

## A new genus and species of sphaeromatid isopod (Crustacea) from Atlantic Costa Rica

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*Abstract.*—*Beatricesphaera ruthae*, a new genus and species of sphaeromatid isopod inhabiting shallow water along the Atlantic Costa Rican coast is described. This small species is placed into a new genus as the combination of characters which describe it precludes inclusion into any known sphaeromatid genus. It is best recognized by these character states: short epistome, flattened antenna 1 peduncle articles 1 and 2, robust setose pereopods, lamellar uropods, simple pleopods 4 and 5, short and unfused penes and an elongate basally attached appendix masculina. It is not readily allied to any genus or group of genera within the Sphaeromatidae.

Costa Rican shores boast every major tropical coastal marine habitat, from rocky shores and sandy beaches, to mangrove lagoons and coral reefs. In a joint project between Universidad de Costa Rica and the Los Angeles County Natural History Museum, the Cahuita Reef (9°18'N, 82°7'W) at Parque Nacional on the Caribbean coast of Costa Rica was surveyed and monitored between April 1986 and August 1987 for habitat degradation resulting from upland deforestation. This national park includes a small 240 hectare barrier reef (Wellington 1974; Risk et al. 1980; Cortés et al. 1984; Guzman & Cortés 1984a, 1984b; Murillo & Cortés 1984; Cortés & Risk 1985).

Knowledge of the Pacific Costa Rican isopod fauna rests with Brusca & Iverson's 1985 summary. The greater Caribbean region is covered by the publications of Kensley (1984), the field guide of Kensley & Schotte (1989) and miscellaneous other contributions, notably by Müller (e.g., 1993a, 1993b). This new genus and species of marine sphaeromatid isopod brings the total number of sphaeromatid genera known from the Caribbean to 17.

Bruce (1993, 1995, 1997) discusses some of the taxonomic difficulties of the Sphaeromatidae (e.g., high levels of homoplasy and the certain lack of monophyly of many larger genera) when compared to other flabelliferan families. The Sphaeromatidae are remarkable for their morphological diversity and are highly speciose. To date almost 100 genera have been described (Bruce 1995), and the latest count reports over 600 described species (see Kensley & Schotte, USNM Isopod List on the WWW at: <http://nrmnhwww.si.edu/gopher-menus/Iso-pods.html>). For the Caribbean, Kensley & Schotte (1989) reported 32 species in 13 genera, and White (1996 unpublished) reports 7 described sphaeromatids from the Cahuita reef and two undescribed species.

*Methods and terminology.*—Coral rubble and algal samples from the intertidal to 12 m were collected and rinsed in fresh water and sieved through a 240  $\mu$ m mesh screen. All material was fixed and preserved in 95% ethyl alcohol. Material was examined with dissecting, compound, and scanning electron microscopes. Appendages were drawn with the aid of a camera lucida. Setal and spine nomenclature as well as the nomen-

clature of appendage orientation follows Brusca et al. 1995. Abbreviations used are: LACM—Los Angeles County Museum of Natural History, Los Angeles, California; MOV—Museum of Victoria, Melbourne, Australia; SDNHM—San Diego Natural History Museum, San Diego, California; UCR—Universidad de Costa Rica, San Jose, Costa Rica; USNM—National Museum of Natural History, Smithsonian Institution, Washington, D.C.; PMS, plumose marginal setae; SEM, scanning electron microscope.

### Systematics

Order Isopoda Latreille, 1817  
Suborder Flabellifera Sars, 1882  
Family Sphaeromatidae  
Milne Edwards, 1840  
*Beatricesphaera*, new genus

*Type species.*—*Beatricesphaera ruthae*, new species, here designated.

*Diagnosis of male.*—Body vaulted, about twice as long as wide, widest at pereonites 5 and 6; body with translucent, flexible membrane-like covering; body margins with setose fringe, membrana cingula (see Buss & Iverson 1981). Cephalon lacking rostral point, lateral margins not expanded; eyes lateral, distinctly faceted. Pereonites 2–6 of about equal length, pereonites 1 and 7 longest; pereonite 7 not extending to lateral margins, laterally overlapped by pereonite 6; coxae without coxal keys (see Bruce 1994a, Figs. 2G, 22D), sutures absent. Pleon consisting of 1 segment. Pleotelson anterolateral margins extending to full body width, posterior margin narrowed, with distinct dorsal foramen, posterior margins of which contact posteriorly.

Antenna 1 peduncle articles 1 and 2 strongly flattened, anteriorly expanded; article 2 with anterodistal lobe; anterior margins of article 1 and 2 contiguous; article 3 slender, not expanded; flagellum short, slightly longer than article 3. Antenna 2 peduncle article 1 shortest, article 5 longest,

articles 2–4 progressively increasing in length.

Epistome short, not laterally narrowed or constricted, with blunt median point; not separating antennule bases; lateral margins narrow, encompassing labrum. Right mandible incisor blade-like, narrow, unicuspid; without spine row and lacinia mobilis; left mandible incisor similar to right, but with lacinia mobilis and spine row of 2 spines; both mandibles with robust molar provided with proximal marginal teeth, gnathal surface smooth. Maxilla 1 outer lobe with 10 spines, outer 5 smooth, inner 5 weakly serrate, inner lobe with 4 feathered spines and 2 short simple spines. Maxilla 2 with 3 subequal lobes, provided with setae. Maxilliped palp articles 2 and 3 with short distinct distomedial lobes, article 4 and 5 quadrate; endite flat, distal margin subtruncate, with acute and blunt spines.

Pereopods robust, ambulatory, accessory unguis of dactylus simple. Pereopod 2 markedly slender in comparison to pereopod 1, pereopods 3–7 more robust than 1 and 2, posterior margins of pereopods with fringe of simple and plumose setae on ventral margins of merus, ischium, and propodus.

Paired short flattened penes present on posterior of sternite 7, not extending to pleopod rami.

Pleopods 1–3 rami with PMS, 4–5 without PMS. Pleopod 1 rami almost subequal in length, neither indurate nor operculate. Pleopod 2 endopod about 1.5 times as long as exopod; appendix masculina on basal lobe, nearly twice (1.8) as long as endopod, apically acute. Pleopod 3 endopod without suture; pleopods 4 and 5 without ridges or folds; pleopod 5 exopod with 3 scale patches. Uropods lamellar, extending just beyond posterior of pleotelson, not meeting at midline; exopod prominent, about half as long as endopod.

*Female.*—Mouthparts not metamorphosed; pleotelson posterior margin entire, without exit channel; oostegites absent;

eggs apparently held within pereon; otherwise similar to male.

*Remarks.*—This small species of sphaeromatid presents a combination of characters that prevents its inclusion in any known sphaeromatid genus, and furthermore, cannot readily be allied to any group of genera within the Sphaeromatidae. We therefore regarded it as *incertae sedis*. Superficially it is perhaps most similar to the “*Cassidinidea* group” discussed by Bruce (1994b), but it lacks the large dorsally visible epistome, fused penes, laterally extended cephalon, and also has short rather than elongate pleopod 1 rami. In common with that group, it has an elongate appendix masculina which is set on a basal lobe, the marsupium is composed of anterior and posterior pockets (see Harrison 1984, Kensley & Schotte 1989: 205 for terminology), the pleon consists of a single segment entirely without sutures, and pleopods 4 and 5 are similar to those of *Cassidinidea* (all of these characters mentioned might be considered possible apomorphies). The significance of the shared characters is uncertain as all of these states are known to occur in other sphaeromatid genera. In common with the “*Leptosphaeroma* group” (sensu Bruce 1994b) are the short epistome and short penes, but the genera of this group are otherwise distinct. What is remarkable, if the affinities of this new genus do lie with *Cassidinidea* and related genera, is that this is the first instance of a perforate pleotelson in that group of genera.

There is, as mentioned earlier, a superficial resemblance to the genus *Cassidinidea* Hansen, 1905 (reviewed in Bruce 1994b). That genus is immediately distinguished by the dorsally visible epistome, narrow antennule peduncle articles, expanded lateral margins of the head, and fusion of the penial processes (Kensley & Schotte’s 1989 statement that the penes are “elongate, separate” is in error, applying only to “*Cassidinidea*” *mosaica* Kensley & Schotte, 1987, a species incorrectly placed in the genus). In addition both male and female *Cas-*

*sidinidea* have the pleotelson posterior margin entire, whereas it is perforate in the male of *Beatricesphaera* new genus. A “gel-layer” occurs in *Cassidinella* (Bruce 1994a) as well as other genera, but seems easily lost, and is usually not recorded, so its significance is entirely uncertain. It was not observed in *Beatricesphaera*.

Lack of thickened ridges or folds on pleopods 4 and 5 has repeatedly been shown to be a character of dubious phylogenetic significance (most recently Bruce 1995, 1997) that can vary within genera, and the flattened antennule peduncle article(s) can also vary within genera (e.g., *Cassidinella*, Bruce 1994a). Another character state that is not widely distributed in the family is the marked slenderness and elongation of the second leg in comparison to the first. This is also known to occur in some genera and species of the *Ischyromene*-group (Bruce 1995) as well as some species of *Dynamenella* (e.g., *D. nuevitas* Kensley et al. 1997). Lamellar uropods, which occur in most genera formerly placed in the subfamily Cassidininae, are also to be found in other genera such as *Exosphaeroma* for example. Without a full phylogenetic analysis of the genera with the associated identification of informative characters and resolution of the evidently high level of homoplasy in the family (Bruce 1993, 1995, 1997), problems such as the one that this genus presents will continue to plague taxonomists working on the Sphaeromatidae.

Of the other sphaeromatid genera known from the Caribbean region, none is particularly similar, and the genus can best be identified by the characters of short epistome, flattened antenna 1 peduncle articles 1 and 2, robust setose pereopods, lamellar uropods, simple pleopods 4 and 5, short and unfused penes and an elongate basally attached appendix masculina. Females can be identified by the antenna 1, epistome and pereopod characters. The prominent bosses on pereonite 7, while not included as a generic character, further serve to identify the genus and species.

*Etymology*.—During her tenure at the SDNHM, RW had the great pleasure of working with and benefiting from two tremendously wise women (Beatrice Koepnick and Ruth Kantor), whose efficacy, insight, and hard-earned wisdom left an indelible impression on all they met. It is the energy that these two women gave to so many scientific projects that this new genus and species honors. The *new genus* honors Bea who passed away April 1995 and unfortunately before this manuscript was completed. The generic name is feminine, as the second element, *sphaera*, is a feminine Latin noun.

*Beatricesphaera ruthae*, new species

Figs. 1–6

*Material examined*.—Male holotype (LACM 86-196.4), Atlantic, Costa Rica, Limon Province, Parque Nacional Cahuita, Punta Cahuita Reef, 9°44.18'N, 82°48.7'W, inner reef flat, brown algae wash, 1–3 m depth. 29 Oct 1986. Coll. R. C. Brusca and P. M. Delaney, LACM 86-196. Ovipigerous female allotype (LACM 86-202.3) Parque Nacional Cahuita, Punta Cahuita Reef, 9°40.3'N, 82°45'W, outer reef crest, algae and algae holdfast washes, 1–8 m depth. 30 Oct 1986. Coll. R. C. Brusca and P. M. Delaney, LACM 86-202. Paratypes (2 mature males, 2 juvenile males) (LACM 86-196.7), Parque Nacional Cahuita, Punta Cahuita Reef, 9°44.18'N, 82°48.7'W, inner reef flat, brown algae wash, 1–3 m depth. 29 Oct 1986. Coll. R. C. Brusca and P. M. Delaney, LACM 86-196. Paratypes (1 male, 1 female, 1 juvenile) (LACM 86-202.4), Parque Nacional Cahuita, Punta Cahuita Reef, 9°40.3'N, 82°45'W, outer reef crest, algae and algae holdfast washes, 1–8 m depth. 30 Oct 1986. Coll. R. C. Brusca and P. M. Delaney, LACM 86-202. Paratypes (2 males, 3 females) (LACM 87-3.2), Parque Nacional Cahuita, Punta Vargas, 9°44.18'N, 82°48.7'W, inner reef lagoon, algae washes, 1–3 m depth. 8 Jan 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-3. Paratype (1

male, dissected and figured appendages) (LACM 86-122.4), Limon Province, north of Puerto Viejo, 9°40.8'N, 82°45.53'W, coralline algae rock wash, offshore algae ridge, 1–3 m depth, CRA-86-13. 27 Jul 1986. Coll. G. L. Hendler, LACM 86-122. Paratypes (5 males, 5 females) (USNM 286886), Parque Nacional Cahuita, Punta Vargas, 9°44.18'N, 82°48.7'W, inner reef lagoon, algae washes, 1–3 m depth. 8 Jan 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-3. Paratypes (4 males, 4 females) (MOV J45491 through J45498), Parque Nacional Cahuita, Punta Cahuita Reef, 9°40.3'N, 82°45'W, outer reef crest, algae and algae holdfast washes, 1–8 m depth. 30 Oct 1986. Coll. R. C. Brusca and P. M. Delaney, LACM 86-202. Paratypes (2 males, 3 females) (UCR-2248), Parque Nacional Cahuita, Punta Cahuita Reef, 9°40.3'N, 82°45'W, outer reef crest, algae and algae holdfast washes, 1–8 m depth. 30 Oct 1986. Coll. R. C. Brusca and P. M. Delaney, LACM 86-202.

*Other material examined*: Atlantic, Costa Rica, specimens: Limon Province, Parque Nacional Cahuita, Punta Cahuita Reef, 9°44.35'N, 82°48.7'W, approximately 500 m from shore, algae and coral rubble washes, 3–4 m depth. 3 Apr 1986. Coll. R. C. Brusca and P. M. Delaney, LACM 86-98, 2 manca. Parque Nacional Cahuita, Punta Cahuita Reef, 9°44.35'N, 82°48.7'W, approximately 500 m from shore, brown algae washes, 3–4 m depth. 4 Apr 1986. Coll. R. C. Brusca, P. M. Delaney, and R. Wetzer, LACM 86-100, 9 specimens. Limon Province, north of Puerto Viejo, 9°40.8'N, 82°45.53'W, coralline algae rock wash, offshore algae ridge, 1–3 m depth, CRA-86-13. 27 Jul 1986. Coll. G. L. Hendler, LACM 86-122, 24 specimens. Limon Province, north of Puerto Viejo, 9°40.8'N, 82°45.53'W, outer reef crest, coralline algae on *Sargassum* reef, 6–11 m depth. 27 Jul 1986. Coll. R. Wetzer, LACM 86-128, 2 specimens each attached to a walking leg of brachyuran crab: *Acanthonyx petiverii*. One specimen attached to left 3rd walking

leg; second specimen attached to left 2nd walking leg. Limon Province, Parque Nacional Cahuita, Punta Cahuita Reef, 9°44.18'N, 82°48.7'W, inner reef flat, brown algae wash, 1–3 m depth. 29 Oct 1986. Coll. R. C. Brusca and P. M. Delaney, LACM 86-196, 40+ specimens. Limon Province, Parque Nacional Cahuita, Punta Cahuita Reef, 9°40.3'N, 82°45'W, outer reef crest, algae and algae holdfast washes, 1–8 m depth. 30 Oct 1986. Coll. R. C. Brusca and P. M. Delaney, LACM 86-202, 64+ specimens. Limon Province, Parque Nacional Cahuita, Punta Vargas, 9°44.18'N, 82°48.7'W, inner reef lagoon, algae washes, 1–3 m depth. 8 Jan 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-3, 70+ specimens. Limon Province, Parque Nacional Cahuita, Punta Vargas, 9°44.18'N, 82°48.7'W, inner reef lagoon, coral rubble washes, 1–12 m depth. 8 Jan 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-4, 2 females. Limon Province, Parque Nacional Cahuita, Punta Vargas, 9°44.18'N, 82°48.7'W, inner reef lagoon, rock, coral rubble, and algae washes, 1–13 m depth. 8 Jan 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-5, 2 manca. Limon Province, Parque Nacional Cahuita, Punta Vargas, 9°44.5'N, 82°48.37'W, inner reef lagoon, skimming *Thalassia* bed off point, intertidal to 1 m depth. 8 Jan 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-7, 1 male. Limon Province, Parque Nacional Cahuita, Punta Vargas, 9°44.18'N, 82°48.7'W, inner reef lagoon, broken coral and rubble washes, 1–3 m depth. 8 Jan 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-8, 1 molt. Limon Province, Puerto Viejo, 9°40.3'N, 82°45'W, forereef crest and along sand bottom junction, algae and gorgonian washes, 1–6 m depth. 9 Jan 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-9, 34 specimens. Limon Province, Parque Nacional Cahuita, Punta Cahuita Reef, 9°44.37'N, 82°48.7'W, rock, coral, and algae holdfast washes, 0.9–3 m depth. 19 Aug 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-158, 21 specimens. Limon Province, Parque Nacional

Cahuita, Punta Cahuita Reef, 9°44.52'N, 82°48.37'W, rock, coral, and algae holdfast washes, 0.5–10 m depth. 20 Aug 1987. Coll. R. C. Brusca and R. Wetzer, LACM 87-165, 64 specimens.

*Description.*—Adult male: Body strongly vaulted, limpet-like, about 2.3 times as long as wide (Figs. 1A, B, 2A). Antennular peduncle articles, lateral body margins, uropods, and pleotelson with conspicuous setal fringe, *membrana cingula* (Figs. 1A, B, C, 3A). Frontal margin of cephalon without rostral process (Fig. 1A). Dorsum of pereonite 7 elevated into large dome-like conical tubercle, with lateral notches on posterior margin. Single free pleonite also with tubercle, somewhat smaller than tubercle on pereonite 7; with lateral projections on posterior margin. Pleotelson acute; pleotelsonic foramen dorsally directed, triangular, entirely enclosed (Figs. 1A, B, 2B). A thin membrane visible with SEM overlies the dorsal cuticle of entire body including antennular peduncle articles and appears finely granular with small, numerous, evenly spaced pits; each pit with 1 to 3 simple or palmate setae (Fig. 2A, B, C). Coxal sutures indistinct dorsally and ventrally. Eyes round, well developed, slightly elevated, with facets and pigmentation, deeply immersed in pereonite 1. Pereonite 1 longest, pereonites 2–6 subequal, pereonite 7 longer than preceding pereonites. First pleonite subequal in length to pereonites 2–6 (Figs. 1A, B, 2A).

Antennae 1 short, extending to posterior margin of pereonite 2 (Fig. 3A). Peduncular articles 1–2 shovel-shaped, dorsoventrally compressed and greatly expanded. Article 1 rectangular, almost twice as long as wide. Last (third) peduncular article narrow, not expanded; about twice as long as wide. Flagellum 6-articulate, article 1 short, article 2 longer, article 3 longest, terminal articles gradually tapering distally. One long, “articulated” aesthetasc on lateral, distal flagellar articles 2, 3, and 4 (Fig. 3A, B).

Antennae 2 extending to anterior margin of pereonite 3; usually not visible in dorsal aspect. Peduncle composed of 4 articles, 1

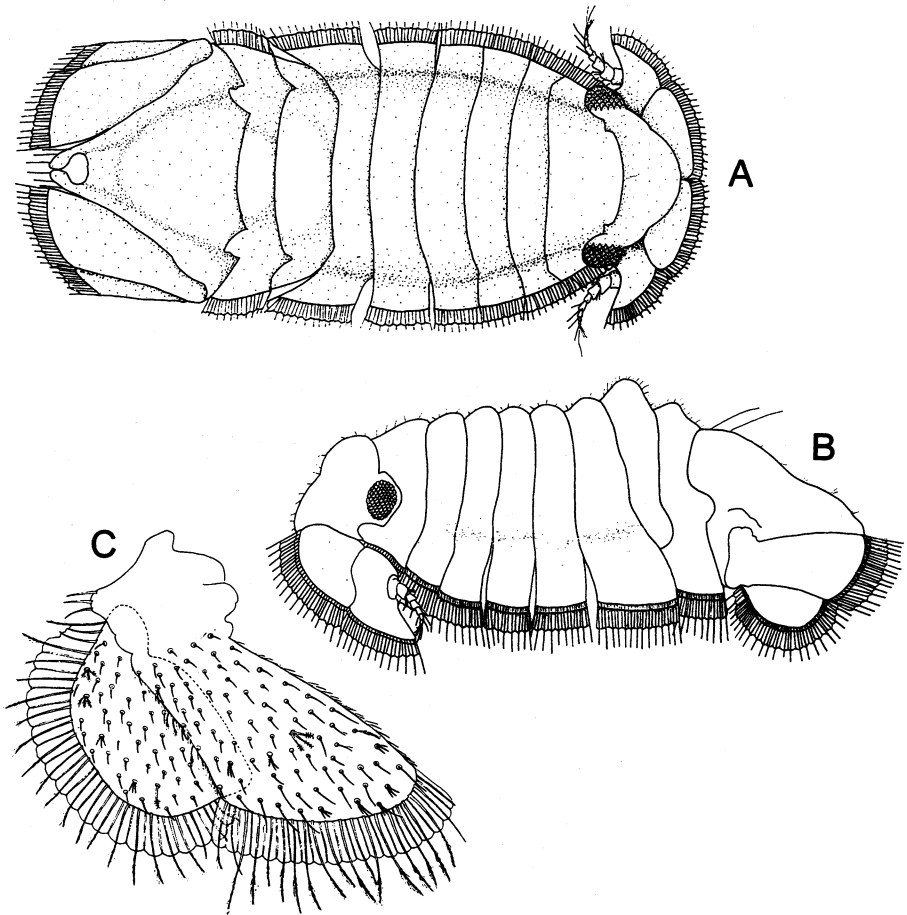


Fig. 1. *Beatricesphaera ruthae*, new species. A, dorsal view, adult male, holotype LACM 86-196; B, lateral view, adult male, holotype LACM 86-196; C, uropod (right), adult male, paratype LACM 86-122.

and 2 subequal in length, article 3 1.6 times as long as 2 and somewhat expanded, article 4 slender and about twice as long as article 1. Simple and palmate setae present on peduncular articles as figured. Flagellum 8-articulate, each article with 2–6 simple setae on margin (Fig. 3C).

Frontal lamina wide, crescent shaped, encompassing clypeus and part of labrum. Labrum with dense short simple setae on medial margin, setae become less dense and longer on lateral margins (Figs. 3D, 4E, F). Clypeus and labrum fused, together forming a subovate structure. Mandibular incisors distally narrow, flattened, unicuspid; lacinia mobilis composed of 2 large bifid

spines; spine row composed of 2 comb spines; molar process with proximal marginal teeth; gnathal surface almost smooth; palp 3-articulate, article 2 with 3 stout biserrate setae, article 3 with 6 biserrate robust setae (Figs. 3E, 4A, B, C). Maxilla 1 outer lobe nearly twice as wide as inner lobe, with 5 flattened, smooth robust spines laterally, 4–5 large, serrate spines medially; inner lobe with 4 slender, plumose robust setae (Fig. 3F). Maxilla 2 with 3 subequal lobes; outer lobe with 4 long robust setae; middle lobe with 4 long robust setae; inner lobe with simple, plumose and comb setae, as figured; numerous short, simple setae dispersed along medial margin; endite basis

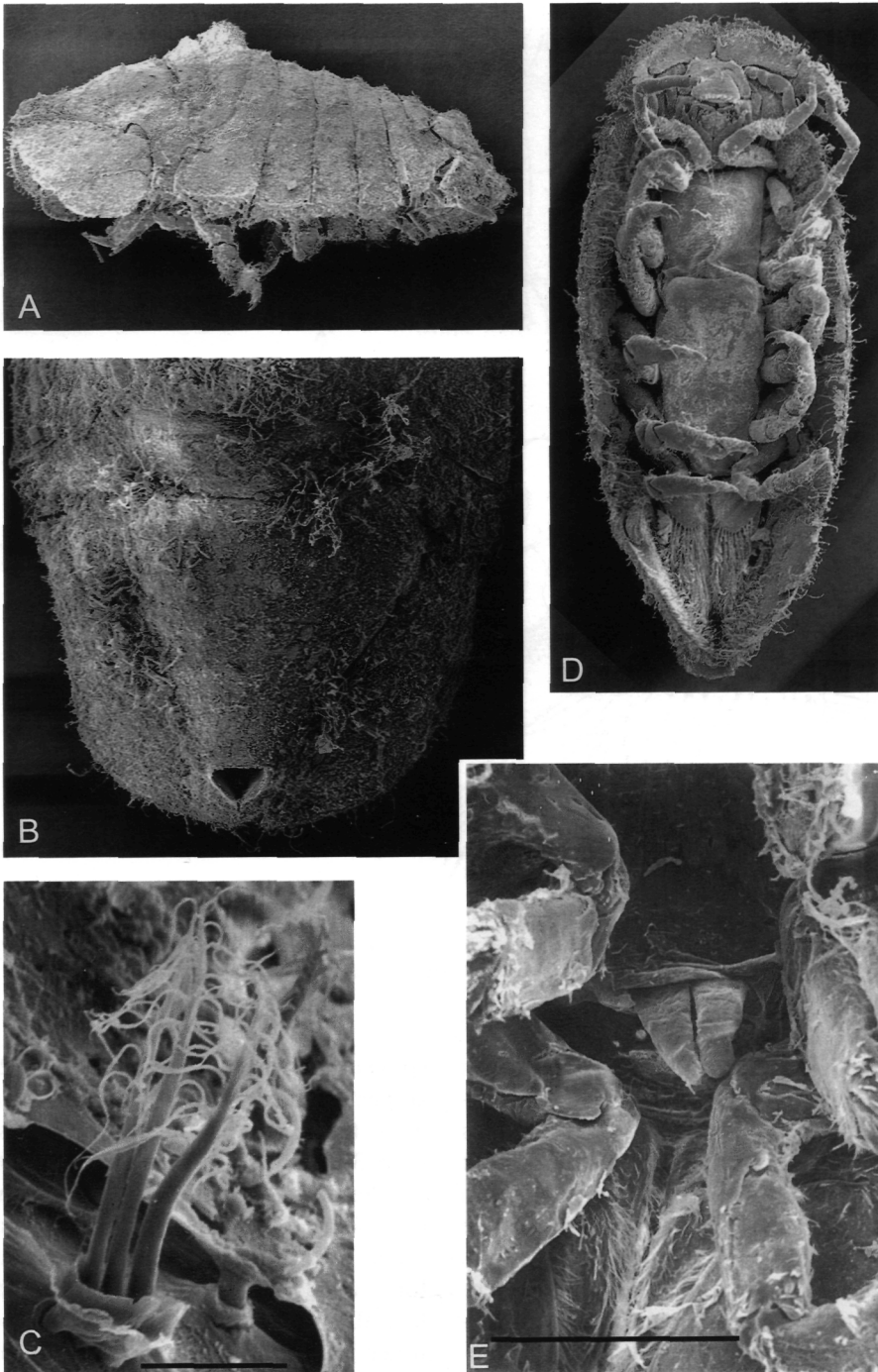


Fig. 2. *Beatricesphaera ruthae*, new species. Scanning electron micrographs. A, adult male LACM 86-122, lateral view; B, adult male LACM 86-122, pleotelson; C, male LACM 87-7 palmate setae on pleotelson, note torn "cuticle;" i.e., membrana cingula, scale bar = 20  $\mu\text{m}$ ; D, gravid female LACM 86-122 ventral brood pouch; E, adult male LACM 86-7 penes, scale bar = 200  $\mu\text{m}$ .

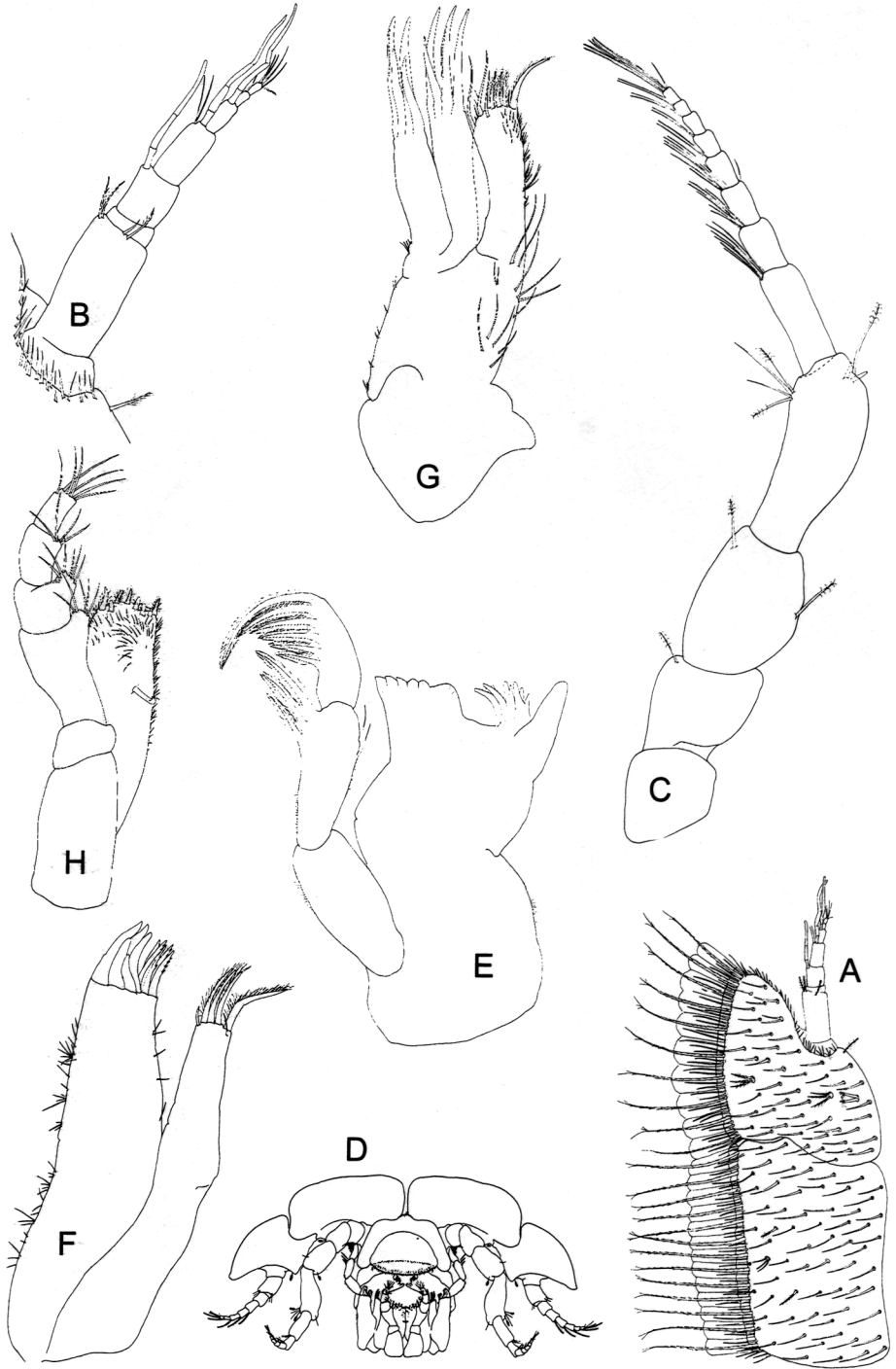


Fig. 3. *Beatricesphaera ruthae*, new species. Adult male paratype LACM 86-122. A, antenna 1 (right); B, flagellular articles antenna 1 (right); C, antenna 2 (right); D, frontal lamina, clypeus, labrum; E, mandible (left); F, maxilla 1 (right); G, maxilla 2 (right); H, maxilliped (right).



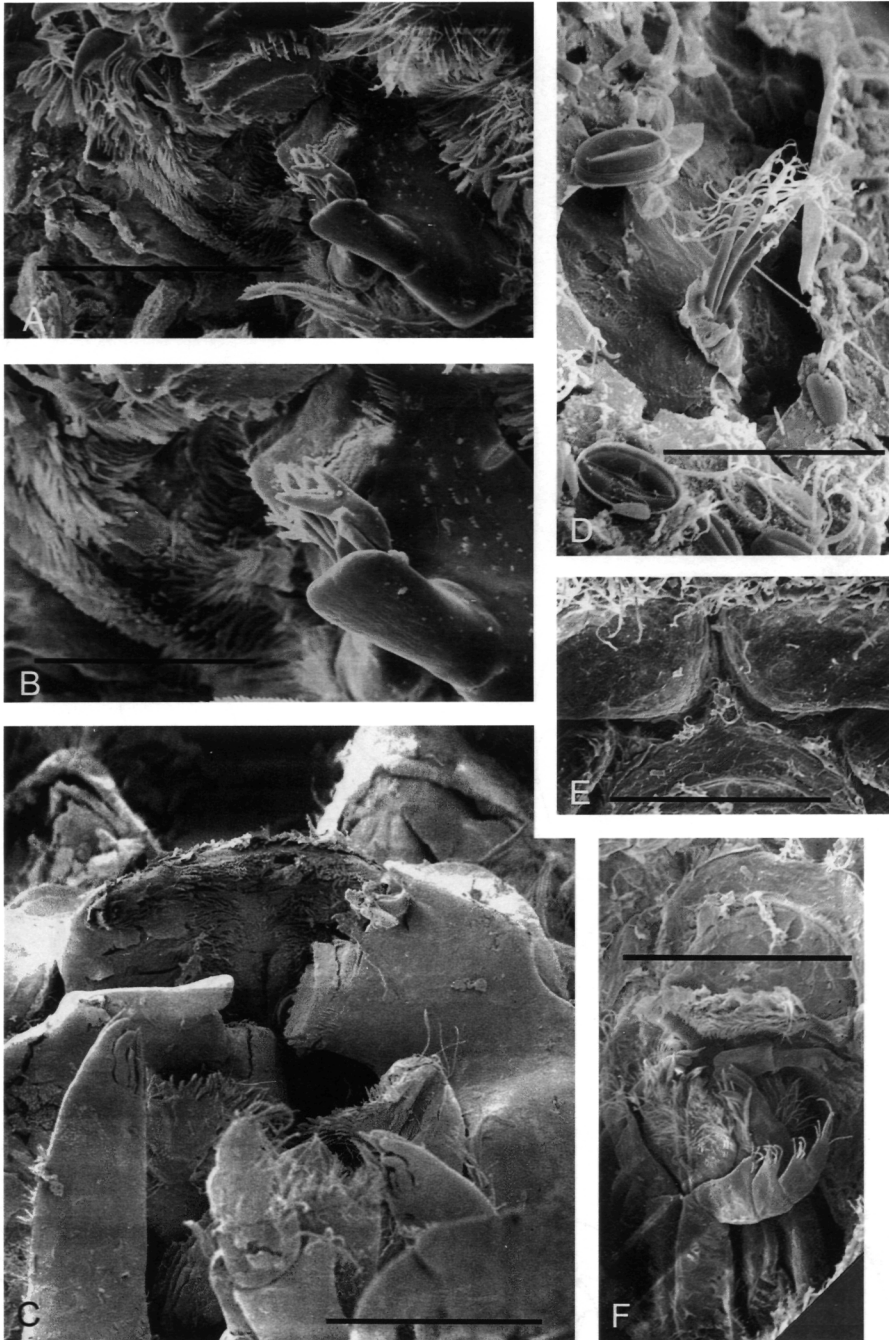


Fig. 4. *Beatricesphaera ruthae*, new species. Scanning electron micrographs. A, male LACM 87-7, mouthfield with right and left molar processes, left incisor, lacinia mobilis, and spine row, scale bar = 100  $\mu\text{m}$ ; B, same as A, scale bar = 50  $\mu\text{m}$ ; C, male LACM 86-122, mouthfield, frontal view, scale bar = 100  $\mu\text{m}$ ; D, male LACM 87-7, palmate setae on pleotelson, membrana cingula torn, discs are diatom symbionts, scale bar = 20  $\mu\text{m}$ ; E, male LACM 87-7, peduncular articles of antennules, frontal lamina, scale bar = 200  $\mu\text{m}$ ; F, male LACM 87-3, mouthfield with clypeus, labrum, left and right maxillipeds, scale bar = 200  $\mu\text{m}$ .

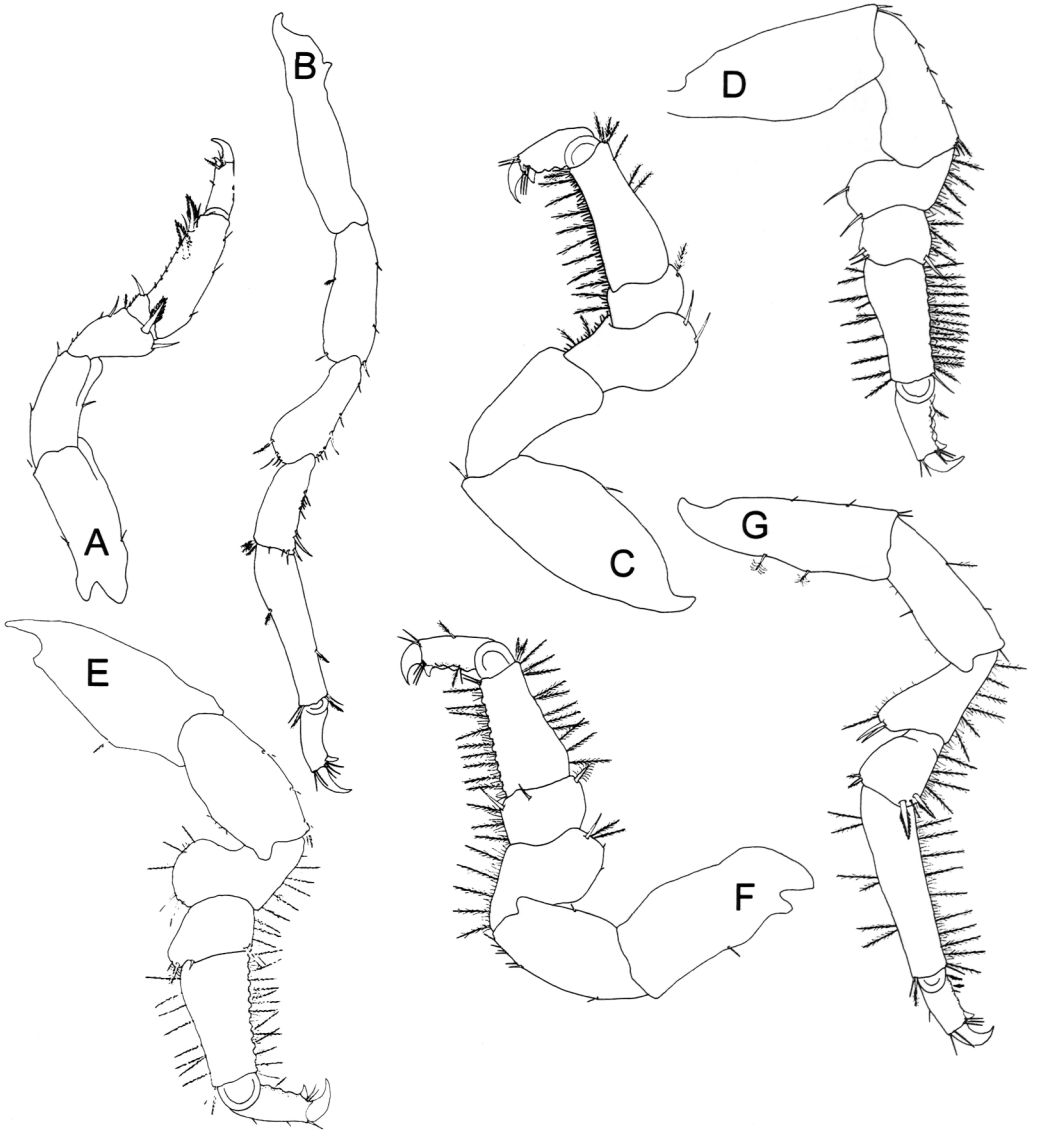


Fig. 5. *Beatricesphaera ruthae*, new species. Adult male paratype LACM 86-122. All appendages from left side of body. A, pereopod 1 posterior surface; B, pereopod 2 anterior surface; C, pereopod 3 posterior surface; D, pereopod 4 anterior surface; E, pereopod 5 posterior surface; F, pereopod 6 posterior surface; G, pereopod 7 posterior surface.

with long setae on dorsal surface, excite basis with very short simple setae on lateral margin (Fig. 3G). Maxillipedal endite extended to middle of palp article 2 (carpus); endite with 4 short, stout, setose robust setae, and 4 acute plumose setae on distal

margin; 1 coupling hook present on each maxilliped (Figs. 3H, 4F).

All pereopods with secondary unguis. Ratios of lengths of pereopods 1–7 respectively (relative to pereopod 1): 1.0:1.6:1.3:1.3:1.3:1.4:1.5 (Fig. 5A–G). Pereopod 1

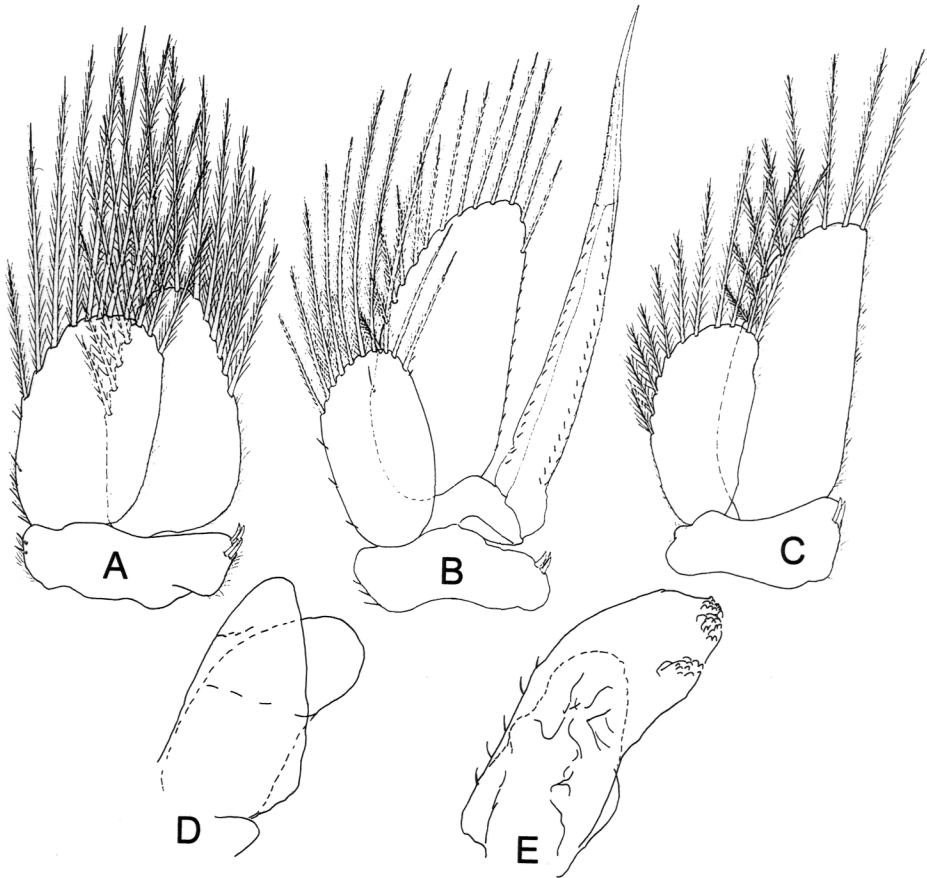


Fig. 6. *Beatricesphaera ruthae*, new species. Adult male paratype LACM 86-122. All appendages from left side of body. A, pleopod 1; B, pleopod 2; C, pleopod 3; D, pleopod 4; E, pleopod 5.

propodus inferior margin with 2 stout serrate setae and one simple distal robust seta; merus and carpus inferior margin each with single simple stout seta; merus anterior superior margin with stout serrate spine (Fig. 5A). Pereopod 2 propodus 2.5 times as long as carpus (Fig. 5B). Pereopods 4–6 with small tubercles on propodal inferior margin; tubercles more prominent on pereopod 5 compared to 4, largest on pereopod 6. Pereopods 3–7 with cuticular scale spines on inferior dactyl surface; with setose fringe on inferior margin of merus, carpus, and propodus; fringe becomes longer, more complex, and denser on posterior pereopods (i.e., fringe composed of variable length simple and plumose setae); simple and plu-

mose setae on superior margins of merus, carpus, and propodus as figured, becoming more abundant on posterior pereopods (Fig. 5C–G).

Penes 2.5 times as long as basal width, conical, separate at base (Fig. 2E).

Pleopods 1–3 endopods and exopods with long plumose marginal setae. Pleopod 1 endopod weakly subtriangular, exopod ovoid, 0.8 times length of exopod; peduncle with 4 coupling spines (Fig. 6A). Pleopod 2 endopod long, 2.4 times as long as wide, 1.5 times as long as exopod; appendix masculina arising basally from endopod and tapering to acute tip, distal  $\frac{1}{3}$  separated from basal  $\frac{2}{3}$  by distinct cuticular “interruption,” 1.8 times as long as endopod, ornamented

with serrations and minute spines; peduncle with 2 coupling spines (Fig. 6B). Pleopod 3 endopod 1.5 times as long as exopod, exopod weakly indurate, peduncle with 2 coupling spines (Fig. 6C). Pleopods 4 and 5 rami without plumose marginal setae (Fig. 6D, E). Uropodal endopod 1.3 times as long as exopod, endopod reaching posterior margin of pleotelson, both rami with setal fringe composed of short and long setae, the latter extending beyond membrana cingula and feathered distally (Fig. 1C).

Adult female: Similar to male, except dorsal tubercles on pereonite 7 and first pleonite less pronounced than in adult males; pleotelson entire, not perforated (pleotelson also entire in juveniles and subadult males). Without oostegites, internal morphology of brood pouches and brood pouch openings not discernible, ventrum of ovigerous females appears entire (see Harrison 1984, fig. 2D).

*Remarks.*—The thin membrane overlying the cuticle is easily damaged during preservation and subsequent handling and with light microscopy has the appearance of shattered glass, which SEM reveals is torn membrane (Figs. 2C, 4D). In preparing specimens for SEM this membrane covering has a tendency to distort and curl especially on appendage margins (Fig. 2D, evident on distal coxal margins).

*Color.*—Live color a uniform pink, lost shortly after preservation in ethanol.

*Size.*—Maximum length to 3.2 mm.

*Variation.*—Cephalon of some specimens with anterior row of 5 long simple setae and one pair of medial setae on pereonites 2–7. Absent in holotype.

*Distribution and ecology.*—Habitats from which specimens were collected include seagrass beds, coral rubble, and algal holdfasts in Limon Province, Parque Nacional Cahuita and south to Puerto Viejo. Two specimens were each attached to a walking leg of brachyuran crab *Acanthonyx petiverii*.

*Etymology.*—The specific epithet honors Ruth Kantor. The name of the new genus is

feminine and the specific name of the type species also is feminine because of its derivation; *ruthae* is the Latin feminine genitive singular of a modern feminine noun.

### Acknowledgments

We thank Bea Koepnick and Ruth Kantor for their help with processing and sorting samples and Manuel Murillo for assistance with field logistics. Thanks go to artist Chip Griffin for his illustrations, Dave White for help with dissections, Todd Haney and Shawn Vose for assistance with SEM, and Clint Cook for his assistance with Adobe Photoshop. The field work was in part supported by the Weiler Foundation, and this project benefited from National Science Foundation grant (DEB-9701524) to RW. Marilyn Schotte, Angelika Brandt, N. Dean Pentcheff, Rick Brusca and two anonymous reviewers are thanked for their helpful comments on the manuscript.

### Literature Cited

- Bruce, N. L. 1993. Two new genera of marine isopod crustaceans (Flabellifera: Sphaeromatidae) from southern Australia, with a reappraisal of the Sphaeromatidae.—*Invertebrate Taxonomy* 7: 151–171.
- . 1994a. Redescription of three poorly known sphaeromatid genera (Crustacea, Isopoda) from south-eastern Australia.—*Memoirs of the Museum of Victoria* 54:149–170.
- . 1994b. The Cassidininae Hansen, 1905 (Crustacea: Isopoda: Sphaeromatidae) of Australia.—*Journal of Natural History* 28:1077–1173.
- . 1995. The taxonomy and phylogeny of tube-tailed sphaeromatid isopods (Crustacea) with descriptions of new species and a new genus from southern Australia.—*Ophelia* 43:127–180.
- . 1997. A new genus of marine isopod (Crustacea: Flabellifera: Sphaeromatidae) from Australia and the Indo-Pacific region.—*Memoirs of the Museum of Victoria* 56:145–234.
- Brusca, R. C., & E. W. Iverson. 1985. A guide to the marine isopod Crustacea of Pacific Costa Rica.—*Revista de Biología Tropical* 33(Supplement):1–77.
- , R. Wetzer, & S. C. France. 1995. Cirolanidae (Crustacea: Isopoda: Flabellifera) of the tropical eastern Pacific.—*Proceedings of the San Diego Natural History Museum* 30:1–96.

- Buss, L. W., & E. W. Iverson. 1981. A new genus and species of Sphaeromatidae (Crustacea: Isopoda) with observations on its reproductive biology, interspecific interactions and color polymorphisms.—*Postilla* 184:1–23.
- Cortés, J., M. M. Murillo, & P. O. Baumgartner. 1984. Organismos de los arrecifes coralinos de Costa Rica I. Lista de corales petreos (Cnidaria: Hydrozoa: Scleractinia) de la Costa Atlantic de Costa Rica.—*Brenesia* 22:57–59.
- , & M. J. Risk. 1985. A reef under siltation stress: Cahuita, Costa Rica.—*Bulletin of Marine Science* 36:339–356.
- Guzman, H. E., & J. N. Cortés. 1984a. Organismos de los arrecifes coralinos de Costa Rica II. Lista de octocoralarios (Cnidaria) de la costa Atlantica.—*Bulletin of Marine Science* 22:61–63.
- , & ———. 1984b. Motandad de *Gorgonia flabellum* Linnaeus (Octocorallia: Gorgoniidae) en la Costa Caribe de Costa Rica.—*Bulletin of Marine Science* 32:305–308.
- Hansen, H. J. 1905. On the propagation, structure and classification of the family Sphaeromatidae.—*Quarterly Journal of Microscopical Science* 49: 69–135.
- Harrison, K. 1984. The morphology of the sphaeromatid brood pouch (Crustacea: Isopoda: Sphaeromatidae).—*Zoological Journal of the Linnean Society* 82:363–407.
- Kensley, B., & M. Schotte. 1987. New records of isopod Crustacea from the Caribbean, the Florida keys, and the Bahamas.—*Proceedings of the Biological Society of Washington* 100:216–247.
- , & ———. 1989. A guide to the marine isopod crustaceans of the Caribbean. Smithsonian Institution Press, Washington, D.C., 308 pp.
- , M. Ortiz, & M. Schotte. 1997. New records of marine Isopoda from Cuba (Crustacea: Peracarida).—*Proceedings of the Biological Society of Washington* 110:74–98.
- Latreille, P. A. 1817. Les Crustacés, les Arachnides, et les Insectes. In G. L. C. F. D. Cuvier, ed. *Le Regne Animal, distribué d'après son organisation, pour servir de base à l'histoire naturelle des animaux et d'introduction à l'anatomie comparée*, vol. 2. Paris.
- Milne Edwards, H. 1840. *Histoire Naturelle des Crustacés, comprenant l'anatomie, la physiologie et al. classification de ces animaux*. vol. 3. Paris.
- Müller, H.-G. 1993a. Cirolanidae of the genera *Calypitolana*, *Cirolana*, *Neocircolana*, *Colopisthus* and *Excirrolana* from the Santa Marta area, Caribbean Sea of Colombia (Crustacea: Isopoda: Cymothoidea).—*Zoologischer Anzeiger* 230(5–6):191–225.
- . 1993b. Marine Janiroidea from Martinique, French Antilles, with descriptions of a new genus and four new species (Crustacea: Isopoda).—*Cahiers de Biologie Marine* 34:433–460.
- Murillo, M. M., & J. N. Cortés. 1984. Alta mortalidad en la población del erizo de mar *Diadema antillarum* Philippi (Echinodermata: Echinoidea), en la Parque Nacional Cahuita, Limón, Costa Rica.—*Bulletin of Marine Science* 32:167–169.
- Risk, M. J., M. M. Murillo, & J. N. Cortés. 1980. Observaciones biológicas preliminares sobre el arrecife coralino en el Parque Nacional de Cahuita, Costa Rica.—*Bulletin of Marine Science* 28:361–382.
- Sars, G. O. 1882. Oversigt af Norges Crustaceer med forelobige Bemærkninger over de nye eller mindre bekjendte Arter I. *Chirstiania Videnskab Forhandling* 18:1–124.
- Wellington, G. M. 1974. The benthic flora of Punta Cahuita: an annotated list of species with new additions to the Costa Rican Atlantic flora.—*Brenesia* 3:19–30.
- White, D. L. 1996. Isopod crustacean assemblages on sediment-stressed and pristine coral reefs in the western Caribbean. Unpublished M.S. thesis, University of Charleston, Charleston, South Carolina, U.S.A., 48 pp.