

A new species of the genus *Campylaspis* (Crustacea: Cumacea) from the mesophotic reefs of St. John, US Virgin Islands

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ABSTRACT.— A new species of the genus *Campylaspis* G.O. Sars, *C. grazielae* and also *Campylaspis* sp. are described from the mesophotic coral ecosystems of St. John, US Virgin Islands, Caribbean Sea. Similarities and dissimilarities with related species are discussed and a taxonomic key is provided for the Western Atlantic species of the genus *Campylaspis*. With the addition of *C. grazielae* sp. nov. described herein, there are 17 recognized species of *Campylaspis* in the Western Atlantic. This is the first record of the genus *Campylaspis* from the US Virgin Islands.

KEYWORDS.— Crustaceans, biodiversity, Caribbean Sea, benthos

INTRODUCTION

Mesophotic coral reefs (MCEs) may be found abundantly on the slopes of continental/island shelves around the tropics from 30 to 150 m (Locker et al. 2010; Sherman et al. 2010). Macroalgae, sponges, scleractinian corals, gorgonians and black corals dominate the landscape and provide habitat for microinvertebrates, which are understudied. In a continuous campaign to improve our understanding of biodiversity of Caribbean MCEs, several descriptions of new metazoan species have materialized during the last 3 years (Pešić et al. 2012, 2014; Petrescu et al. 2012, 2013, 2014a, b; Corgosinho and Schizas 2013). The benthic Cumacea associated with MCEs have proved to be a taxon whose biodiversity has been grossly underestimated evidenced by the many newly described species (Petrescu et al. 2012, 2013, 2014a, b).

There are 16 species of the genus *Campylaspis* known from tropical western Atlantic, of which 2, *Campylaspis heardi* Muradian-Ciamician, 1980 and *C. caribbeana* Petrescu, 2002 are from shallow waters (Donath 1988; Petrescu and Iliffé 1992; Petrescu 2002, 2003, 2004) and the other 14, *C. bicarinata* Jones, 1974, *C. costata costata* Sars, 1865, *C. mansa* Jones, 1974, *C. porcata* Jones, 1974, *C. propinqua* Jones, 1984, *C. pulchella* Sars, 1873, *C. scuta* Jones, 1984, *C. spinosa* Calman, 1906,

C. squamifera Fage, 1929, *C. torulosa* Jones, 1974, *C. valleculata* Jones, 1974, *C. vitrea* Calman, 1906, *C. valida* Jones, 1984, and *C. selvakumarani* (Băcescu & Muradian, 1974) are from deep waters (Băcescu and Muradian 1974; Jones 1974, 1984; Muradian 1976; Petrescu 2003).

In this paper we describe the new species of the genus *Campylaspis*, *C. grazielae* sp. nov. and also describe *Campylaspis* sp. based on a manca stage from the MCEs of St. John, US Virgin Islands, Caribbean Sea. This is the first record of the genus from St. John, US Virgin Islands.

MATERIALS AND METHODS

Specimens were collected in 2012, from the island of St. John, during the last of the 3 mesophotic cruises (2010–2012) organized by the University of Puerto Rico at Mayagüez (UPRM), the Caribbean Coral Reef Institute (CCRI) and the Department of Marine Sciences (DMS) of UPRM (Sherman et al. 2013). Divers equipped with Tri-Mix Rebreathers collected substrata (loose rubble, corals, sponges, algae) from 54 m depth and placed them in sealed plastic bags. Samples were returned to the surface with liftbags and were placed on a 1 mm and 0.125 mm sieves. Samples were washed with filtered seawater and the portion of fauna retained on the

0.125 mm sieve was preserved in 100% ethanol. Specimens were examined and separated in broad taxonomic categories with an Olympus SZH10 dissecting stereo-microscope. For the morphological observations, the cumaceans were dissected in lactic acid. Drawings were prepared using a camera lucida on an Olympus CH-2 microscope. All specimens are deposited in the Crustacean Collection of the "Grigore Antipa" National Museum of Natural History in Bucharest (Muzeul Național de Istorie Naturală "Grigore Antipa"- MGAB).

SYSTEMATICS

Campylaspis G. O. Sars, 1865

Campylaspis grazielae sp. nov.

(Figs. 1, 2)

Material examined: Holotype, female, MGAB CUM 1713. Type locality: St. John, US Virgin Islands, GPS coordinates Latitude N 18°13'18", Longitude W 64°40' 33", depth 54 m, 05/08/2012, Collector Nikolaos V. Schizas.

Description

Female. Body size: 1.73 mm (Fig. 1 A). Smooth tegument.

Carapace (Fig. 1 A). Broken, 0.50 times of entire body length, small anterior-ventral corner, serrate ventral margin.

Antenna 1 (Fig. 1 B). Peduncle with slender articles, basal article of peduncle 0.42 times of entire antenna length, main flagellum 0.81 times as long as last article of peduncle, short accessory flagellum.

Maxilliped 3 (Fig. 1 C). Basis 0.44 times entire appendage length, 2 plumose setae on medial margin and other 2 setae on outer one; large merus 2.5 times as long as ischium, large serration on median margin with simple short setae interspersed, 1 pappose seta on outer margin; carpus 0.57 times as long as merus, large serrate medial margin, 3 simple setae and 1 plumose one on medial margin, serrate outer margin with 1 pappose seta; propodus 0.6 times as long as dactylus, large serrate medial margin with 1 simple seta and 2 pappose ones, 1 pappose

seta on outer margin; dactylus 0.38 times as long as propodus, terminal robust seta 2.6 times as long as dactylus; slender exopod.

Pereopod 1 (Fig. 1 D). Basis 0.44 times entire pereopod length, 1 long plumose seta on medial margin, 1 plumose seta on medial margin of ischium, merus 3.2 times as long as ischium, 2 plumose and 1 simple setae on medial margin, 1 plumose seta on outer serrate margin, carpus 0.88 times merus length, 2 long plumose and 2 short simple setae on medial margin, 1 plumose seta on outer serrate margin, propodus as long as carpus, 2 plumose and 1 simple setae on medial margin, 1 simple and 1 plumose setae on outer margin, dactylus as long as propodus, 1 simple seta on medial margin, 1 simple seta and 2 subterminal setae on outer margin, simple stout terminal seta; slender exopod.

Pereopod 2 (Fig. 2 A). Basis 0.33 times entire pereopod length, serrate margins, merus 1.9 times as long as ischium, serrate margins, 1 long plumose seta on medial margin, 1 simple seta on outer margin, carpus 1.19 times merus length, 1 simple and 1 stout setae on medial margin, 1 plumose and 2 simple setae on outer margin, dactylus 2.66 times as long as propodus, 3 simple setae on medial margin, 1 simple seta on outer margin, 2 subterminal simple short setae, terminal seta stout 1.07 as long as dactylus; exopod with broken flagellum.

Pereopod 3 (Fig. 2 B). Basis 0.47 times entire pereopod length, merus 1.33 times as long as ischium, long simple seta on medial margin, carpus 1.16 times as long as merus, 1 simple seta on each margin, propodus 0.85 times as long as carpus, 1 setule on medial margin, 1 setule and 1 annulate seta on outer margin, dactylus 0.18 times as long as propodus, terminal robust seta 5 times dactylus length.

Pereopod 4 (Fig. 2 C). Basis 0.43 times entire pereopod length, 1 simple seta on each margin, merus 1.85 times ischium length, long simple seta on medial margin, carpus 1.69 times as long as merus, 1 annulate seta on outer margin, propodus 0.63 times as long as carpus, long terminal robust seta 0.15 times dactylus length.

Pereopod 5 (Fig. 2 D). Basis 0.22 times

entire pereopod length, merus 2 times as long as ischium, 1 stout long simple seta on merus, carpus 2.16 times as long as merus, 1 simple seta on medial margin, propodus 0.5 times as long as carpus, 1 annulate seta on outer margin, dactylus 0.15 times as long as propodus, terminal stout seta 6 times dactylus length.

Uropod (Fig. 2 E). Peduncle 1.81 times 6th pleonite length, 1.81 times endopod length, serrate margins, 4 simple setae on outer margin; exopod as long as endopod, 2 articles, 3 setules on outer margin, 1 subterminal seta and 1 terminal stout seta; endopod with 2 setae on medial margin, 2 subterminal and 1 terminal stout seta, terminal seta 0.90 times endopod length.

Etymology

The species is dedicated in honor of Graziela Ștefan, first author's (IP) professor of Romanian language and literature as a sign of posthumous gratitude.

Remarks

Campylaspis grazielae sp. nov. resembles *C. caribbeana* Petrescu, 2002 from Belize (Petrescu, 2002). It differs in the following characters: 1) carapace without lateral sulcus (depression), 2) maxilliped 3 with serrate outer margin of merus, 3) pereopod 1 with more setae than in *C. caribbeana*, 4) pereopod 2 with more setae than in *C. caribbeana*, 5) pereopod 2 with long dactylus vs. shorter in *C. caribbeana*, 6) longer articles on pereopods 3-5 vs. shorter in *C. caribbeana*, 7) uropodal rami with simple setae vs. serrate ones in *C. caribbeana*.

Campylaspis sp.

(Figs 3, 4)

Material examined: manca, MGAB CUM 1714. Type locality: St. John, US Virgin Islands, GPS coordinates Latitude N 18°13'18", Longitude W 64°40' 33", depth 54 m, 05/08/2012, Collector Nikolaos V. Schizas.

Description

Manca: Body (Fig. 3 A). Body size: 2.04 mm. Smooth tegument.

Carapace (Fig. 3 A, B). 0.41 of entire body length, 1.5 times as long as high, numerous large and small dorsal tubercles, 1 small tubercle on top of pseudorostral lobes, large antennal notch, rounded anterior-ventral corner, anterior half of ventral margin small serrated, 2 pairs of lenses on ocular lobe, pseudorostrum longer than ocular lobe.

Pereon. All five articles visible.

Pleon. 0.4 times the entire body length.

Antenna 1 (Fig. 3 C). Basal article of peduncle as long as rest of articles combined, main flagellum 0.66 times as long as last article of peduncle, small accessory flagellum.

Maxilliped 3 (Fig. 3 D). Basis 0.36 times entire maxilliped length, setulose medial margin, 1 pappose seta on medial distal corner, 2 plumose setae on outer margin, large merus 3.2 times ischium length, serrate outer margin with short simple setae interspersed, carpus 0.31 times merus length, 2 simple setae on medial margin, serrate outer margin with 1 pappose seta, large propodus 1.66 times as long as carpus, 1 simple seta and serrate on medial margin, serrate outer margin, dactylus 0.32 times as long as propodus, 2 medial simple setae, 1 simple seta on outer margin, terminal simple seta as long as dactylus; exopod with large basis and peduncle.

Pereopod 1 (Fig. 3 E). Basis 0.41 times entire pereopod length, short serration and 1 simple long seta on medial distal margin, merus 2.76 times as long as ischium, 1 simple seta on short serrated medial margin, stronger serration and 1 simple short seta on outer margin, large carpus 0.86 times as long as merus, serrate medial margin with 1 simple seta and numerous short setae, strong serrate outer margin with 1 simple and 1 plumose seta, propodus 0.70 times as long as carpus, large propodus and microserrate medial margin with 3 simple setae, strong serrate outer margin with 1 plumose seta, dactylus 0.56 times as long as propodus, 2 short plumose setae on medial margin, 3 short plumose setae on outer margin, 1 terminal plumose short seta; large exopod, basis with short serrated

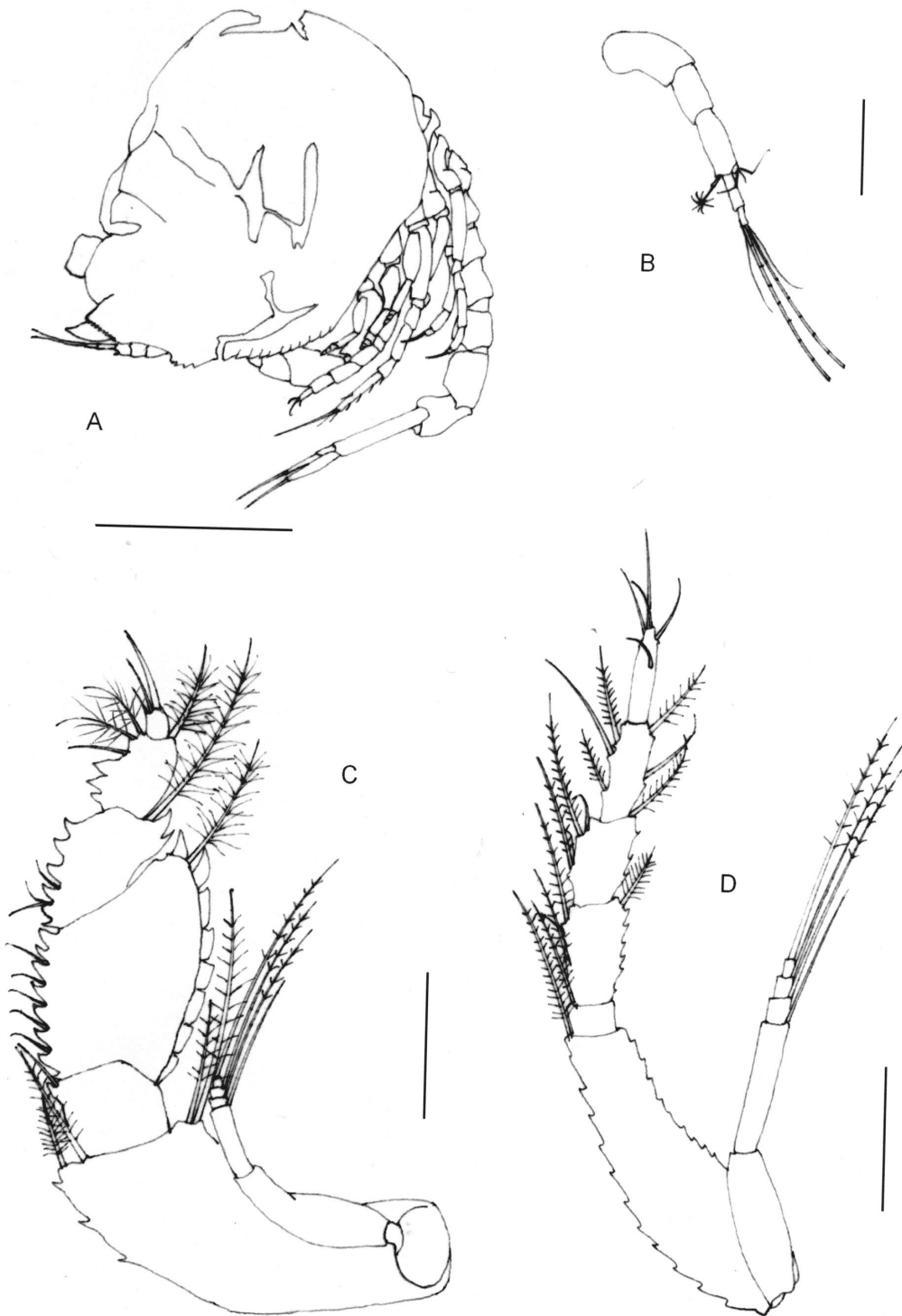


FIG. 1. *Campylaspis grazielae* sp. nov., holotype female. A. Body, lateral view; B. Antenna 1; C. Maxilliped 3; D. Pereopod 1. Scale Bars: A = 0.5 mm, B = 0.1 mm, C, D = 0.1 mm.

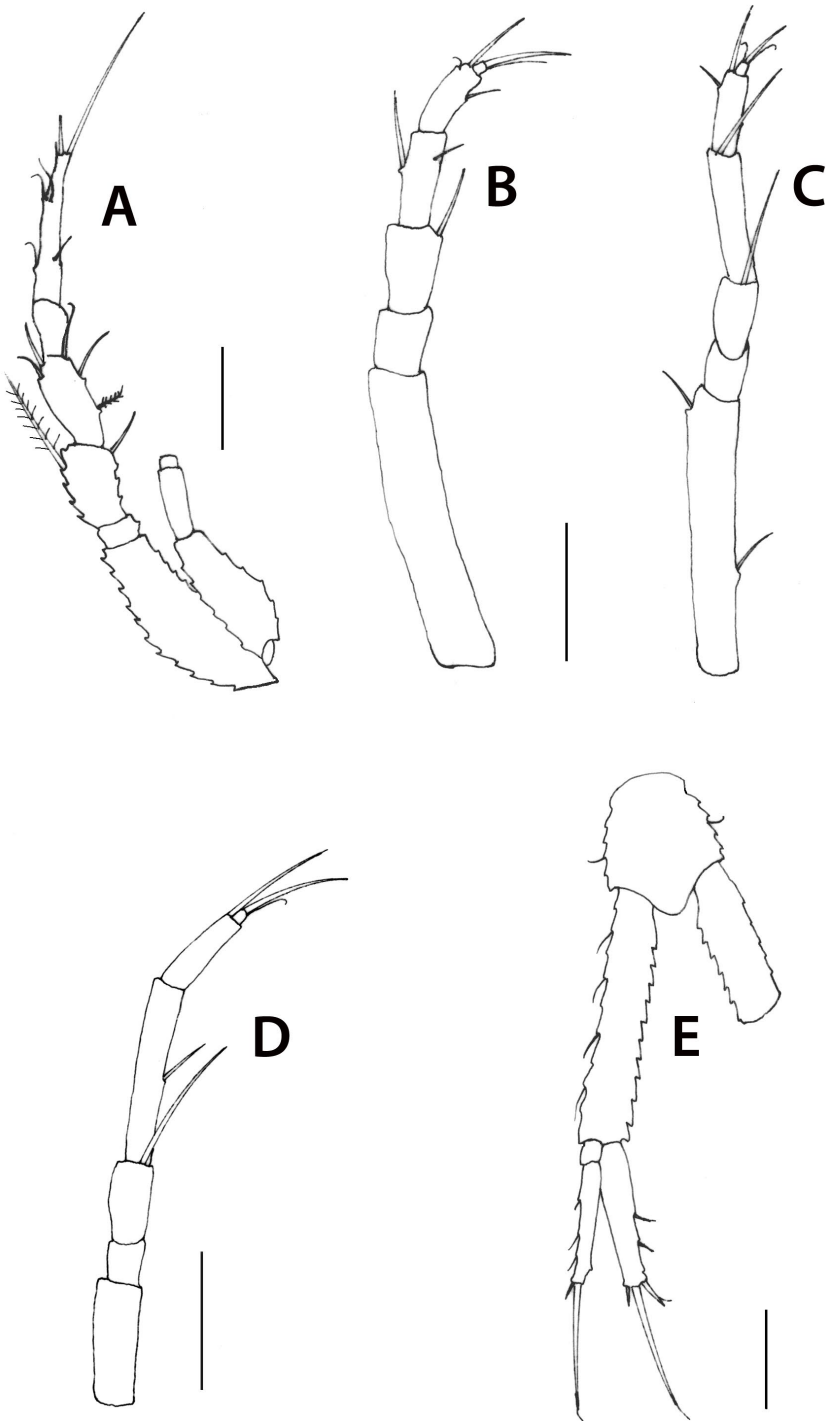


FIG. 2. *Campylaspis grazielae* sp. nov., holotype female. A. Pereopod 2; B. Pereopod 3; C. Pereopod 4. D. Pereopod 5. E. Uropod. Scale Bars: A, E = 0.1 mm, B-D = 0.1 mm.

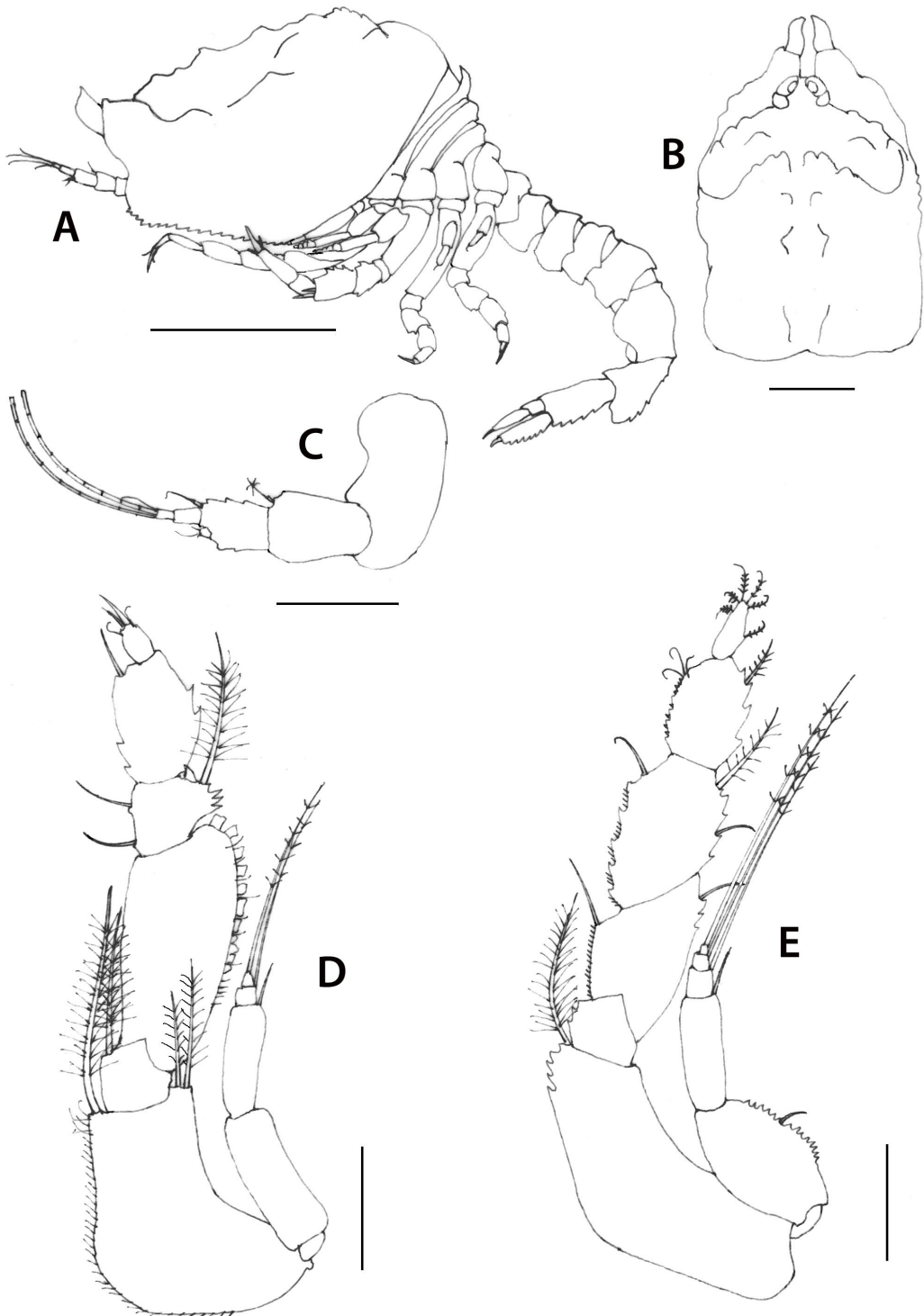


FIG. 3. *Campylaspis* sp., manca. A. Body, lateral view. B. Carapace, dorsal view. C. Antenna 1. D. Maxilliped 3. E. Pereopod 1. Scale Bars: A = 0.5 mm, B = 0.1 mm, C-E = 0.1 mm.

outer margin.

Pereopod 2 (Fig. 4 A). Basis 0.34 times entire length, short serration on outer distal margin, large merus 6.66 times as long as

ischium length, strong serrate medial margin, small serrate outer margin with 1 simple seta, large carpus 1.21 times as long as merus length, small serrate medial margin with 1 simple and 1

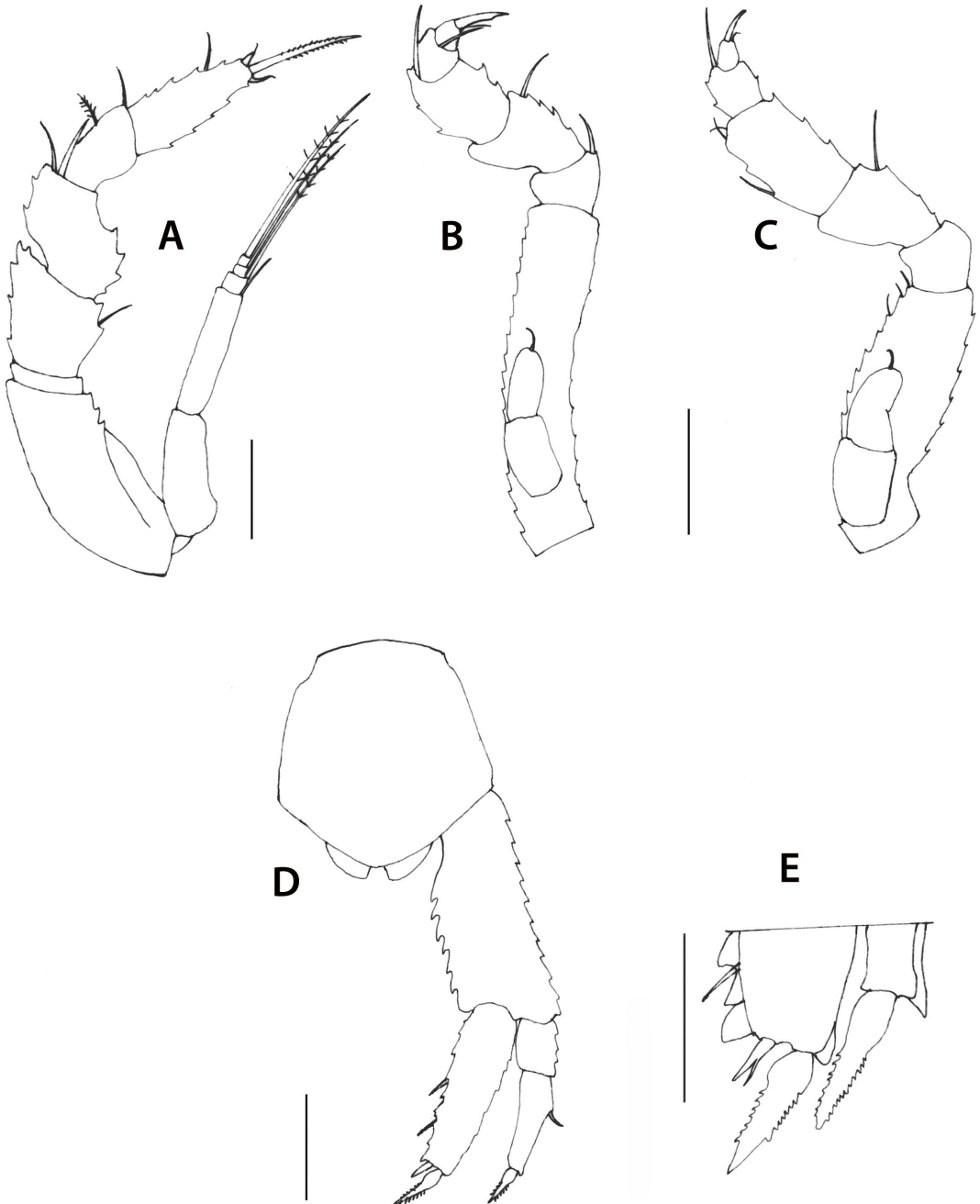


FIG. 4. *Campylaspis* sp., manca. A. Pereopod 2. B. Pereopod 3. C. Pereopod 4. D. Uropod. E. Tip of uropodal rami, magnified. Scale Bars: A-D = 0.1 mm, E = 0.05 mm.

stout seta, strong serrate outer margin, dactylus 1.55 times as long as propodus length, serrate margins, 1 simple seta on medial margin, 2 short subterminal setae, terminal serrate seta 0.77 as long as dactylus length; long exopod.

Pereopod 3 (Fig. 4 B). Basis 0.52 times entire length, serrate margins, large merus 1.45 times ischium length, 1 simple seta on medial margin of ischium and merus, large carpus 1.25 times merus length, 1 stout seta on outer margin, propodus 0.45 times carpus length, 1 simple short seta on outer margin, dactylus 0.55 times propodus length, robust terminal seta; incomplete developed exopod.

Pereopod 4 (Fig. 4 C). Basis 0.41 times entire length, merus 1.58 times as long as ischium, 1 simple seta on medial margin, large carpus 1.21 times as long as merus, serrate margins, 3 simple short setae on medial margin, propodus 0.41 times as long as carpus, 1 short simple seta on medial distal margin, dactylus 0.62 times as long as propodus, terminal short robust seta; incomplete developed exopod.

Uropod (Fig. 4 D, E). Short peduncle 1.06 times as long as last pleonite, serrate margins, 1.42 times as long as endopod, exopod 0.91 times as long as endopod, 2 articles, 1 simple seta on outer margin, terminal short stout microserrate seta, endopod with serrate medial margin, 2 simple setae, 1 subterminal seta with single subterminally setule and 1 terminal short stout microserrate seta.

Remarks

Campylaspis sp. resembles *Campylaspis paucispina* Jones, 1974 from the deep benthos of Atlantic (Jones 1974) regarding carapace ornamentation and also resembles *C. heardi* Muradian-Ciamician, 1980 recorded from Florida, Bahamas, Grand Cayman, Cuba,

Honduras, and Caribbean Mexico (Muradian-Ciamician, 1980; Donath 1988; Petrescu and Iliffe, 1992; Petrescu, 2003, 2004), especially on maxilliped 3 which has a short and large basis and long merus. However, *Campylaspis* sp. differs from *C. paucispina* and *C. heardi* in having: 1) maxilliped 3 with shorter outer plumose setae of basis, merus with smooth medial margin, without outer seta, larger propodus, dactylus with shorter terminal seta; 2) pereopod 1 with larger articles, fewer setae; 3) pereopod 2 with fewer setae; 4) pereopod 3 with larger articles, with shorter setae; 5) shorter uropodal peduncle and uropodal rami with shorter terminal seta.

We are not proposing *Campylaspis* sp. as a new species, yet, because our single specimen is a manca. A manca is a juvenile stage, recently released from the brood pouch of the mother; the carapace ornamentation, body proportions and appendage proportions are typically quite different from the more mature individuals and may have fewer setae, so it is often difficult to identify cumaceans accurately to the species level based on a manca.

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KEY FOR SPECIES OF THE GENUS *CAMPYLASPIS* RECORDED FROM WESTERN ATLANTIC*Females:*

1. Carapace with lateral sulcus 2
Carapace without lateral sulcus 8
2. Carapace with 2 lateral sulci *valleculata* Jones, 1974
Carapace with 1 lateral sulcus 3
3. Carapace with long lateral sulcus 4
Carapace with short lateral sulcus 7
4. Carapace with short protuberances 5
Carapace without short protuberances 6
5. Uropodal endopod longer than exopod *selvakumarani* (Băcescu & Muradian, 1974)
Uropodal endopod shorter than exopod *valida* Jones, 1984
6. Uropodal endopod with five medial setae *propinqua* Jones, 1984
Uropodal endopod with three medial setae *bicarinata* Jones, 1974
7. Pereon and pleon with dorsal ridges *vitrea* Calman, 1906
Pereon and pleon without dorsal ridges 8
8. Ocular lobe with lenses *caribbeana* Petrescu, 2002
Ocular lobe without lenses 9
9. Carapace with spines, tubercles and carinae 10
Carapace without spines, tubercles and carinae 14
10. Carapace with spines 11
Carapace without spines 12
11. Carapace fully covered with spines *spinosa* Calman, 1906
Carapace with a few spines dorsally *scuta* Jones, 1974
12. Carapace with tubercles 13
Carapace without tubercles, with carinae *heardi* Muradian, 1980
13. Carapace with numerous tubercles *squamifera* Fage, 1929
Carapace with a few tubercles *tumulifera* Jones, 1984
14. Uropodal peduncle 2.37 times rami length *pulchella* Sars, 1873
Uropodal peduncle 1.8 times rami length *grazielae* sp. nov.

Males:

1. Carapace with lateral sulcus 2
Carapace without lateral sulcus 6
2. Carapace with long sulcus 3
Carapace with short sulcus 5
3. Carapace with 4 lateral ridges *costata* Sars, 1865
Carapace with less than 4 lateral ridges 4
4. Carapace with 3 lateral ridges *valleculata* Jones, 1974
Carapace with 2 lateral ridges *bicarinata* Jones, 1974
5. Carapace with 1 large rotundity on each side of frontal area *mansa* Jones, 1974
Carapace without any rotundity on frontal area *porcata* Jones, 1974
6. Carapace with depressions marked by carinae *heardi* Muradian-Ciamician, 1980
Carapace without depressions marked by carinae 7
7. Ocular lobe with lenses sp. (described in present paper based on a manca)
Ocular lobe without lenses *squamifera* Fage, 1929

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