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Three new species of Cumacea (Crustacea: Peracarida) from Costa Rica

IORGU PETRESCU[1] & RICHARD W. HEARD[2]

[1]*"Grigore Antipa" National Museum of Natural History, Department of Aquatic fauna, Kiseleff 1 Bucharest, 011341, Romania. E-mail: iorgup@antipa.ro*

[2]*Department of Coastal Sciences, University of Southern Mississippi, P.O. Box 7000, Ocean Springs, MS 39566-7000, USA. E-mail: richard.heard@usm.edu*

Abstract

Three new species of Cumacea are described from Costa Rican coastal waters. The bodotriids, *Cyclaspys breedyae* n. sp. and *Cyclaspis vargasae* n. sp., occurred on the Pacific coast, and the nannastacid, *Cumella spinifera* n. sp., came from a shallow back reef habitat of the Caribbean coast. *Cyclaspis breedyae* n. sp., which was collected from shallow water (1–1.5 m) at a beach just north of Puerto Caldera, has affinities with *Cyclaspis varians* Calman, 1912 from the northwestern Atlantic; it differs by having a carapace with fewer (usually 4), but larger, dorsal spines behind the ocular lobe and by having the pseudorostrum not extending beyond the ocular lobe. *Cyclaspis vargasae* n. sp., which was collected at a depth of 35 m off San José Island on the northwest coast, has some similarities with western Atlantic species, *Cyclaspis alba* Roccatagliata & Moreira 1986 and *C. variabilis* Roccatagliata & Moreira, 1986, but it differs from these species by having a carapace with oblique dorsal crests and a lateral ridge running anteriorly from the posteroventral margin of the carapace to just above the antennal notch. *Cumella spinifera* n. sp. was collected on the Caribbean coast at Puerto Vargas and has its closest affinities with *C. zimmeri* Petrescu, Iliffe, & Sarbu, 1994, known from shallow Caribbean waters off Jamaica. It is distinguished from the Jamaican species by several characters, including having the female carapace with more dorsal spines (10 verses 3 on the carapace of *C. zimmeri*) and being more dorsally pronounced with a papulate integument.

Key words: Cumacea, Costa Rica fauna, *Cyclaspis*, *Cumella*, new species

Introduction

There are only a few previously published reports dealing with Cumacea from Costa Rican waters, all of which deal with species occurring along or off the Pacific coast. The first record was that of Zimmer (1944), who reported *Cyclaspis dolera* Zimmer, 1944 from

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shallow waters on the northwest coast. Băcescu (1961, 1962) described two diastylid species, *Vemakylindrus coastaricanus* (Băcescu, 1961) and *Makrokylindrus menziesi* Băcescu, 1962, from deep waters off Costa Rica. A fourth species, *Coricuma nicoyensis* Watling & Breedy, 1988 appears to be endemic to the upper brackish waters of the Golfo de Nicoya. Vargas (1989) studied the seasonal occurrence and the abundance for this species in the vicinity of the type locality.

Petrescu, et al. (in press) have summarized the available information on Costa Rican cumaceans and have added new records from both the Caribbean and Pacific coasts. Our report is based on some of the new taxa found during that study. Three new species, two from the Pacific coast belonging to the bodotriid genus *Cyclaspis* Sars, 1885 and a nannastacid from the Caribbean belonging to the genus *Cumella* Sars, 1865, are described and illustrated here.

Materials and methods

Specimens were collected by Odalisca Breedy, Jorge Cortés, Richard Heard, Leonora Rodríguez, Jose Vargas, and Rita Vargas during several trips to the Caribbean (Puerto Vargas) and Pacific (Puerto Caldera and Islas Murciélago) coasts between 1998 and 2001. Various collecting methods and gear types were employed including fine mesh (1 mm) dredge nets (kicknets), yabby pumps (hand-held suction devices), epibenthic sleds, dredges, and rock and algae washings. These collections were part of an ongoing inventory of the marine fauna of Costa Rica conducted by the School of Biology, University of Costa Rica.

Type material has been deposited in the Zoology Museum (UCRZM), School of Biology, University of Costa Rica, San José, Costa Rica; “Grigore Antipa" National Museum of Natural History (MGAB), Bucharest, Romania; and the Gulf Coast Research Laboratory Museum (GCRL), Ocean Springs, MS, USA.

Family Bodotriidae T. Scott, 1901
Cyclaspis Sars, 1885
Cyclaspis breedyae n. sp. (Figure 1)

Material examined. Holotype.– Female (UCR 8383-01). *Type locality*: Costa Rica, Golfo de Nicoya (Pacific coast), beach 1–2 km north of Puerto Caldera, fine mesh dredge net, 1–1.5 m depth, sand substratum, 28 April 1998. Paratypes: 1 female (MGAB CUM 1447), 1 female (GCRL 2074), same collection data as holotype.

Diagnosis. Carapace with four dorsal teeth and an oblique ridge on each side. Pereopod 1 with propodus as long as dactylus. Uropodal exopod slightly longer than endopod. Endopod with four stout setae on inner margin.

Description. Female. Body, elongate, 4.3 mm in length.

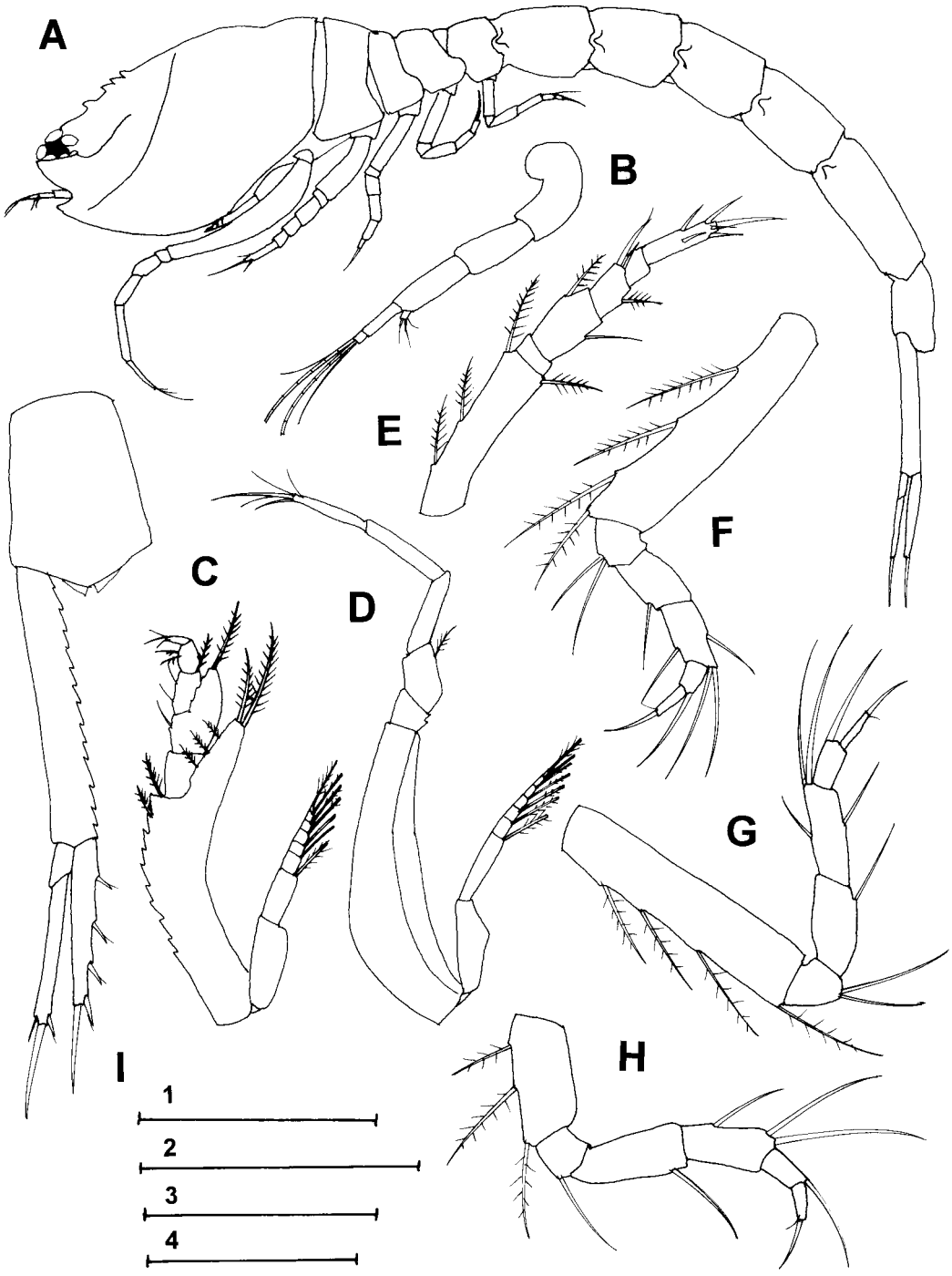

FIGURE 1. *Cyclaspis breedyae* n.sp. Subadult female. A , lateral view; B, antenna 1; C, maxilliped 3; D, pereopod 1; E, pereopod 2; F, pereopod 3; G, pereopod 4; H, pereopod 5; I, uropod. Scale 1 = 1 mm (A); Scale 2 = 0.3 mm (B, F–I); Scale 3 = 0.5 mm (C, D); Scale 4 = 0.3 mm (E).

Carapace (Figure 1 A): ocular lobe large, pigmented, typically with 11 lenses (omatidia); pseudorostral lobes shorter than ocular lobe; distinct antennal notch present; dorsal crest immediately behind ocular lobe armed with four teeth (confined to anterior 1/3 of carapace behind ocular lobe); oblique ridge running from mid-dorsal region to anterior corner just below antennal notch.

Pleon. Longer than carapace and pereon combined.

Antenna 1 (Figure 1 B): peduncle with last two articles equal in length, main flagellum biarticulate with basal article much longer than distal article.

Maxilliped 2. Lost during dissection.

Maxilliped 3 (Figure 1 C). Outer process well developed, merus with process having apical long plumose seta

Pereopod 1 (Figure 1 D): endopod with basis less than half length of pereopod, carpus as long as propodus, slightly longer than dactylus. Exopod, excluding setae, extending slightly beyond basis of endopod.

Pereopod 2 (Figure 1 E): basis less than ½ length of entire pereopod, with plumose setae on both sides, merus as long as carpus and propodus combined, with a plumose seta on inner margin and a simple one on outer margin, carpus with two long stout distal setae, dactylus 3 times longer than propodus, with few short simple setae including subterminal and terminal ones.

Pereopod 3 (Figure 1 F): basis more than ½ length of remaining (distal) articles combined, long plumose setae on inner margin, ischium with simple setae on inner margin, merus nearly as long as carpus, carpus with two long stout setae on distal end, thin dactylus with terminal simple seta.

Pereopods 4 & 5 (Figure 1 G, H): basis shorter, merus longer than carpus compared to pereopod 3, setation like in previous pair.

Uropod (Figure 1 I): peduncle with inner margin serrate, slightly less than 1.4 longer than pleonite 6 and about 1.5 times longer than exopod. Exopod slightly longer than endopod, with three terminal robust spiniform setae, middle seta much longer than others. Endopod with terminal robust spiniform seta, four stout shorter setae on inner margin.

Male. unknown

Etymology. The species is named in honour of Odalisca Breedy, in recognition of her work on Cumacea and other invertebrates from Costa Rican waters; she was instrumental in the collection of much the material for this study.

Remarks. *Cyclaspis breedyae* **n.sp.** has affinities with *Cyclaspis varians* Calman, 1912 from the western Atlantic. Both have similar uropods, but the Costa Rican species differs by its carapace (1) having a more strongly developed dorsal spines ("fine teeth" present in *C. varians*), (2) having a distinct ridge, which is missing in the Atlantic species, running obliquely from mid dorsal region to the base of antennal notch, and (3) having the pseudorostrum not exceeding the ocular lobe. It further differs from *C. varians* by having the antennule with the last peduncle article no longer than those preceding it, and pereopod 1 relatively longer with a shorter basis.

Some other sand dwelling crustaceans occurring in dredge net samples from the surf zone at Puerto Caldera with *C. breedyae* included the cumacean *Leptocuma forsmani* Zimmer, 1943; the mysid *Bowmaniella banneri* Băcescu, 1968; the isopod *Ancinus panamensis* Glynn & Glynn, 1974); and the mole crab *Emerita rathbunae* Schmitt, 1935.

Cyclaspis vargasae n. sp. (Figures 2, 3)

Material examined. Holotype.–Subadult female (UCRZM 2382-02). *Type locality*: NW coast of Costa Rica, Station 8, off San José Island, Islas Murciélago, dredge, fine sand-silt substratum, 35 m depth, 08 May1999. Paratypes: 1 male (UCR 8382-01), 1 female (MGAB CUM 1448), same collection data as holotype.

Diagnosis. Carapace with surface pitted, oblique ridge extending from mid dorsal carapace towards anterior corner. Maxilliped 3 with numerous plumose setae on outer margin of basis, merus with strongly serrate inner margin. Pereopod 1 with propodus longer than carpus and dactylus. Uropodal peduncle 1.5 times longer than last pleonite, with equal rami.

Description. Female. Body (Figure 2A,B): elongate, 6 mm in length, with well-calcified integument.

Carapace. Surface pitted with oblique ridge extending from mid dorsal region towards anterior corner, another ridge extending from ventral posterior corner toward pseudorostrum. Median dorsal keel extending from ocular lobe posteriorly. Abdomen with each pleonite having parallel dorsal and ventral crests; pleonites 1–5 each with short lateral crest ending anteriorly in subacute process or tubercle at articulation of each segment. Pleonite 6 with lateral crest present, but lacking anterior process.

Maxilliped 2. Lost during dissection.

Maxilliped 3 (Figure 2 C): basis longer than remaining articles combined, bearing numerous plumose setae on outer margin, and with strongly serrate inner margin; outer process almost reaching mero-carpal articulation, ischium, merus, and carpus with serrated inner margin; merus with process exceeding extremity of carpus, with strong teeth on inner margin, carpus longer than propodus, propodus little longer than dactylus.

Pereopod 1 (Figure 2 D): basis less than half length of entire pereopod, distal half with margins irregularly serrate; ischium with spinose dorsal margin; merus longer than dactylus, carpus shorter than propodus.

Pereopod 2 (Figure 2 E) basis half length of entire pereopod, plumose setae on outer margin, merus longer than carpus, with two plumose setae on inner margin, carpus with two stout setae on inner distal corner, dactylus twice as long as propodus, with short simple setae.

Pereopods 3–5 (Figure 2 F–H): basis becoming progressively shorter, with plumose setae on inner margin, merus as long as carpus, carpus with a long stout seta on distal end, dactylus fused with its terminal short stout seta.

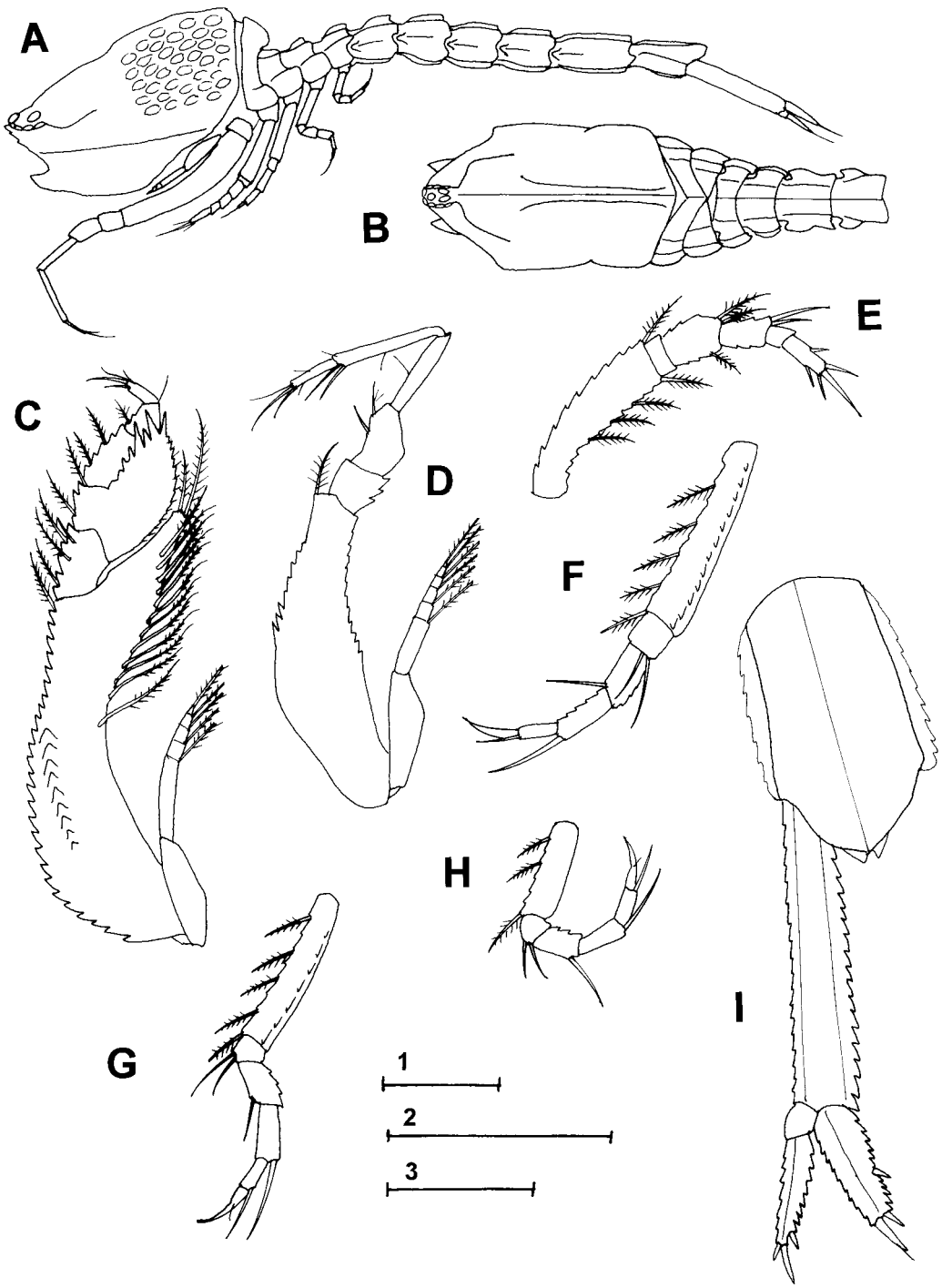

FIGURE 2. *Cyclaspis vargasae* n. sp. Subadult female. A, lateral view; B, cephalothorax, dorsal view; C, maxilliped 3; D, pereopod 1; E, pereopod 2; F, pereopod 3; G, pereopod 4; H, pereopod 5; I, uropod. Scale 1 = 1 mm (A,B); Scale 2 = 0.5 mm (C, E–I); Scale 3 = 0.5 mm (D).

Uropod (Figure 2 I): peduncle with margins serrate (as in other species of the genus), about twice as long as rami. Exopod with two small subterminal setae and robust terminal seta; endopod as long as exopod, with subterminal seta, one stronger terminal seta, one seta on inner serrated margin.

Male. Body elongate, narrower than female, 5.8 mm in length.

Carapace (Figure 3 A): much lower and longer than female, only ventral oblique crest present and extending along pleon.

Pereopod 1 (Figure 3 B). Basis slender with six stout setae on inner margin, carpus subequal with propodus, dactylus shorter than propodus.

Uropod (Figure 3 C): peduncle with numerous plumose setae, 1.5 times longer than last pleonite and twice as long as rami. Exopod with two short subterminal setae and one longer terminal seta. Endopod about equal in length with exopod, with terminal robust seta and three microserrate setae and four simple setae on inner margin.

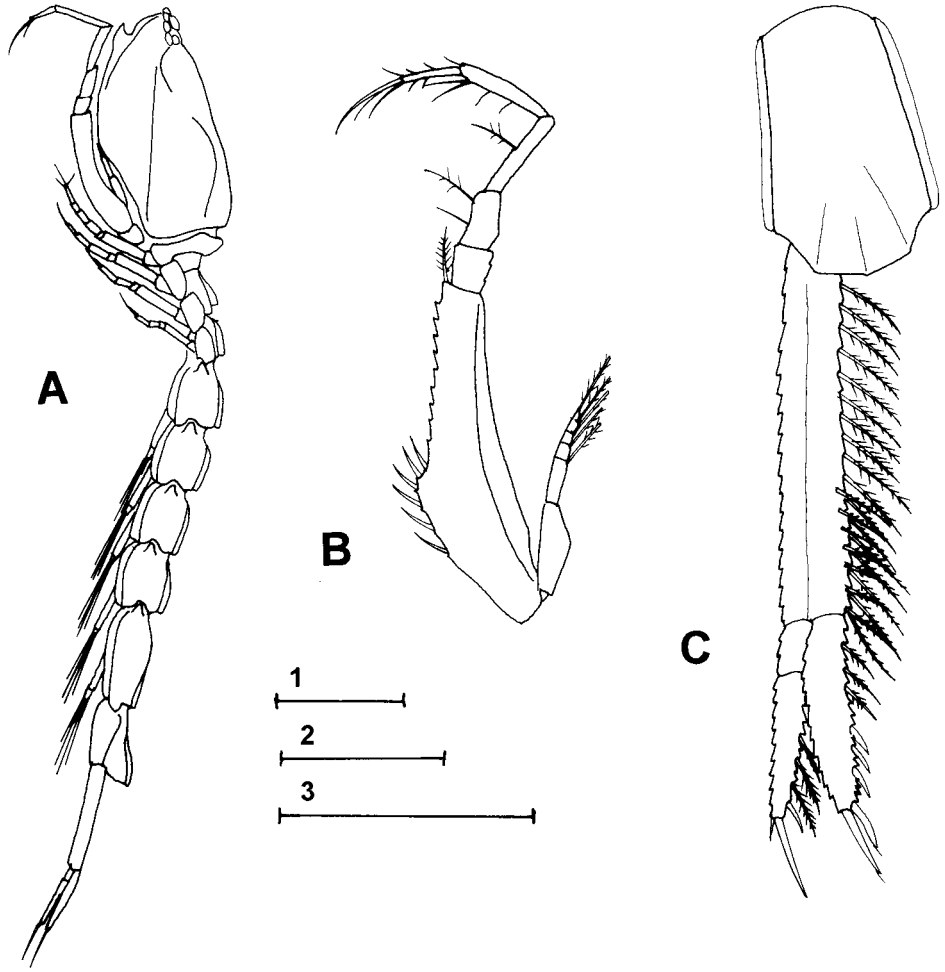

FIGURE 3. *Cyclaspis vargasae* n. sp. Adult male. A, lateral view; B, pereopod 1; C, uropod. Scale 1 = 1 mm (A); Scale 2 = 0.5 mm (B); Scale 3 = 0.5 mm (C).

Etymology. The species is named in honour of Rita Vargas, who participated in the collection of the type material, in recognition of her work on the malacostracan Crustacea of Costa Rica.

Remarks. *Cyclaspis vargasae* n. sp. has some similarities with *Cyclaspis alba* Roccatagliata & Moreira, 1986 and *C. variabilis* Roccatagliata & Moreira, 1986, which are both known from the western Atlantic. It differs from these two species by having (1) a carapace with oblique dorsal crests, (2) a lateral ridge running anteriorly from the posteroventral margin of the carapace to end just above the antennal notch, and (3) a uropod with fewer setae on the endopod.

Cyclapsis vargasae co-occurred with a diverse group of invertebrates, including mollusks, polychaetes, and a variety of crustaceans including tanaidaceans (*Leptochelia* sp.), amphipods, brachyuran crabs, caridean shrimps, and the diastylid cumacean, *Diastylis californica* Zimmer, 1936.

Family Nannastacidae Bate, 1866
***Cumella* G. O. Sars, 1865**
***Cumella spinifera* n. sp. (Figures 4, 5)**

Material examined. Holotype.–Subadult female (UCR 2383-01). *Type locality*: Costa Rica, southern Caribbean coast, Puerto Vargas, back reef, carbonate rock rubble washings, depth 1–1.5 m. Paratype: 1 subadult male (UCR 2383-02) same collection data as holotype.

Diagnosis. Female with 12 strong dorsal spines; spines also on dorsal side of pereon and first three pleonites. Male with dorsal margin of carapace armed with four spines, three on ocular lob. Pereonites 2–5 in both sexes having lateral margins with acute prolongations.

Description. Subadult female. Body (Fig A): elongate, about 2 mm in length. Integument spiny and finely setose, especially on carapace (spines disposed in almost parallel rows).

Carapace (Figure 4 A): slightly more than 1/3 length of entire body, with 12 strong dorsal spines, three on posterior elevation and 5 on the frontal lobe (most of spines with broken tips); pseudorostrum long and spinose, notch distinct with strong tooth on anteroventral corner. Pereonites 2–4 each with short irregular, row of three-five spines on each side of dorsal crest (divide), two dorsal-most spines usually largest.

Antenna 1 (Figure 4 B): peduncle with teeth on margins of article 2, third article 3 times longer than article 2.

Maxillipeds. Lost during dissection.

Pereopod 1 (Figure 4 C): basis, ischium, and merus lacking distinct setae, carpus long and robust, longer than ischium and merus combined; propodus with two long simple setae on inner margin, more than twice as long as dactylus, slightly shorter than carpus; dactylus with long simple setae. Exopod small, not fully developed.

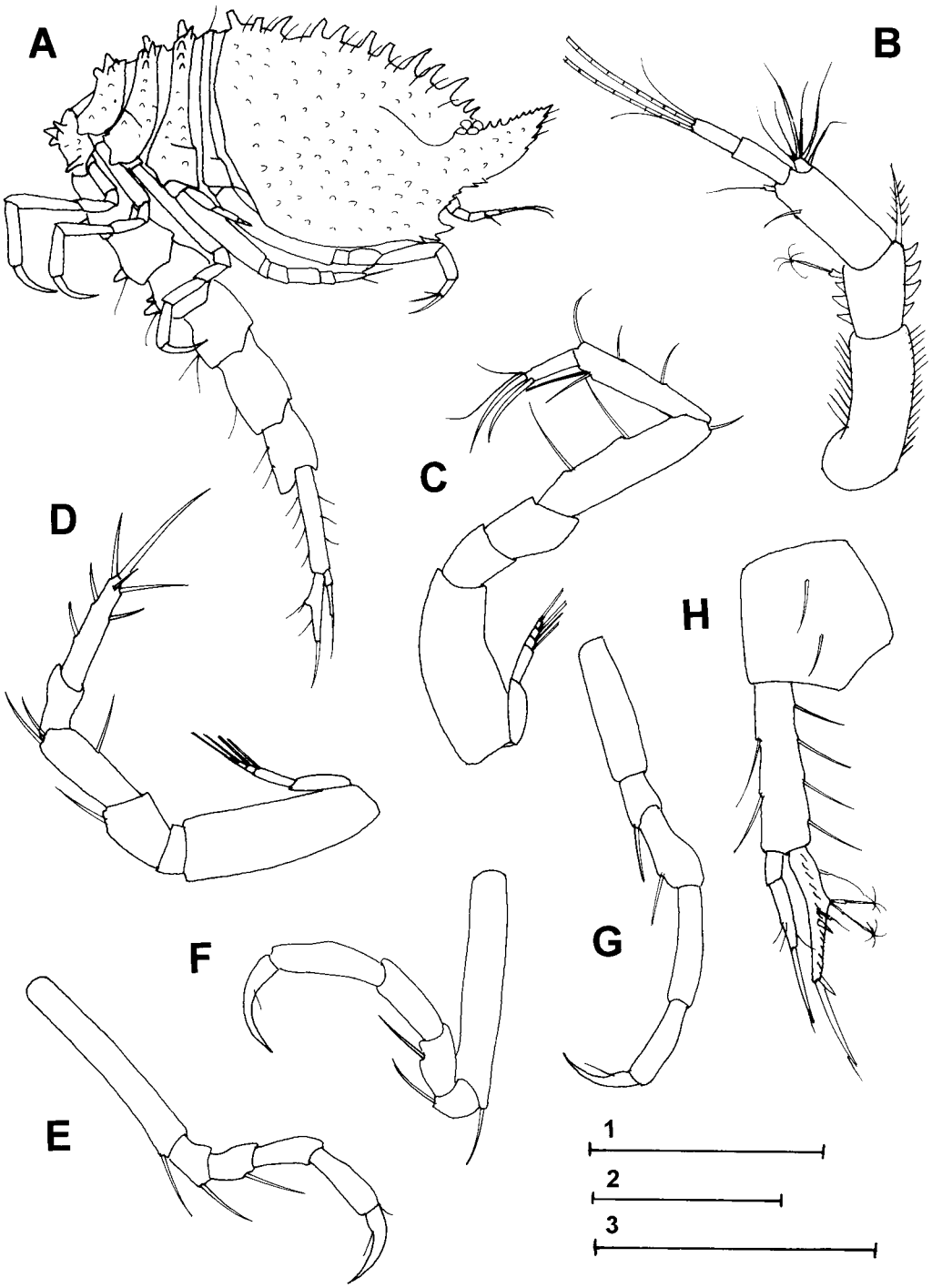

FIGURE 4. *Cumella spinifera* n.sp. Subadult female. A, lateral view; B, antenna 1; C, pereopod 1; D, pereopod 2; E, pereopod 3; F, pereopod 4; G, pereopod 5; H, uropod. Scale 1 = 0.5 mm (A); Scale 2 = 0.1 mm (B); Scale 3 = 0.3 mm (C–H).

Pereopod 2 (Figure 4 D): basis slightly longer than third of entire length of pereopod, merus with a simple seta on inner margin, carpus longer than ischium and merus combined, with two stout simple setae on distal end; dactylus twice as long as propodus, with long subterminal and terminal setae. Exopod small.

Pereopods 3–5 (Figure 4 E–G): robust, with basis becoming progressively shorter; dactylus fused with robust, curved terminal seta.

Uropod (Figure 4 H): peduncle slightly longer than last pleonite and about 1.3 times length of endopod, with long simple setae on both sides. Exopod slightly shorter than endopod, with stout terminal seta. Endopod curved, with two long sensory brush setae and two stout short seta on inner margin, one short terminal seta present.

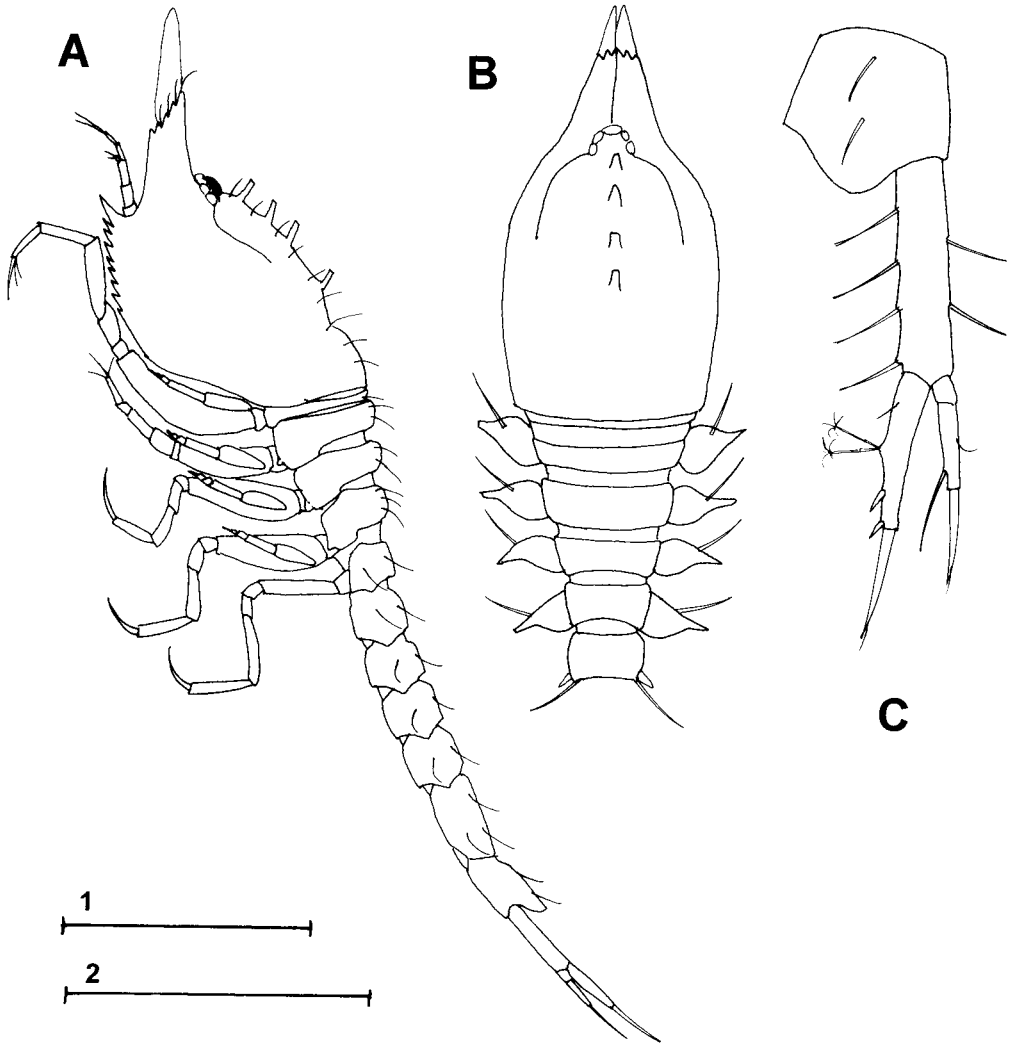

FIGURE 5. *Cumella spinifera* n.sp. Subadult male (A) lateral view; (B) cephalothorax, dorsal view; (C) uropod. Scale 1= 0.5 mm (A, B); Scale 2= 0.3 mm (C).

Subadult male. Carapace. Dorsal margin armed with spine dorsal spines, three on ocular lobe (Figure 5 A). Five pairs of incompletely developed exopods.

Pereonites 2–5 (Figure 5 B): with lateral acuminate prolongations.

Uropod (Figure 5 C): peduncle with six long marginal setae, two outer margin and four on inner margin; about 1.4 times longer than last pleonite and about equal in length to inner ramus (including terminal seta). Exopod about 7/10 length of endopod, with one long terminal seta, one small seta on outer margin and one large subdistal simple seta on inner margin. Endopod with outer margin lacking setae, inner margin with one small proximal seta, two sensory brush seta on shallow lobe mid-marginally, two short (spiniform) subdistal setae, and one large terminal seta (over 3/4 length of remaining part of endopod).

Etymology. The specific name refers to the spinose nature of the integument.

Remarks. *Cumella spinifera* **n.sp.** appears to be most similar and closely related to *Cumella zimmeri* Petrescu, Iliffe & Sarbu, 1994 described from Jamaican waters. The two species both have dorsal spines, a long pseudorostrum, similarly shaped pereonites with acuminate margins and spines, and nearly similar pereopods and uropod. *Cumella spinifera* differs from *C. zimmeri* by having (1) more numerous dorsal spines on the carapace of the female (10 versus 3 on *C. zimmeri*), (2) the carapace of the female higher and more dorsally pronounced, and with thick rugous integument (versus smooth integument on *C. zimmeri*), (3) dorsal spines on pereonites and pleonites, (4) the antennular peduncle spinose, and (5) the uropod with peduncle longer than last pleonite and endopod.

This small cryptic species occurred in rock washings, which contained a diverse invertebrate fauna, especially crustaceans. These included caridean shrimps, amphipods (many spp.), tanaidaceans, mysids (*Heteromysis* sp.), and a variety of other cumaceans including *Vaunthompsonia* cf. *cristata* Bate, 1856; *Elassocumella micruropus* (Calman, 1911); *Schizotrema agglutinanta* (Băcescu, 1971), and several other species of *Cumella* (see Petrescu et al., in press).

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