennular segment, with a row of small spinules ventrally, and with two subdistal sensilla.

Prosome (fig. 1A) 4-segmented, comprising cephalothorax (including first pedigerous somite) and three free pedigerous somites bearing P_2-P_4. Cephalothorax

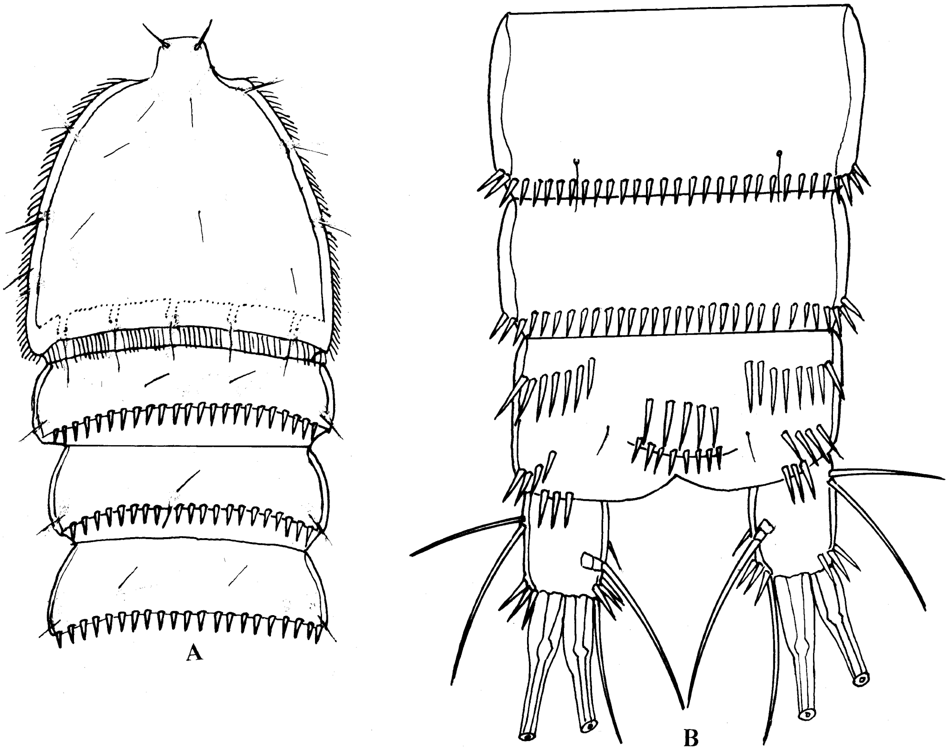

Fig. 1. *Cletocamptus cubaensis* n. sp., holotype ♀. A, Prosome, dorsal view; B, urosome and caudal rami, dorsal view.

25% of total body length, about 1.2 times as long as wide, widest at posterior end in dorsal view, tapering towards anterior end in dorsal and lateral views; cephalothoracic shield (fig. 1A) with fine hairs along its posterior margin dorsally and laterally, with 17 pairs of sensilla located in shallow cuticular pits of different sizes on the dorsal side, on the lateral edge longer, and posterolateral angles rounded. Prosome/urosome ratio about 1.2 in dorsal view. Free prosomal somites slightly narrower than cephalothorax in lateral view, without lateral or dorsal expansions.

Second pedigerous somite (first free prosomite) (fig. 1A) slightly narrower than posterior half of cephalothorax in dorsal view; with only four sensilla; dorsal and lateral surface with few short transverse rows of minute spinules (not shown) and with a continuous row of spinules along its posterior margin dorsally and laterally.

Third pedigerous somite (second free prosomite) (fig. 1A) slightly narrower than preceding somite; ornamentation similar to first free prosomite, but with three dorsal sensilla; posterior margin with row of small spinules.

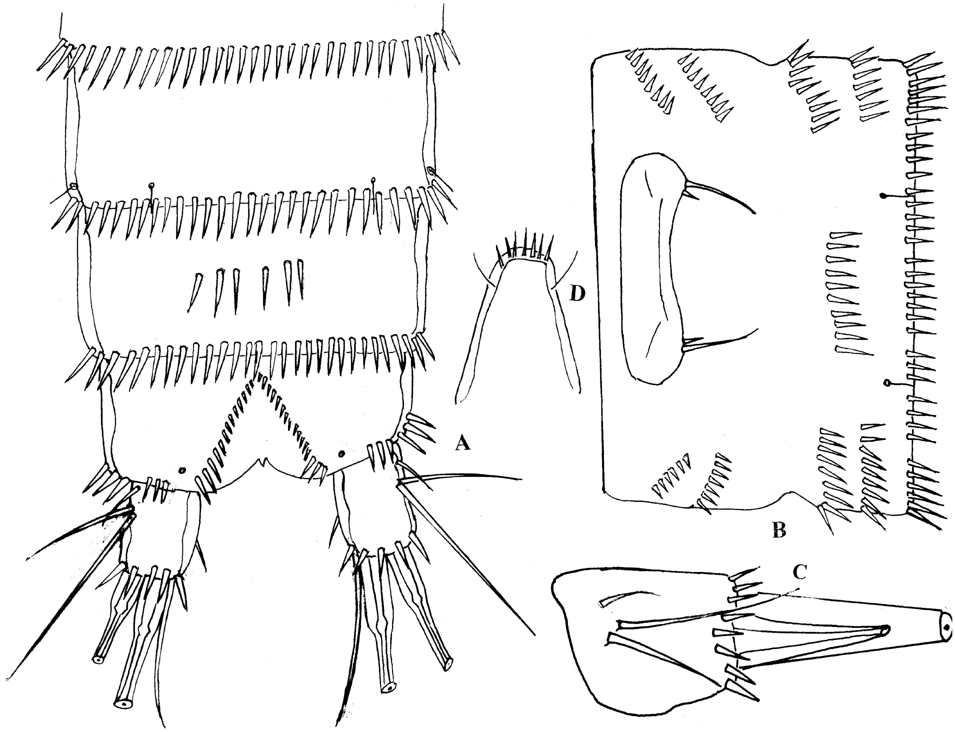

Fig. 2. *Cletocamptus cubaensis* n. sp., holotype ♀. A, Urosome and caudal rami, ventral view; B, genital double-somite, ventral view; C, caudal rami, lateral view; D, rostrum.

Fourth pedigerous somite (third free prosomite) (fig. 1A) slightly shorter than preceding somite in dorsal view; ornamentation similar to preceding somite but with four dorsal sensilla; posterior margin with row of small spinules.

Urosome (fig. 1B) 5-segmented, comprising fifth pedigerous somite (first urosomite bearing P_5), genital double-somite (= genital somite (second urosomite) and third urosomite fused), two free urosomites, and anal somite bearing furcal branches.

First urosomite (fifth pedigerous, P5-bearing somite) slightly narrower than preceding prosomite; dorsal and lateral surface seemingly smooth, with row of spinules along posterior margin and two sensilla.

Genital double-somite with subcuticular rib dorsally and laterally indicating former division between genital and third urosomites, but completely fused ventrally (fig. 2B). Ventrally, anterior and posterior parts of genital double-somite with transverse rows of minute spinules; posterior margin of both somites with row of long spinules. P6 represented by a small plate located in the anterior half of the genital double-somite (= second urosomite); each rudimentary leg armed with one long outer seta and one strongly reduced inner seta.

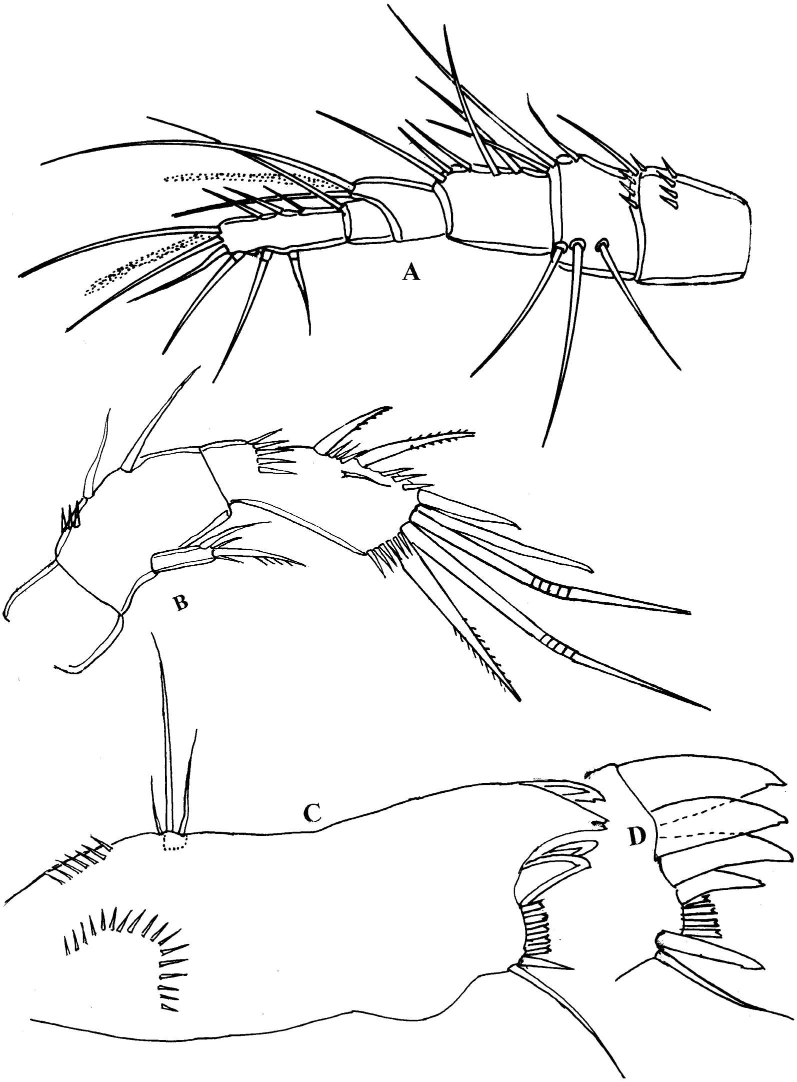

Fig. 3. *Cletocamptus cubaensis* n. sp., holotype ♀. A, Antennula; B, antenna; C, mandibula; D, chewing edge of mandibula.

Fourth urosomite (figs. 1B, 2A): largely as posterior half of genital double-somite dorsally; posterior margin with short spinules dorsally and longer spinular elements ventrally, with two dorsal and four ventral sensilla.

Fifth (preanal) urosomite (figs. 1B, 2A) slightly narrower than fourth urosomite; without sensilla; with a continuous row of spinules of different lengths on the posterior margin dorsally and ventrally, and with one row of spinules in middle of urosomite ventrally.

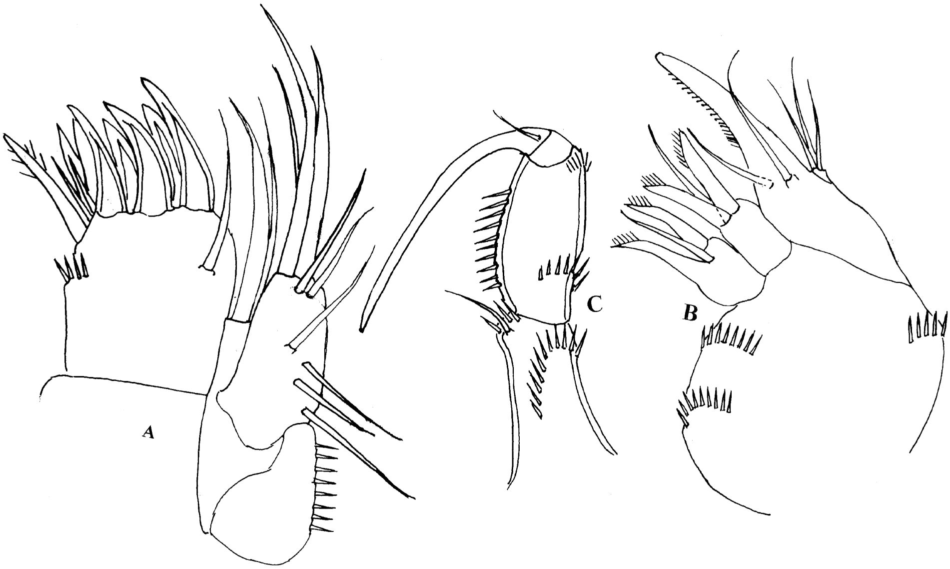

Fig. 4. *Cletocamptus cubaensis* n. sp., holotype ♀. A, Maxillula; B, maxilla; C, maxilliped.

Sixth urosomite (anal somite) (figs.1B, 2A) with dorsal surface ornamented with anterior transverse row of spinules on each side, with dorsolateral strong spinules close to joint with caudal rami, and with three spinules located close to the insertion site of each caudal ramus; posterior part of somite cleft medially; with pair of large dorsal sensilla on each side of anal operculum; ventral surface with three strong spinules in distal corner near caudal rami and three spinules at base of caudal rami; two pores as shown, and two rows of spines, of different length. Anal operculum short, narrow and convex, about 53% of somite's width, not reaching posterior end of anal somite, with eight spinules at its free edge and one row of five long spinules above.

Caudal rami (figs. 1B, 2A, C) about 1.5 times as long as wide in dorsal view; shorter than anal somite; with space between rami about three times the ramus width; dorsal and ventral surface smooth, except for one row of spinules at the base of the apical setae; armed with seven elements (three lateral, three terminal, one dorsal), of which lateral proximal setae inserted very close to each other in first third; setae I small, short and smooth, (hardly visible) situated ventrally, close to setae II; setae II and III well developed, smooth; seta III about 2 times as long as seta II, and 2 times as long as caudal rami; apical setae IV and V well developed (seta V twice as long as seta IV); seta IV smooth, expanded at its base but much shorter than median apical seta (V), about 2 times as long as caudal rami; seta V strongest, pinnate in distal half; seta VI situated on distal inner corner, smooth; seta

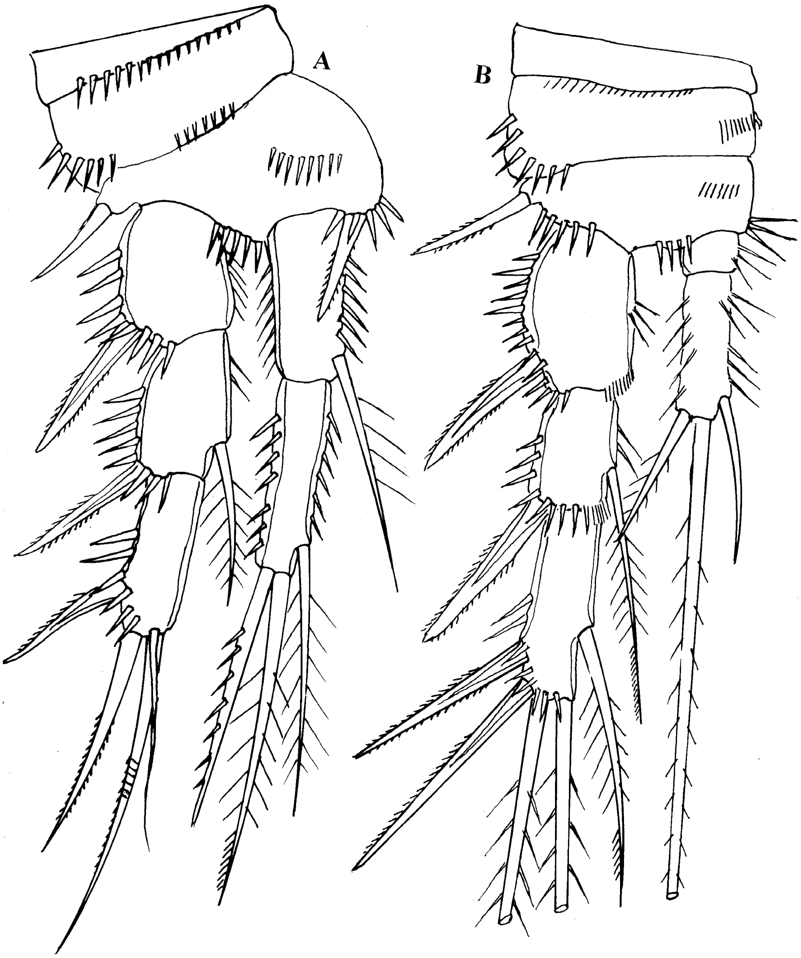

Fig. 5. *Cletocamptus cubaensis* n. sp., holotype ♀. A, First swimming leg; B, second swimming leg.

VII situated dorsally, midway length of ramus on inner edge, about 2 times as long as caudal rami, triarticulate basally.

Antennula (fig. 3A) six-segmented; surface of segments smooth except for two rows of spinules on first segment. Segments 1-3 stout; segment 4 with 1 aesthetasc surpassing distal part of last antennular segment and fused with one accompanying seta; segment 5 small; segment 6 elongate. Armature of antennulary segments 1, (1); 2, (6); 3, (5); 4, (1) + [1 + aesth.]; 5, (1); 6, (9) + [1 + aesth].

Antenna (fig. 3B) with small coxa unarmed and unornamented. Allobasis almost 1.6 times as long as wide, with two abexopodal setae; with a row of spinules at base of proximal abexopodal seta. Free endopodal segment slightly longer than allobasis; proximal part narrower than distal part, and 2.5 times as long as wide; with spinular rows proximally, medially and subdistally, and with additional

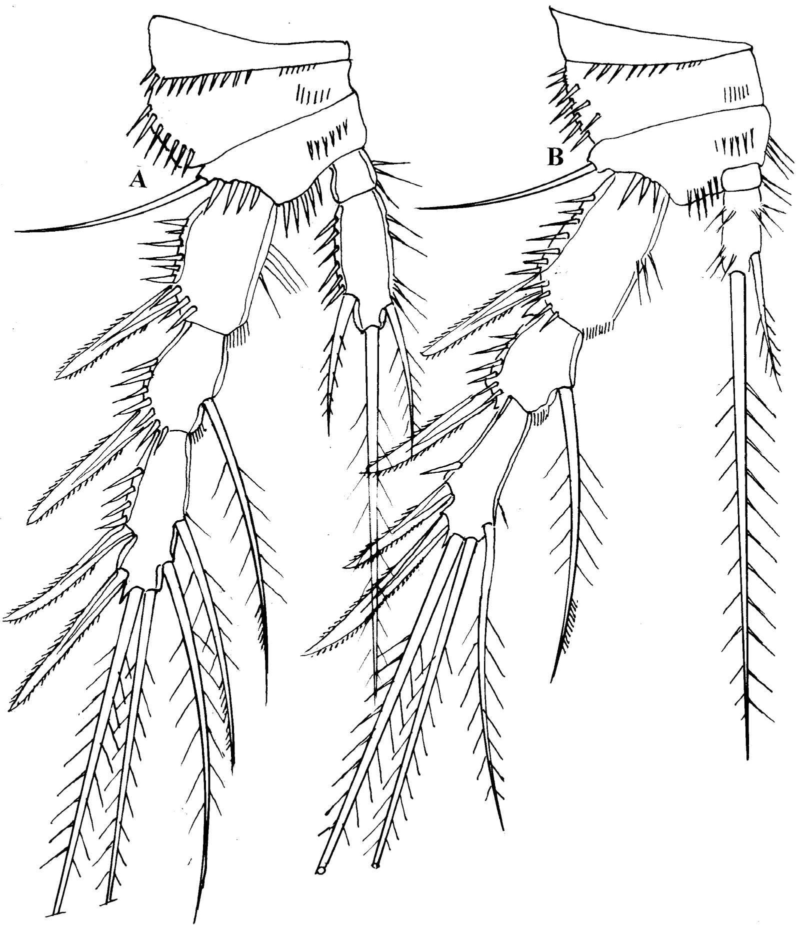

Fig. 6. *Cletocamptus cubaensis* n. sp., holotype ♀. A, Third swimming leg; B, fourth swimming leg.

transverse subdistal row of spinules close to outer distal corner; with two lateral strong spines and a slender seta; with five distal elements (two distal inner spines, two geniculate setae and one distal outer spine). Exopod one-segmented; slender, cylindrical, with base narrower than distal part; about three times as long as wide; with two subdistal spinules; with one lateral and one apical seta.

Mandibula (fig. 3C) elongate, robust, tapering distally; with well-developed coxal gnathobase bearing 4 strong, pointed teeth, and several smaller bicuspidate teeth, and one lateral seta at dorsal corner accompanied by small spinule. Palp vestigial, represented by one small segment bearing two naked setae of different lengths apically, flanked by one very short naked seta nearby.

Maxillula (fig. 4A) much larger than mandibula; composed of praecoxa, coxa, and basal complex with endopod and exopod completely fused to basis; praecoxa

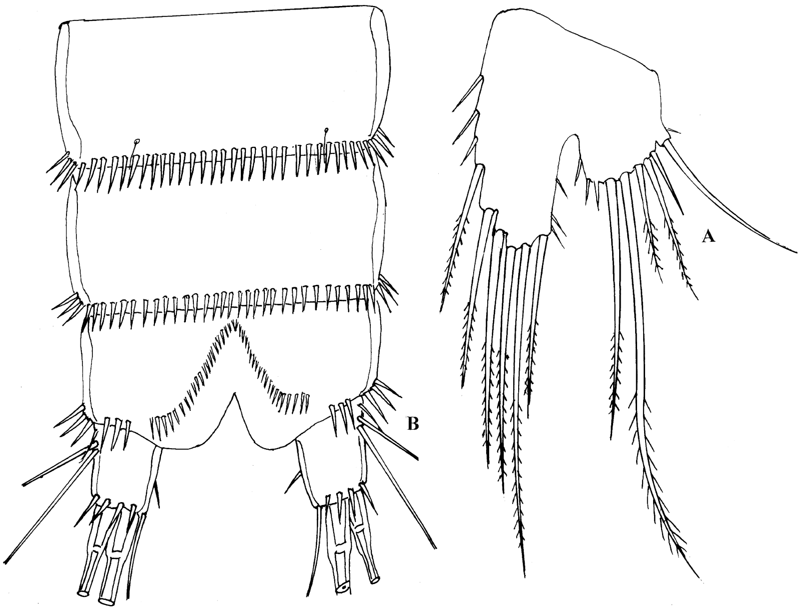

Fig. 7. *Cletocamptus cubaensis* n. sp., ♀, ♂. A, Fifth leg, holotype ♀; B, urosome and caudal rami, allotype ♂, ventral view.

large, praecoxal arthrite with a single surface seta and several spinules on inner margin; with six strong apical spines, two slender setae distally and one strong spiniform lateral seta. Coxa with single short cylindrical endite 1.3 times as long as wide and reaching middle of praecoxal arthrite, with one strong and one slender bare seta. Basis three times as long as coxal endite and two times as long as wide; wider at the base and tapering towards distal end; armed with two strong apical, one apical slender bare seta, and two lateral elements; exopod and endopod completely fused to basis, each bearing 2 setal elements.

Maxilla (fig. 4B) composed of syncoxa, allobasis, and one-segmented endopod. Syncoxa large, with two rows of large spinules along inner margin and some spinules along outer margin, with two syncoxal cylindrical endites of similar length, each with two apical unipinnate setae of similar lengths, and a middle thin bare seta. Allobasis drawn out into strong unipinnate claw, unornamented, flanked by 2 setae at base (one anterior, and one posterior); endopod represented by small protuberance bearing three naked setae of nearly equal length.

Maxilliped (fig. 4C) subchelate, composed of syncoxa, basis and one-segmented endopod. Syncoxa 2.6 times as long as wide, with a small seta on inner distal corner, flanked by a row of spinules at its base, and one longitudinal row of spinules on both anterior and posterior surfaces, as illustrated. Basis cylindrical, almost two times as long as wide, slightly swollen in central part, armed with longitudinal row of spinules along inner margin, and spinular row on posterior surface. Endopod short, fused completely with apical claw-like spine, armed with one short, slender and naked anterior seta at base of apical spine; apical spine slightly curved and reaching end of basis.

First swimming leg (fig. 5A) with praecoxa ornamented with rows of small spinules close to joint with coxa. Coxa 2.4 times as wide as long, with slightly convex outer distal corner, ornamented with anterior row of distal spinules, and one row of spinules in the middle of the border with the basis. Basis slightly wider than coxa with slightly convex inner margin, 1.8 times as wide as long and 1.5 times as long as coxa, with one outer and one inner strong spine; ornamented with median spinular row, and with spinules at base of exopod, between rami and at base of inner basal spine, the latter not reaching posterior end of P_1ENP1. Coxa and basis forming 33% of the length of this leg. Exopod three-segmented; P_1EXP1 about as long as widest part of basis and 1.2 times as long as wide, with outer strong and bipinnate spine, and with one row of large spinules along outer margin; P_1EXP2 equal in length to first segment, but narrower, with outer strong and bipinnate spine, with inner short and plumose seta in distal part of segment not reaching end of distal segment of exopod; P_1EXP3 being 3 times as long as wide and longer than second exopodal segment, with few large spinules along outer margin, with two strong pinnate outer spines of different lengths, one bare and one geniculate seta apically. Endopod two-segmented; shorter than the exopod, reaching middle of P_1EXP3; first segment elongated, not reaching middle of P_1EXP2, bearing one seta at the distal third of its inner margin, outer and inner margins with spinules; P_1ENP2 slightly longer than first segment, and 4 times as long as wide, with one inner subdistal plumose seta, two apical setae of different lengths, of which inner apical seta with distal comb of minute spinules, outer and inner margins of segment with spinules. Exopod making 70% of entire length of this swimming leg; length of 2-segmented endopod being 85% of exopod length.

Second swimming leg (fig. 5B) with praecoxa as in P_1. Coxa 2 times as wide as long, ornamented with strong spinules close to outer distal corner anteriorly, with row of small spinules close to distal corner posteriorly. Basis with outer basal spine bipinnate, no inner spine, basis 2.4 times as wide as long, ornamented with spinules between rami and at base of endopod, with stronger spinules at base of exopod. Coxa and basis together forming 25% of length of P_2. Exopod three-segmented, all segments of different lengths; P_2EXP1 1.5 as long as wide, with long bipinnate outer spine on distal margin, with one row of spinules along outer margin, without inner seta, inner apical angle with comb of minute spinules; P_2EXP2 0.5 times as short as first exopodal segment, with strong bipinnate outer spine, armed with inner plumose seta with comb of minute spinules in distal part; outer margin of segment with a row of spinules, and inner apical angle with comb of minute spinules. P_2EXP3 3 times as long as wide, about 1.5 times as long as second exopodal segment, with two strong pinnate outer spines, and inner long plumose seta with distal comb of minute spinules, and two plumose apical setae. Endopod slightly longer than first exopodal segment but not reaching middle of P_2EXP2; P_2ENP1 very small, without inner seta, with three thin long spinules on inner edge; P_2ENP2 2 times as long as wide, 3 times as long as first endopodal segment, with rows of spinules along outer and inner margins, armed with one outer spine, one long apical seta and one smooth short inner seta. Exopod making 75% of entire length of this swimming leg; endopod being 35% of exopod length.

Third swimming leg (fig. 6A) with praecoxa and coxa as in P_2. Basis with straight inner margin, no inner spine on basis, and with slender, long and bare outer seta instead of spine, with a single row of spinules on the surface as shown, with few long spinules between exopod and endopod, and at the base of the exopod. Coxa and basis together forming 25% the length of this swimming leg. Exopod three-segmented; P_3EXP1 1.5 times as long as wide, without inner seta, with long bipinnate outer spine on distal margin, with one row of spinules along outer margin; P_3EXP2 narrower and shorter than first exopodal segment, 1.25 times as long as wide, with strong and bipinnate outer spine, with one inner plumose seta with distal comb of minute spinules, with one row of large spinules along outer margin; P_3EXP3 3 times as long as wide and only 1.5 times as long as second exopodal segment, with two plumose inner setae (first inner seta shorter than second and with distal comb of minute spinules), with two plumose apical setae and two long, strongly developed bipinnate outer spines. Endopod two-segmented, reaching end of P_3EXP1; P_3ENP1 small, almost square, with three spinules on inner margin, without inner seta. P_3ENP2 reaching end of P_3EXP1, about 2.5 times as long as wide, tapering distally, nearly 3 times as long as first endopodal segment, armed with one plumose inner distal seta, one long plumose apical seta, and one spiniform outer seta; outer margin with a row of short spinules, inner margin with very long and thin spinules distributed in two groups, one in proximal and the other in distal part of the segment. Exopod making 80% of entire length of the swimming leg; length of endopod being 41% of length of exopod.

Fourth swimming leg (fig. 6B) with praecoxa, coxa and basis as in P_3. Coxa and basis together being 25% the length of this swimming leg. Exopod three-segmented, P_4EXP1 elongate, without inner seta, 1.8 as long as wide, with an outer bipinnate spine, outer margins with stout spinules, inner margin with slender, hair-like spinules; P_4EXP2 unornamented, half as long as first exopodal segment and 1.4 times as long as wide, armed with strong and pinnate outer spine, with one plumose inner seta with distal comb of minute spinules, along outer margin of segment row of spinules, inner distal angle with minute spinules; P_4EXP3 elongate, slightly widening distally, 1.3 times as long as second exopodal segment and 3 times as long as wide, with two bipinnate outer spines, two apical plumose setae of different lengths, and one inner plumose seta located in distal part of segment. Two-segmented endopod somewhat shorter than half the length of P_4EXP1; P_4ENP1 very small, square, without inner seta, inner margins with slender, hair-like spinules; P_4ENP2 3.3 times as long as first endopodal segment, two times as long as wide, with three rows spinules as indicated; armed with one long apical plumose seta and one inner, located in distal part of segment. Exopod being 81% of entire length of this swimming leg, length of endopod being 24% of length of exopod.

Armature formulae of female P_1-P_5 as follows (Roman numerals represent spines, Arabic numerals are setae):

Leg	P_1	P_2	P_3	P_4	P_5
Basis	I-I	I-0	1-0	1-0	1
Exopod	I-0; I-1; II,1,1	I-0; I-1; II,2,1	I-0; I-1; II,2,2	I-0; I-1; II,2,1	5
Endopod	0-1; I,1,1	0-0; I,1,1	0-0; I,1,1	0-0; 0,2,0	6

Fifth leg (fig. 7A) with baseoendopod and exopod fused; baseoendopod longer than exopod, 2.3 times as long as wide, with long and slender outer basal seta on short setophore, ornamented with single thin and long spinules along inner and outer margins, with six armature elements of various thickness and length as shown. Exopodal lobe small, slightly wider than long, shorter than baseoendopod, armed with five setae of various thickness and length; first, third and fourth setae pinnate, second plumose, fifth seta thin, short and smooth; second seta thick and longest, equal in length to second apical endopodal seta and about 6 times as long as exopod; inner exopodal seta slightly longer than outer endopodal seta.

Variability.— Not observed.

Male.— Adult males are smaller and slenderer than females. Total body length 0.42 mm measured from tip of rostrum to posterior margin of caudal rami. Habitus (not show) cylindrical, greatest width measured at posterior end of cephalosome. Cephalic shield as in female. Sexual dimorphism present in antennula, swimming legs P_1-P_3, P_5, P_6, and genital body segmentation. Antenna, mandibula, maxillula, maxilla, maxilliped, anal operculum, caudal rami and their setae, as in female.

Antennula (fig. 8A) seven-segmented, subchirocerate, surface of segments smooth except for two spinular rows on first segment, fourth segment bulbous, armed with two setae and one aesthetasc, and 7 long spinules on inner margin, last segment with three teeth.

First swimming leg (fig. 9A) with distomedial corner of basis forming a sharp projection.

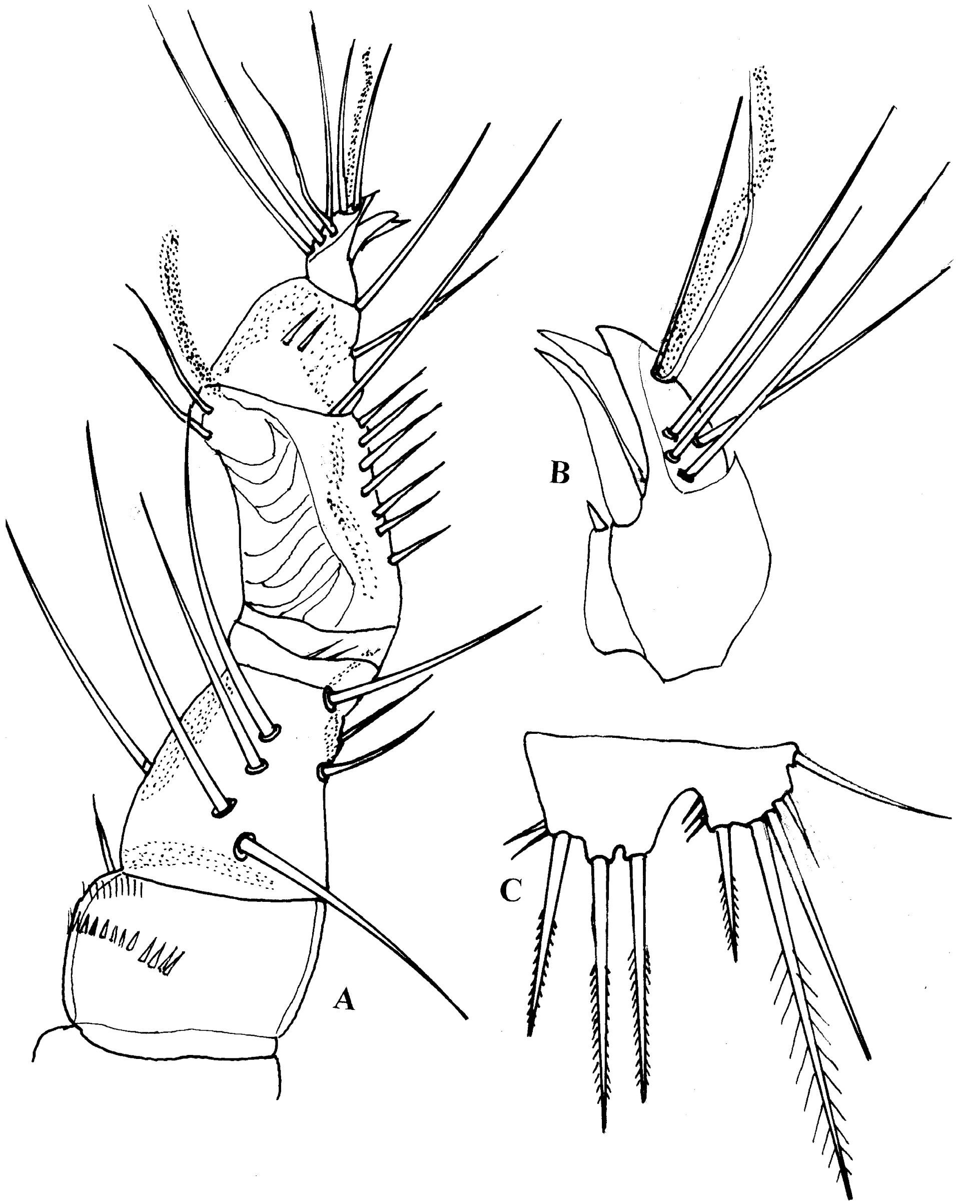

Fig. 8. *Cletocamptus cubaensis*. n. sp., allotype ♂. A, Antennula; B, seventh antennular segment; C, fifth leg.

Inner distal spine on basis not modified, slender and shorter than in female, not reaching posterior end of P_1ENP1. Length of endopod equal to exopod; P_1ENP1 slightly shorter than P_1ENP2, not reaching middle of P_1EXP2.

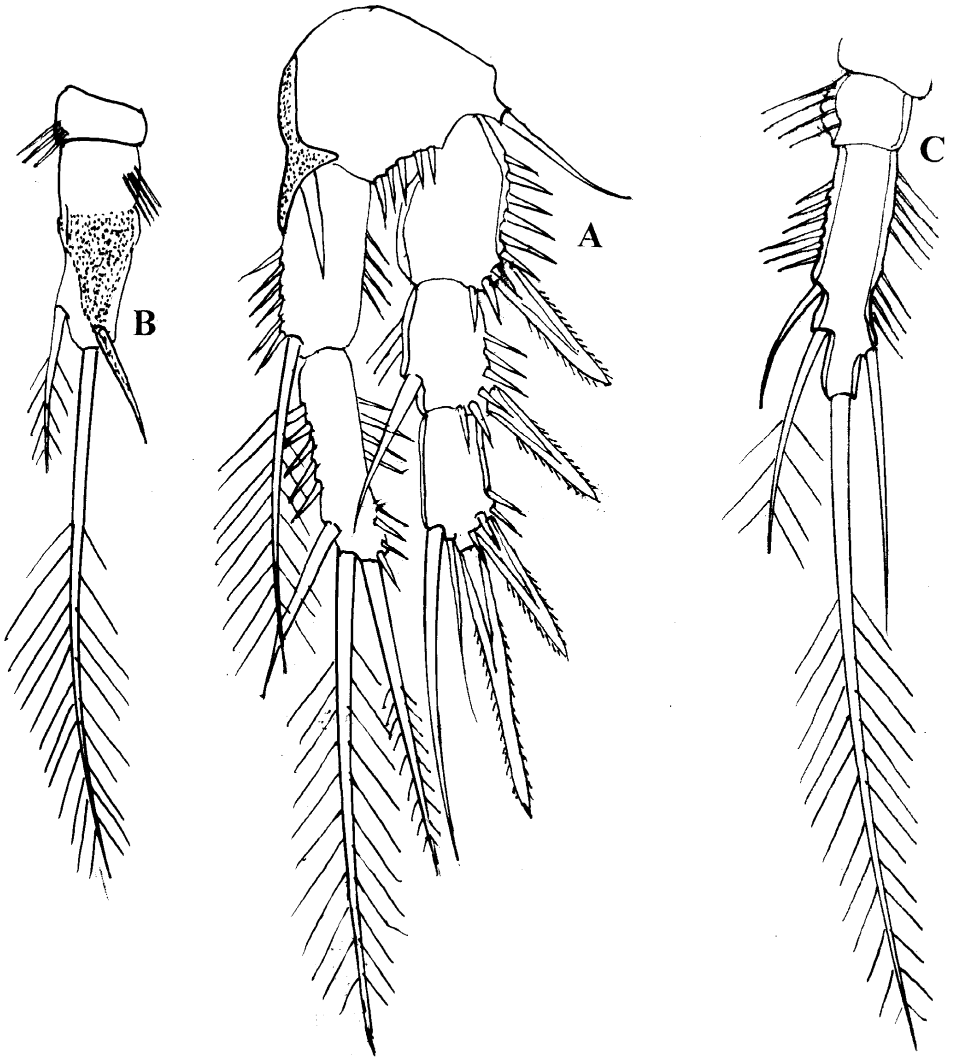

Fig. 9. *Cletocamptus cubaensis*. n. sp., allotype ♂. A, First swimming leg; B, endopod of third swimming leg; C, endopod of second swimming leg.

Second swimming leg (fig. 9C) with praecoxa, coxa and basis as in female. Exopod as in female except for stronger outer spines. Endopod as in female, except P_2ENP2 armed with four setae.

Third swimming leg (fig. 9B) with exopod (not shown) as in female except for dimorphic and stronger outer spines. Endopod modified, three-segmented; P_3ENP1 very small, without inner seta, about 1.3 times as wide as long; P_3ENP2 with inner apophysis reaching far beyond P_3ENP3, the latter armed with two plumose setae.

Fifth leg (fig. 8C) with baseoendopod and exopod fused basally. Baseoendopodal lobe slightly longer than exopod, with two spinules on inner margin; armed with two apical setae, and one inner element, of different lengths, all of them pinnate, plus outer basal seta as indicated; exopod wider than long, and shorter than baseoendopod, with few inner spinules, armed with four distal setae, the innermost pinnate, the second seta plumose and longest, 1.4 times as long as longest endopodal seta; innermost exopodal seta half as long as outer endopodal seta; the third and outermost setae being bare.

DISCUSSION

Cletocamptus cubaensis n. sp. is similar to *Cletocamptus deitersi* described by Richard in 1897 as *Mesochra deitersi* from an unspecified location in the Naposta Grande River, Argentina. Unfortunately, the description *C. deitersi* is very short and incomplete, and the material used for it has not been preserved. Furthermore, in the description of the species, Richard (1897) gave an incorrect interpretation of the armature formula of the swimming legs. In this regard, Mielke (2000) presented some amendments to Richard's description.

Despite the presence of characters similar between the two species, the new species also has characters that distinguish it from the description of *Cletocamptus deitersi*. The differences concern the armament of exopod A2 (one-segmented, with one lateral and one apical seta with two small spinules at the base in *C. cubaensis* vs. two-segmented with one lateral, two apical and one seta on the inside in *C. deitersi*). In the original description of *C. deitersi* (p. 269) it is stated that the exopod of A_2 is one-segmented, but Richard's (1897) fig. 6, p. 270, clearly shows that the exopod is two-segmented with 1 seta on the first segment, on the second segment two apical setae, and one seta in the middle on the inside. In fact, the apical seta is surrounded by spinules, which Richard (1897) accepted as setae. Differences include the length of the P_1ENP (shorter than P_1EXP, reaching middle of third segment of exopod in *C. cubaensis* vs. equal to P_1EXP in *C. deitersi*); number of setae on P_1ENP2 (two apical and one internal in *C. cubaensis* vs. two apical in *C. deitersi*, which contradicts the diagnosis of the species); number of inner setae on P_2ENP1 (without in *C. cubaensis* vs. one in *C. deitersi*; in species of this genus, the first segment of the endopod lacks inner armature). In the original text, Richard (1897) states that the first endopodal segment of the second leg is very short and bears a small seta along its inner margin (fig. 9 at p. 271). It is actually a thin cilium, which Richard mistakes for a seta. There is a significant difference with regard to the inner seta of P_4EXP3, which in *C. deitersi* is indicated as extremely thin, rudimentary (Richard, 1897: 272), while in the new species it is normally developed, long, and plumose. Differences are also observed in the different length and width of the baseoendopod and exopod of the fifth swimming leg in the female specimens (2.5 times as long as wide in *C. cubaensis* vs. 2.25 in *C. deitersi*); exopod (2 times as wide as long in *C. cubaensis* vs. 1.5 times as long as wide in *C. deitersi*); shape of the exopod (ovoid in *C. cubaensis* vs. elongated in *C. deitersi*); *C. cubaensis* with inner exopodal seta 1.4 times as long as outer endopodal seta vs. 2.7 in *C. deitersi*; exopodal setae 1, 3, 4 pinnate, second plumose and 5 smooth vs. setae 1 and 4 pinnate, setae 3 and 5 smooth in *C. deitersi*; all endopodal setae in *C. cubaensis* pinnate vs. setae 1-4 pinnate, and 5-6 smooth in *C. deitersi*; length of the caudal rami (1.6 times as long as wide in *C. cubaensis* vs. 2 times as long as wide in *C. deitersi*); number of lateral setae (three in *C. cubaensis* vs. two in *C. deitersi*). The first lateral seta is very small, located in the proximal part of the caudal ramus, which makes it difficult to notice. It is possible that it was not noticed in the description of *C. deitersi*. Differences are observed in the different number of setae on exopod P_5 in males (four in *C. cubaen*sis vs. five in *C. deitersi*); the different length of the fourth seta (short in *C. cubaensis* vs. slightly longer in *C. deitersi*); different lengths of endopodal and exopodal setae in males (the inner exopodal seta is short and pinnate in *C. cubaensis* vs. long and smooth in *C. deitersi*); length of endopodal and exopodal setae (the inner exopodal seta in *C. deitersi* is 1.25 times as short as the first outer endopodal seta vs. 1.75 times as short as the outer endopodal seta in *C. cubaensis*); number of setae on P_2ENP2 in males (four in *C. cubaensis* vs. three in *C. deitersi*).

Yeatman (1963) described *C. deitersi* from the littoral of the Woods Hole region, (Massachusetts). When comparing the Cuban specimens with *Cletocamptus deitersi* as described by Yeatman, differences in the formula of P_1-P_4 were found. In Yeatman's figure 14, P_1EXP3 is armed with three setae, four in *C. cubaensis*; length of P_1ENP (equal to P_1EXP in *C. deitersis* vs. visibly longer and reaching the middle of P_1EXP3 in *C. cubaensis*); number of setae on P_3EXP3 (with an inner seta in *C. deitersi* (fig. 16) vs. two in *C. cubaensis*); number of setae on P_4EXP3 (without an inner seta in *C. deitersi* vs. with an inner seta in *C. cubaensis*). The mandibular palp of the specimens from Woods Hole, is reduced to a small protuberance and a single apical seta, in *C. cubaensis* with three setae. Yetman (1963) in describing the female, indicates the fifth leg with the exopod fused to the basal segment forming an outer lobe that bears five or six setae and an inner lobe with six setae. In Yeatman's (1963) report the P_5EXP has 5 setae including the outer seta of the basis. In reality, the P_5EXP has 4 setae and one baseoendopodal outer seta.

Differences are also observed in male specimens from both localities, in the ornamentation of the urosome dorsally and ventrally; the number of setae on P_3EXP3 (with an inner seta in *C. deitersi* vs. two in *C. cubaensis*); the number of setae on P_4EXP3 (without an inner seta in *C. deitersi* vs. with an inner seta in *C. cubaensis*).

Of the known species, only three species (*C. nudus* Gómez, 2005, known from Brazil and Colombia, *C. schmidti* Mielke, 2000, known from the Galapagos archipelago, and *C. samariensis* Fuentes-Reinés, Zoppi de Roa & Torres, 2015, from Colombia) are close to *Cletocamptus cubaensis* n. sp. Upon inspection, differences were observed between the new Cuban species and the Brazilian and Colombian *C. nudus*, pertaining to the relative length of P_1ENP1 (reaching approximately middle of P_1EXP2 in *C. nudus* vs. shorter in *C. cubaensis*), length of the inner basal spine of P_1 (as long as P_1ENP1 in *C. nudus* vs. shorter in *C. cubaensis*), length of P_4ENP (reaching the middle of P_4EXP1 in *C. nudus* vs. shorter in *C. cubaensis*), ornamentation of prosome and urosome in the two species, and number of spinules on the anal operculum (without spinules in *C. nudus* vs. with 8 spinules in *C. cubaensis*), and shape and size of the caudal rami (about 1.8 times as long as wide in ventral view in *C. nudus* vs. 1.5 times in *C. cubaensis*), the numbers of setae on antennulary segments, ornamentation of the arthrite of the maxillula (few spinules in *C. nudus* vs. smooth in *C. cubaensis*), coxa (with some spinules in *C. nudus* vs. smooth in *C. cubaensis*), and basis (with some median spinules and with two apical setae in *C. nudus* vs. three apical setae and without spinulation in *C. cubaensis* n. sp.).

Cletocamptus cubaensis n. sp., is also similar to *C. schmidti*, known from the Galapagos Islands, by the armature of P_1-P_4, and P_5 in the female. Despite this similarity between the two species, the following differences can be highlighted: ornamentation of somites; presence of spinulation on the coxa and basis of the maxillula of *C. schmidti*, but absent in *C. cubaensis* n. sp.; anal operculum set with more spinules (11) on distal margin, accompanied by another row of spinules (14) subdistally in *C. schmidti* vs. 8 on distal margin, and five long and strong spinules subdistally in *C. cubaensis* n. sp.; length of inner basal spine of P_1 (reaching the middle of P_1ENP2 in *C. schmidti* vs. the middle of P_1ENP1 in *C. cubaensis* n. sp.); greatly shortened P_1ENP1 in *C. schmidti* reaching the end of P_1EXP1, in *C. cubaensis* n. sp. this segment is elongated, and exceeds the length of P_1EXP1; length of P_1ENP (longer than P_1EXP2 in *C. schmidti* vs. longer and reaching the middle of P_1EXP3 in *C. cubaensis* n. sp.); caudal rami in both lateral and dorsal views (with spinules in *C. schmidti* vs. smooth in *C. cubaensis* n. sp.); baseoendopod/exopod length ratio of the female P_5 is about 3 in *C. cubaensis* n. sp., but 2.3 in *C. schmidti*. Differences were also found in male specimens: number of setae on P_2ENP2 (three in *C. schmidti* vs. four in *C. cubaensis* n. sp.); P_3ENP2 nearly two times as long as first endopodal segment, tapering distally into curved apophysis, the latter 1.2 times as long as the entire endopod in *C. schmidti* vs. P_3ENP2 square-shaped, tapering distally into apophysis, different in shape and length in *C. cubaensis* n. sp.; length of the inner exopodal seta on P_5EXP (equal in length to outer endopodal seta in *C. schmidti* vs. twice as short as outer endopodal seta in *C. cubaensis* n. sp.); number and length of setae of P_5BENP (three almost equal in length in *C. schmidti* vs. three of which the innermost short, 1.3 times as short as both apical setae in *C. cubaensis* n. sp.).

Cletocamptus cubaensis n. sp., shows some characteristics of the female specimens, close to *C. samariensis* from Colombia, with which it shares the combination of the armature formula of the P_1-P_4, the length of P_1ENP, and P_3EXP3 with two setae. However, these two species seem to be only remotely related, as they differ in numerous characters including the different shape and size of the rostrum; ornamentation of prosome and urosome in females and males; exopod of antenna in both species one-segmented, but with different number of spinules of different lengths; number of setae on the mandibular palp (three in *C. cubaensis* n. sp. vs. two in *C. samariensis*); the inner basal spine of P_1 almost reaches the middle of P_1ENP2 in *C. samariensis*, but in *C. cubaensis* n. sp. it passes the middle of P_1ENP1; P_5BENP lobe 1.8 times as long as exopod in *C. samariensis*, 1.6 times in *C. cubaensis* n. sp. Differences are also observed in the number of spinules on the anal operculum. In *C. cubaensis* n. sp. there are 8, in *C. samariensis* 13. *C. cubaensis* n. sp. can be separated from *C. samariensis* by both the ornamentation and shape of the caudal rami in both lateral and dorsal views, and the absence of the first lateral seta on the caudal rami in *C. samariensis*. In male specimens, the differences refer to: the ornamentation of the prosome and urosome, as well as the caudal rami; P_1ENP reaches the end of P_1EXP in *C. cubaensis* n. sp., but it is shorter in *C. samariensis*; P_2ENP2 in *C. cubaensis* n. sp. with four setae, instead of three setae in *C. samariensis*; P_5EXP with four setae in *C. cubaensis* n. sp., while the exopod in *C. samariensis* is armed with three setae.

The presence of two internal setae on the third exopodal segment of the third swimming leg is a feature that *C. cubaensis* n. sp. shares only with *C. nudus* from Brazil and Colombia, *C. schmidti*, known from the Galapagos, and *C. samariensis*, from Colombia. These four species constitute a potentially well-defined Caribbean clade whose distribution appears to be restricted to the Caribbean, Galapagos and the northern coast of Brazil. This clade seems to be Caribbean in origin. Some populations might have migrated to the south, and some were probably separated by the formation of Central America about three million years ago, that ended the shallow marine circulation between the Pacific and the Caribbean (Wegner et al., 2011).

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