



Two new species of the genus *Cumella* (Crustacea: Cumacea: Nannastacidae) associated with mesophotic reefs of Puerto Rico and St. Croix, Caribbean Sea

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Abstract: Two new species of genus *Cumella* G. O. Sars: *Cumella solomoni* and *C. manolelii* are described from mesophotic substrata of Puerto Rico and St. Croix (U.S. Virgin Islands), respectively. Similarities and dissimilarities with related species are discussed.

Résumé: Deux nouvelles espèces du genre *Cumella* (Crustacea : Cumacea : Nannastacidae) associées aux récifs mésophotiques de Porto Rico et de Sainte Croix, Caraïbes. Deux nouvelles espèces du genre *Cumella* G.O. Sars, *Cumella solomoni* et *C. manolelii*, sont décrites de substrats mésophotiques venant de Porto Rico et de Sainte Croix (Îles Vierges Américaines) respectivement. Les similitudes et les différences avec les espèces apparentées sont discutées.

Keywords: Cumacea • *Cumella* • New species • Caribbean • Mesophotic reefs

Introduction

Mesophotic Coral Ecosystems (MCEs) are found between 30-40 m depth and 100 m on the insular and continental slopes of islands (Locker et al., 2010). Macroalgae, sponges and reef-building corals visually dominate the mesophotic terrain (Sherman et al., 2010), providing a diverse habitat for a specialized benthic fauna. Recent efforts to characterize the mesophotic reefs of Puerto Rico and U.S. Virgin Islands have yielded several new species of microcrustaceans (cumaceans: Petrescu et al., 2012; harpacticoid

copepods: Corgosinho & Schizas, 2013) indicating that the MCEs may harbor a largely unexplored fauna. We hypothesized that the mesophotic zone may be qualified as a biodiversity hotspot inhabited by a transitional fauna between the shallow and deeper zones.

The herein described species indicate that the Caribbean cumacean diversity is not adequately explored even at relatively shallow depths. The vast majority of new cumacean records refer to littoral locations less than 100 m depth in the Caribbean including Puerto Rico (Petrescu et al., 2012), Cuba (Zimmer, 1944; Petrescu, 2004), Jamaica (Petrescu et al., 1994), Martinique (Zimmer, 1944) and Bahamas (Petrescu & Iliffe, 1992; Petrescu, 1996 & 2003). Only one new species, *Ceratocuma amoena* Jones, 1969, has been described from the abyssal depths (2,840 m) of the

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Puerto Rico Trench. Undoubtedly, new species of cumaceans are awaiting discovery from the shallow to the mesophotic to the abyssal habitats surrounding Puerto Rico. So far, three species of cumaceans are recorded from Puerto Rico: *Ceratocuma amoena* Jones (1969), *Cumellana caribbica* Petrescu, Chatterjee & Schizas (2012) and *Cumella alexandrinae* Petrescu, Chatterjee & Schizas (2012), the last two from MCEs.

Materials and Methods

The specimens described in this study were collected from SW Puerto Rico, offshore La Parguera, Hole-in-the-Wall (17°53'04.5960"N-67°01'18.9120"W), from sponges, 67 m depth, November 18, 2009 and Cane Bay, St. Croix (U.S. Virgin Islands), 67 m depth, wash from substrata, January 20, 2010. Specimens were collected during research activities related to the DeepCres Program of the Department of Marine Sciences, University of Puerto Rico, Mayagüez. Samples from St. Croix were collected during the 2010 Mesophotic Cruise organized by the Caribbean Coral Reef Institute (CCRI) with the vessel Nekton Rorqual. Substrata (loose rubble, corals, sponges, algae) were collected by hand through technical diving (Tri-Mix Rebreathers) and were placed in plastic bags. Within minutes of collection, the substrata were placed over a 1 mm and 0.125 mm sieve and washed with filtered seawater. Microcrustaceans retained at the 0.125 mm sieve were examined with an Olympus SZH10 dissecting stereomicroscope and preserved into ethanol (100%). For the morphological observations, the cumaceans were dissected in lactic acid. Drawings were prepared using a camera lucida on an Olympus CH-2 microscope. The terminology follows Băcescu & Petrescu (1999). 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

Family Nannastacidae Bate, 1866

Genus *Cumella* G. O. Sars, 1865

Cumella solomoni sp. nov.

(Fig. 1)

Material examined

Holotype female (MGAB CUM 1673), Caribbean Sea, Cane Bay, St. Croix (U.S. Virgin Islands), 67 m depth, wash from substrata, January 20, 2010.

Diagnosis

Smooth carapace with long pseudorostrum. Maxilliped 3 with long propodus, twice as long as carpus. Uropodal peduncle little shorter than last pleonite, as long as endopod.

Description

Female. Body, covered with granulated integument. 1.82 mm in length.

Carapace (Fig. 1A). 0.36 of entire body length, 1/3 of pseudorostrum in front of ocular lobe, ocular lobe with three large lenses, long siphon, 1.16 times as long as pseudorostrum, antennal notch hardly visible, ventro-lateral margin serrated.

Pereon. All five somites visible, 0.23 as long as entire body.

Pleon. 0.4 of entire body length.

Antenna 1 (Fig. 1B). First article of peduncle 0.56 as long as other two articles, main flagellum 0.8 times as long as distal article of peduncle, accessory one minute.

Maxilliped 3 (Fig. 1C). Basis 1/3 of entire length, short plumose medial seta, two longer plumose setae on outer corner, merus as long as carpus, a plumose seta on outer margin of merus and carpus, propodus twice as long as carpus, two pappose setae on medial margin, dactylus 0.4 times as long as propodus, terminal median seta as long as dactylus. Small exopod, fully developed.

Pereopod 1 (Fig. 1D). Basis 0.37 times as long as entire pereopod length, carpus, second longest article, 1.9 times as long as ischium and merus combined, propodus 0.4 times as long as carpus, dactylus 0.5 times as long as propodus, three terminal setae, central one 1.6 times of dactylus length. Small exopod.

Pereopod 2 (Fig. 1E). Basis 0.36 times as long as entire pereopod, merus 6 times as long as ischium, short seta on medial margin, carpus 1.5 times as long as merus, 3 simple setae on distal end, one, much longer than propodus, dactylus 3 times as long as propodus, terminal robust seta shorter than dactylus. Exopod with slender basis.

Pereopod 3 (Fig. 1F). Basis longer than half of pereopod length, carpus little longer than ischium and merus combined, propodus as long as carpus, dactylus fused with terminal robust seta.

Pereopod 4 (Fig. 1G). Little longer than previous pair, basis 0.42 times as long as entire pereopod length, carpus 1.6 times as long as ischium and merus combined, as long as propodus and dactylus combined, dactylus fused with terminal robust seta.

Pereopod 5 (Fig. 1H). Basis 0.23 times as long as entire pereopod length, carpus, longest article of pereopod, twice as long as ischium and merus combined, 1.4 times as long as propodus and dactylus combined, dactylus fused with terminal robust seta.

Uropod (Fig. 1I). Peduncle 0.8 times as long as 6th pleonite, as long as endopod, 1.36 times as long as exopod, exopod, 0.73 times as long as endopod, two-articled, 1.3 times as long its terminal robust seta, one simple seta on medial margin, endopod, one-articled, 1.07 times as long as terminal robust seta, two short simple spiniform setae on medial margin.

Male. Unknown.

Etymology

The species is dedicated in honour of Reuven Solomon, as a sign of high appreciation and respect for his love and sacrifice he has shown to the mother-in-law of the first author.

Remarks

Cumella solomoni sp. nov. is closely related to *C. (Cumella) andri* Petrescu & Iliffe, 1992, *C. (Cumella) bahamensis* Petrescu & Iliffe, 1992, both from Andros Island, Bahamas and *C.*

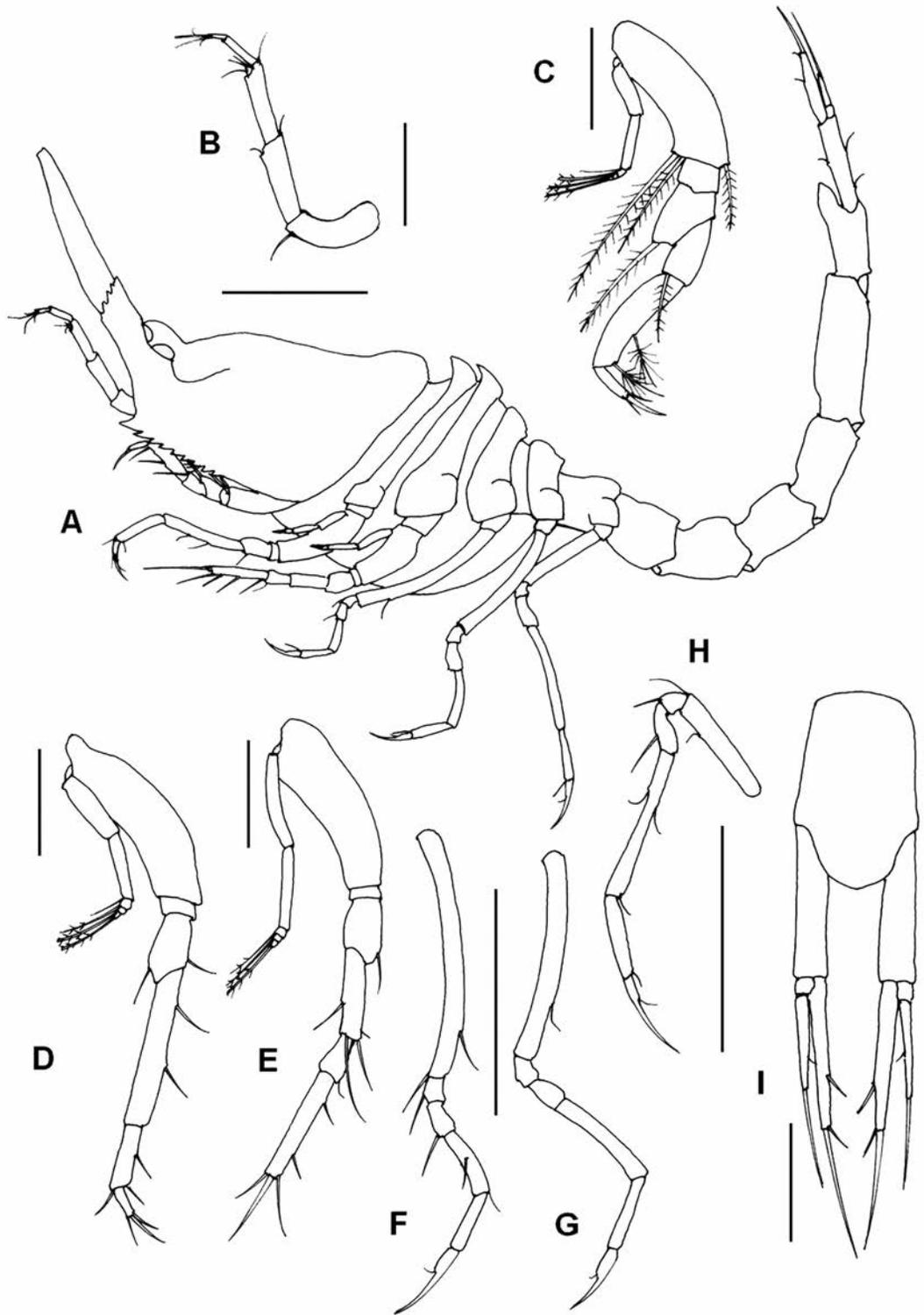


Figure 1. *Cumella solomoni* sp. nov., holotype female. **A.** Body, lateral view. **B.** Antenna 1. **C.** Maxilliped 3. **D.** Pereopod 1. **E.** Pereopod 2. **F.** Pereopod 3. **G.** Pereopod 4. **H.** Pereopod 5. **I.** Uropods. Scale bars: A = 0.25 mm, B-E = 0.2 mm, F-H = 0.25 mm, I = 0.2 mm.

(*Cumewingia*) *garrityi* Băcescu & Muradian, 1977 from Florida and Bahamas (Petrescu & Iliffe, 1992) due to the general aspect of body, of carapace, pereopod 1 with carpus longer than propodus, pereopod 5 with long carpus, and uropods with two seta on endopod. But differs from those on following points: 1) carapace with serrated ventral margin, 2) pereopod 1 with longer carpus, 2.3 times as long as propodus (1.3 in *C. andri*, 1.5 in *C. bahamensis* and 1.6 in *C. garrityi*), 3) pereopod 1 with shorter terminal seta, and 4) uropodal peduncle shorter than 6th pleonite (longer in *C. andri*, *C. bahamensis* and *C. garrityi*).

Cumella manolelii sp. nov.
(Fig. 2)

Material examined

Holotype ovigerous female (MGAB CUM 1674), Caribbean Sea, SW Puerto Rico, offshore La Parguera, Hole-in-the-Wall (17°53'04.5960"N-67°01'18.9120"W), from sponges, 67 m depth, November 18, 2009. Collected by the University of Puerto Rico-Mayagüez, Department of Marine Sciences (UPRM-DMS) Trimix Rebreather diving team. Substrata were sieved and specimen was extracted from sediment by the third author.

Diagnosis

Carapace with three dorsal spines. Pereopod 1 with propodus 0.88 times as long as carpus. Uropodal peduncle longer than last pleonite and longer than endopod.

Description

Female. Body elongated, finely granulated, 2.62 mm in length.

Carapace (Fig. 2A). 0.31 of entire body length, triangular in dorsal view (Fig. 2B), 2.5 times longer than high, pseudorostrum 0.46 times carapace length, 0.34 of it in front of ocular lobe, anterior extremity of the pseudorostrum ending in a spine, ocular lobe with five lenses, three strong dorsal spines on anterior half of carapace, also numerous setae, strong anterior lateral spine, ventral lateral with small serration.

Pereon 0.19 times as long as entire body length, with smooth integument.

Pleon 0.49 of entire body length, with smooth integument.

Antenna 1 (Fig. 2C), proximal article of peduncle shorter than rest of two articles combined, minute accessory flagellum.

Maxilliped 3 (Fig. 2D). Basis 0.28 times as long as entire length, one short plumose setae on distal inner corner, two long plumose setae on outer corner, merus twice as long as ischium, a plumose seta on outer margin, carpus as long as merus, with a plumose inner seta and an outer longer one, propodus, second longest article, 1.8 times as long as carpus, three pappose setae on medial margin, dactylus 0.44 times as long as propodus, terminal setae as long as dactylus. Small and slender exopod.

Pereopod 1 (Fig. 2E). Basis 0.31 as long as entire pereopod length, simple seta on medial margin, ischium little longer than merus, simple seta on medial margin, one seta on each margin of merus, carpus 2.7 times as long as merus, two simple setae on medial margin and one on outer margin, propodus 0.88 times as long as carpus, simple seta on medial margin, dactylus 0.41 times

as long as propodus, one of 5 terminal setae longer than dactylus. Longer exopod than in maxilliped 3.

Pereopod 2 (Fig. 2F). Basis 0.41 times as long as entire pereopod length, merus five times as long as ischium, one seta on medial margin, carpus 1.5 times as long as merus, one simple seta on outer margin, three distal setae, one exceeding extremity of propodus, dactylus twice as long as propodus, two medial setae, one outer, two subterminal setae and one, robust, little longer than dactylus. Slender exopod, bigger than in previous pair.

Pereopod 3 (Fig. 2G). Basis 0.47 of entire pereopod length, short distal medial seta, merus 1.25 times as long as ischium, one medial seta on ischium and merus, carpus 1.2 times as long as merus, propodus 0.83 times as long as carpus, dactylus fused with terminal robust curved seta.

Pereopod 4 (Fig. 2H). Basis 0.4 of entire pereopod length, merus 1.5 times as long as ischium, carpus 1.44 times as long as merus, propodus 1.15 times as long as carpus, twice as long as dactylus, dactylus fused with terminal seta.

Pereopod 5 (Fig. 2I). Basis 0.4 of entire pereopod length, merus 1.71 times as long as ischium, carpus 1.83 times as long as merus, propodus 0.64 times as long as carpus, dactylus fused with terminal seta.

Uropod (Fig. 2J). Peduncle 1.12 times as long as last pleonite, four short setae on medial margin, 1.48 times as long as endopod, exopod 0.72 times as long as endopod, terminal robust seta little shorter than exopod, endopod with two short simple setae on medial margin, terminal seta 0.52 times as long as endopod.

Male. Unknown.

Etymology

The species is dedicated in honour of late Dan Gabriel Manoleli (1943-2011), specialist in Polychaeta, as a sign of posthumous gratitude to the specialist who led the first steps of first author in the Museum "Grigore Antipa".

Remarks

Cumella manolelii sp. nov. resembles the other 10 *Cumella* species with dorsal spines on carapace from the Caribbean Sea, *C. serrata* Calman, 1911 and *C. somersi* Petrescu & Sterrer, 2001 from Bermuda, *C. antipai*, *C. jamaicensis*, *C. longicaudata*, *C. medeae*, *C. zimmeri*, described by Petrescu, Iliffe & Sarbu (1994) from Jamaica, *C. californica* Watling & McCann, 1997, *C. biserrata* Petrescu, 2002, *C. ruetzleri* Petrescu, 2002, *C. vicina* Zimmer, 1944 from Belize (Petrescu, 2002) and *C. spinifera* Petrescu & Heard, 2004 from Costa Rica (Caribbean coast). Among all the above mentioned species only *Cumella manolelii* sp. nov. and *C. zimmeri* have three spines. The new species differs from *C. zimmeri* by 1) a shorter pseudorostrum, 2) fewer lenses (five instead eight), 3) antenna 1 with shorter aesthetascs 4) ventral margin of pereonites without apophysis 5) pleon without lateral spines 6) pereopod 1 with carpus longer than propodus 7) uropodal peduncle longer than 6th pleonite versus equal ones 8) uropodal peduncle with four medial setae instead three, and 9) endopod versus exopod ratio 1.3 instead of 1.4.

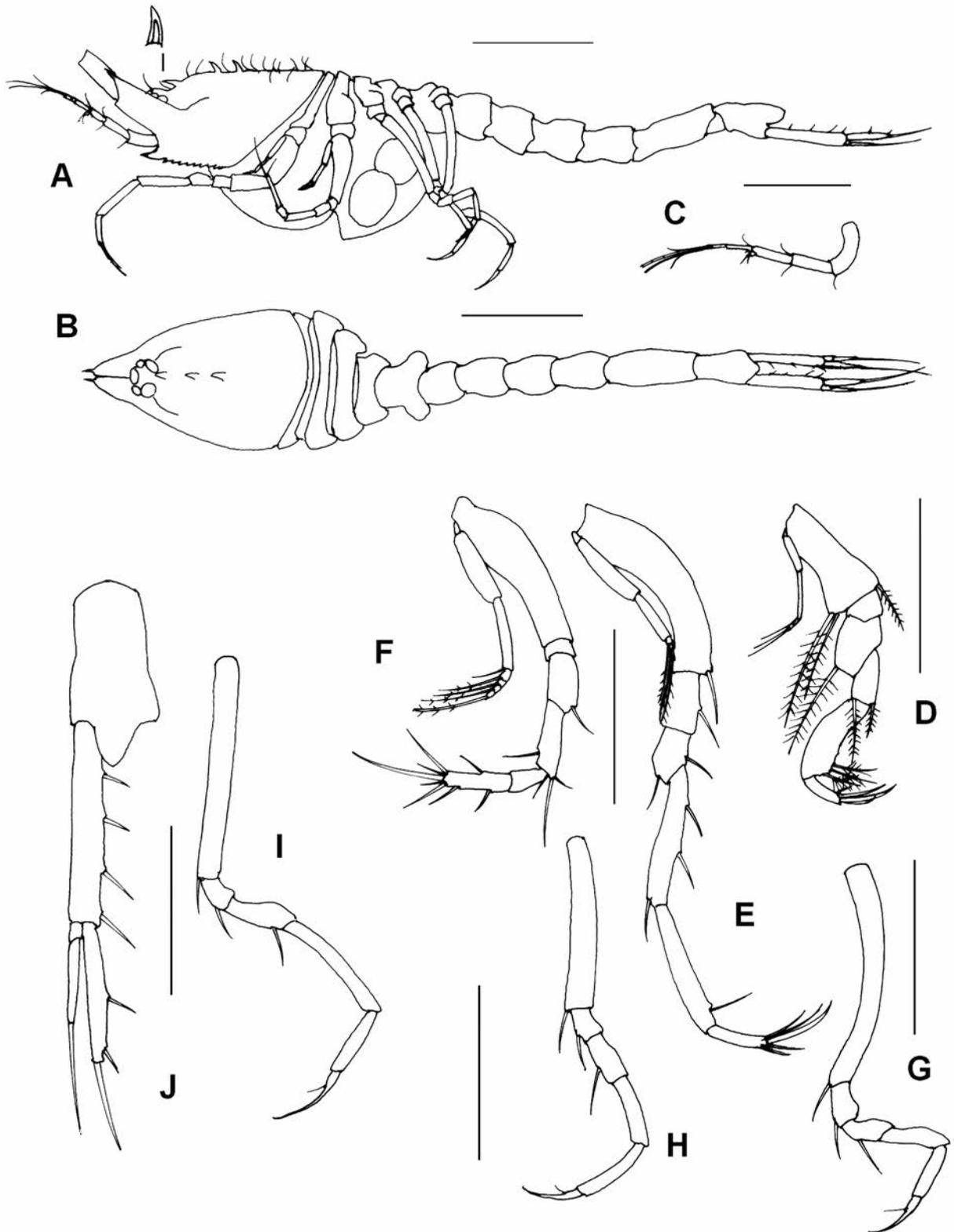


Figure 2. *Cumella manolelii* sp.nov., holotype female. **A.** Body, lateral view. **B.** Body, dorsal view. **C.** Antenna 1. **D.** Maxilliped 3. **E.** Pereopod 1. **F.** Pereopod 2. **G.** Pereopod 3. **H.** Pereopod 4. **I.** Pereopod 5. **J.** Left uropod. Scale bars: A & B = 0.5 mm, C = 0.2 mm, D-J = 0.25 mm.

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