

## Redescription of *Dynameniscus carinatus* (Richardson, 1900) (Crustacea: Isopoda: Sphaeromatidae)

Brian Kensley and Niel L. Bruce

(BK) Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.;

(NLB) National Institute of Water and Atmospheric Research PO Box: 14-901, Kilbirnie, Wellington, New Zealand

**Abstract.**—*Dynameniscus carinatus*, originally described one hundred years ago from a single female from deep water off Georgia, U.S.A., is redescribed, based on an additional male and two females, all from the Caribbean. The genus is redefined, and its affinities briefly discussed. Its subfamilial placement remains uncertain, however, given a number of unusual features in the mouthparts, pleopods, and uropods.

Harriet Richardson described *Cilicæa carinata* in 1900, from a single specimen collected in 1885 from deep water off Georgia, U.S.A. In 1905, Richardson placed the species in the new genus *Dynameniscus*, but unfortunately, this genus was not included in Hansen's (1905) monographic review of the family, and has since been largely overlooked. Richardson (1906) gave a further account of the genus which thereafter remained unmentioned until Harrison (1984) referred to an ovigerous female of *Dynameniscus* sp., from which he extracted brood-pouch information. This specimen, the source of the deep water (804–1033 m) Caribbean record later mentioned in Harrison & Ellis (1991:938), was never described, but is included in this study. In 1999, a female specimen was found in a small collection of material from Texas A&M University Oceanographic Department, and two months later a male was found in a small collection of material from the University of the West Indies, from the vicinity of Jamaica. This new material significantly extends the known range of the species, and presents an opportunity to redescribe the species and to redefine the genus.

### Family Sphaeromatidae

#### *Dynameniscus* Richardson, 1905

*Dynameniscus* Richardson, 1905:x, xi; 1906:16.—Harrison, 1984:379.—Harrison & Ellis, 1991:921, 938.

**Diagnosis.**—Male: Body fairly strongly vaulted, able to enroll (conglobate). Dorsal integument finely granulate and with larger tubercles, lacking setae. Anterior rostral process present, consisting of rounded boss-like process separating antennular bases (Fig. 1D). Anterior cephalon margin simple, not produced, not incised. Eyes simple, dorsolateral, ommatidia not visible. Pereonite 1 lateral margin somewhat produced anteriorly below eye, lacking 'keys'. Sternite 1 lacking mesial extensions. Coxae ventrally narrowed, with groove articulation; coxae 2–6 triangular, not overlapping, laterally contiguous when animal enrolled; coxae 4–5 not overlapping; coxa 6 acute but not produced ventrally, shorter than coxa 5; coxa 7 short, rounded, not ventrally produced. Marsupium lacking anterior and posterior pocket, formed by 4 pairs of medially overlapping oostegites. Pereonites 2–7, posterior margin not raised, all segments ornamented; pereonite 7 almost as wide as 6,

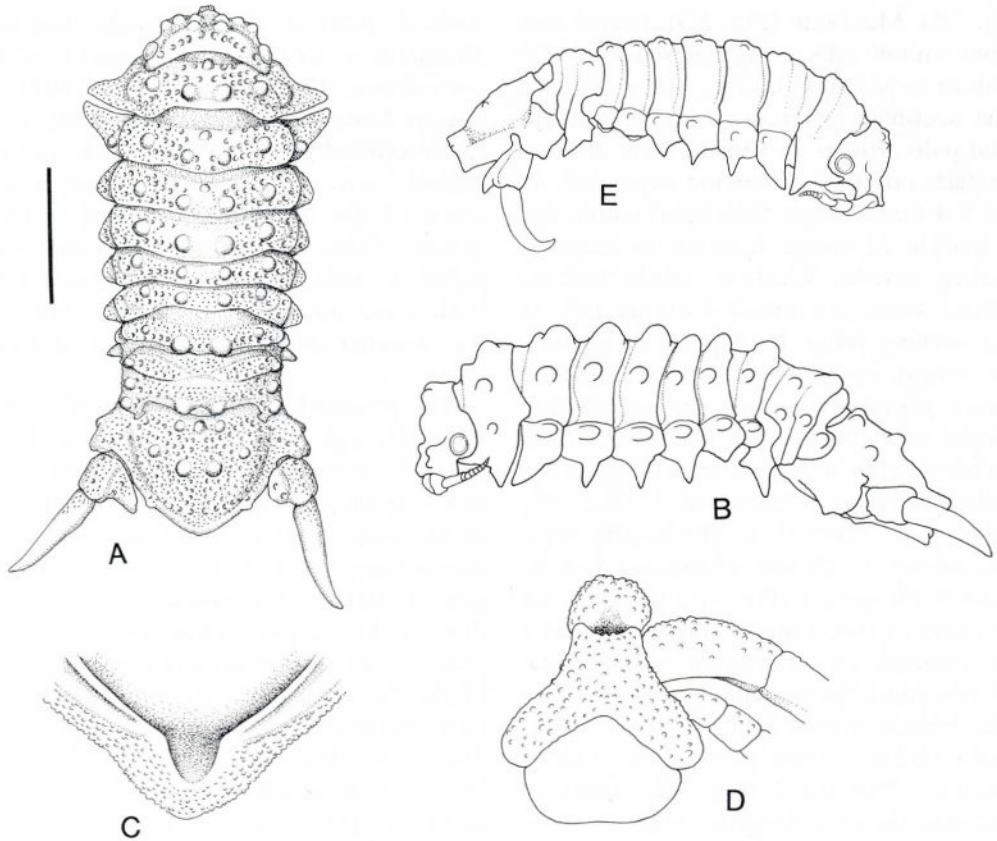


Fig. 1. *Dynameniscus carinatus* (Richardson, 1900). A, female, USNM 298346, off Aruba, in dorsal view, scale = 3 mm; B, same specimen, lateral view outline; C, same specimen, pleotelsonic apex in ventral view; D, same specimen, rostrum, epistome and left antennular and antennal bases in anterior view; E, holotype female, USNM 23907, lateral view outline, same scale as A.

similarly ornamented to preceding segments. Pereonite 6 not produced as in pereonites 5 and 7. Pleon consisting of 4 pleonites plus pleotelson, anterior 3 incomplete dorsally, sutures separate, reaching to lateral margin. Pleon sternite 1 wide. Pleonite 4 with complete posterior margin. Pleotelson similar in male and female, as wide as anterior pleon, somewhat domed, lacking dorsal processes, lateral margin entire, forming ridge; apex rounded in dorsal view, with strong median notch or incomplete groove in marginal flange in ventral view (Fig. 1C).

Antennular and antennal peduncles robust, calcified, not in contact mesially. Antennular peduncle (Fig. 2A) article 1 not an-

teriorly produced, lacking anterior lobe; peduncle article 2 twice longer than wide, lacking anterodistal or posterior lobe; peduncle article 3 about twice longer than wide; articles 2 and 3 colinear, not compressed; flagellum shorter than peduncle, but longer than peduncle article 3. Antennal peduncle articles colinear (Fig. 2B), articles 4 and 5 somewhat enlarged. Epistome anteriorly sessile, without median constriction, barely visible in dorsal view, anterior part not extended, anterior margin truncate to faintly concave. Mandible (Fig. 2C, D) incisor narrow, bicuspid; strongly sclerotised lacinia mobilis on left side having 3 or 4 cusps; spine row 'normal'; molar distally truncate, surface granular; palp of 3 articles

(Fig. 2E). Maxillule (Fig. 2G), lateral lobe spines smooth and serrate; mesial lobe with 3 robust setae. Maxilla (Fig. 2H) with distal setae pectinate or circumplumose. Maxillipedal palp articles 2–4 lobed (Fig. 2F), not elongate; article 2 somewhat expanded, article 5 4 times longer than basal width, distal margin of endite truncate to rounded, bearing several setulose setae, lacking clubbed setae, dorsomedial corner lacking long curving setae. Pereopods all ambulatory, robust, covered with pile of very short setules; accessory unguis simple, slender; ischium with sinuate seta. Pereopod 1 (Fig. 3A) barely subchelate, merus somewhat expanded anteriorly. Pereopod 2 (Fig. 3B) similar to 3. Penes (Fig. 4F) basally separate, relatively slender-elongate, distally rounded. Pleopod 1 (Fig. 4A) lamellar, not operculate; exopod and endopod of similar size; exopod mesial margin of triangular endopod not indurate, endopod longer than wide, lacking lateral heel; exopod oblique, distal margin narrowly rounded, lacking serrations. Pleopod 2 (Fig. 4B) appendix masculina slender, elongate, slightly longer than ramus, articulating basally on endopod, latter longer than wide. Pleopod 3 (Fig. 4C), endopod longer than exopod; exopod lacking transverse suture; endopod lacking ridges. Pleopods 4 and 5, both rami lamellar, lacking folds and plumose marginal setae. Pleopod 4 (Fig. 4D) endopod lacking ridges and proximomedial lobe; exopod lacking transverse suture and ridges, lateral margin not thickened. Pleopod 5 (Fig. 4E, G) endopod lacking ridges; exopod with incomplete transverse suture in distal third, with three thin-walled scale patches on lateral margin. Uropodal rami similar in male and female, endopod reduced, fused with protopod; exopod elongate, articulated, terete.

Female: Similar to male, not strongly sexually dimorphic. Mouthparts not metamorphosed.

*Remarks.*—The generic status of *Dynameniscus* has long remained unassessed, given that *D. carinatus* was briefly de-

scribed from a single female specimen (Richardson 1905, 1906). Because of this uncertainty, Harrison & Ellis (1991) excluded *Dynameniscus* from their key to the sphaeromatid genera. With a male and two females now available, details of at least some of the features considered to be of generic value can be provided, and a detailed generic diagnosis provided. Even with these additional characters, however, the affinities of the species still remain unclear.

The generic key (Harrison & Ellis 1991), while not a phylogenetic key, is nonetheless the only recent global identification guide to the sphaeromatid genera. This key takes *Dynameniscus* to a dead-end at the *Neonaesa-Geocerceis* couplet, neither of these genera sharing any characters in common that would suggest a close affinity. Marine genera with similar uropod morphology include the *Cilicaea-Cilicaeopsis-Paracilicaea* group (see Harrison & Holdich 1984), *Discerceis* Richardson, 1905, *Neonaesa* Harrison & Holdich, 1982, *Naesicopea* Stebbing, 1893, *Paracerceis* (see Harrison & Holdich 1982), *Pistorius* (see Harrison & Holdich 1982), *Cymodetta* (see Holdich & Harrison 1983), *Campecopea* Leach, 1814, and *Bathycopea* Tattersall, 1905 (see Bruce 1991, now placed in the Ancinidae, see Bruce 1993). Most of these genera belong to the subfamily Sphaeromatinae or Dynameninae, having the endopods or both rami of pleopods 4 and 5 with thickened fleshy ridges and folds; most of these genera also have metamorphosed mouthparts, and substantially different morphology to pleopods 1 and 2.

While *Dynameniscus* unambiguously belongs to the Sphaeromatidae, we refrain here from making any definitive statements on its phylogenetic position within the family, preferring to give a detailed generic diagnosis and description which includes most characters used in generic discrimination in this family. The lack of pleopodal folds or thickenings is a common reversal in the Sphaeromatidae (see Bruce, 1993,

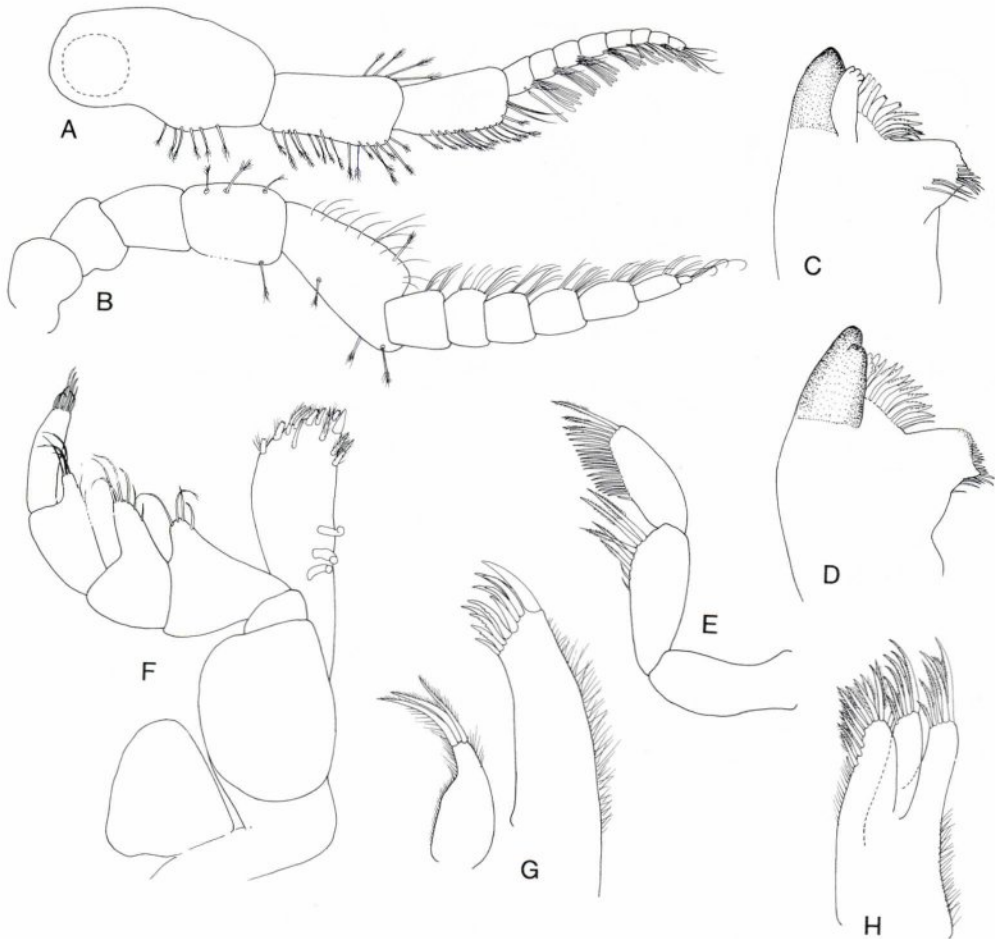


Fig. 2. *Dynameniscus carinatus* (Richardson, 1900), female, USNM 298346, off Aruba. A, antennule; B, antenna; C, left mandible; D, right mandible; E, mandibular palp; F, maxilliped; G, maxilla 1; H, maxilla 2.

1994, 1995, 1997), and we can deduce little from that character state. Until a phylogenetic character assessment exists for the family, we regard *Dynameniscus* as incertae sedis.

*Dynameniscus carinatus* (Richardson, 1900)  
Figs. 1–4

*Cilicea carinata* Richardson, 1900:224; 1901:535, fig. 17–19; 1905:309 [key], 319, fig. 350, 352.

*Dynameniscus carinata*: Richardson, 1905: x, xi [designation of new genus in Introduction].

*Dynameniscus carinatus*: Richardson, 1906:16, fig. 20.—Schultz, 1969:118, fig. 164.—Harrison, 1984:379.—Harrison & Ellis, 1991:921, 938, fig. 7a.

*Material examined*.—Holotype, USNM 23907, ♀ tl 10.1 mm, R/V *Albatross* sta 2415, 30°44'N, 79°26'W, off Georgia, U.S.A., 805 m, coral and coarse sand, shells and foraminiferans, 1 Apr 1885. USNM 298346, (ex TAMU 2—5584), ♀ 12.5 mm, sta 70A10-41, 12°53'N, 69°58'W, off Aruba, Netherlands Antilles, 550–610 m, coll. W. Pequegnat, 19 Jul 1970.—USNM 298347, University of the West Indies EST.861, 1 ♂ 12.8 mm, sta EST 5/72,

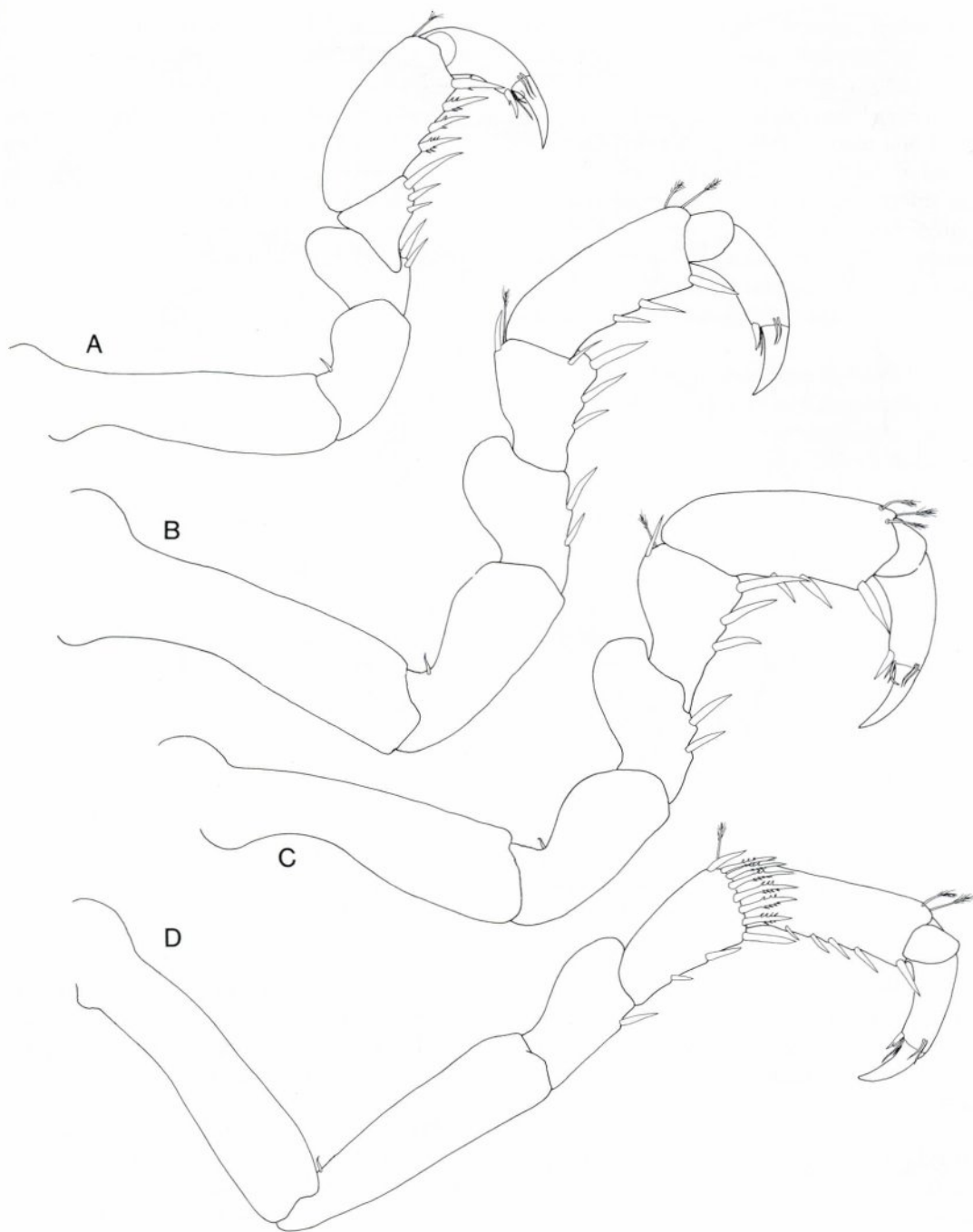


Fig. 3. *Dynameniscus carinatus* (Richardson, 1900), female, USNM 298346, off Aruba. A, pereopod 1; B, pereopod 2; C, pereopod 4; D, pereopod 7.

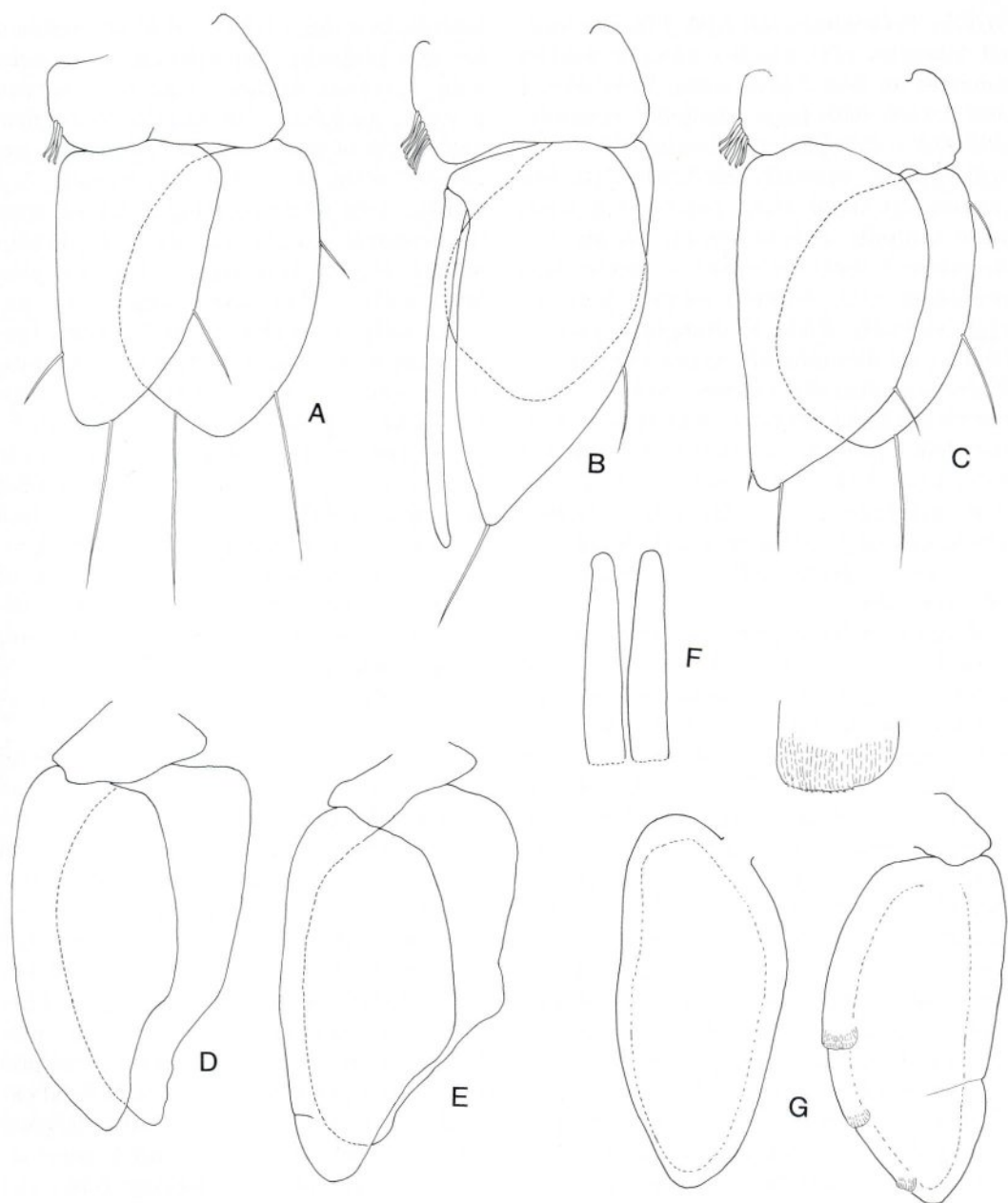


Fig. 4. *Dynameniscus carinata* (Richardson, 1900), male, USNM 298347, off Jamaica. A, pleopod 1; B, pleopod 2; C, pleopod 3; D, pleopod 4; E, pleopod 5; F, penes, same scale as pleopods; G, pleopod 5 of ovigerous female, ZMUC, with scale patch enlarged.

17°53'N, 78°38.5'W, off Jamaica, 1260 m, 17 Feb 1972.—ZMUC, 1 ovigerous ♀ 11.5 mm, R/V *Pillsbury* sta P-1187, 18°17'N, 75°05'W, between Jamaica and Haiti, 1034 m, 2 Jun 1970.

*Description*.—Male: Integument indurate, brittle, rugose, with numerous large and small rounded tubercles. Cephalon with 8 large rounded tubercles. Eyes poorly pigmented (in preservative), ommatidia not

visible. Pereonites each with 4 large rounded tubercles plus smaller anterior median tubercle on first 3 pereonites. Pereonites 1 and 2 each with large triangular ventrally-directed coxal plate; pereonites 3–5 each with strong ventrally directed spike-like process on coxal plate; pereonite 6 coxal plate ventrally with low triangular process, pereonite 7 ventrally rounded, shorter than preceding coxa. Anterior pleonite with lateral ventrally-directed triangular process bearing smaller tubercle on anterior margin. Pleotelson dorsally convex, with 7 larger rounded tubercles, posterior margin broadly rounded. Epistome separating antennal and antennular bases, anteriorly with 2 low rounded tubercles, hollowed between, touching well marked, rounded rostral process dorsally; posterior lobes divergent, distally rounded.

Antennular basal peduncle article almost twice length of article 2; latter subequal to article 3; flagellum of 8 aesthetasc-bearing articles. Antennal peduncle with 3 basal articles short, subequal, article 4 one-fourth longer than 3, article 5 longer than 4; flagellum of 7 setose articles. Mandible with strongly corneous incisor, about 12 dentate setae in setal row plus lacinia or robust lacinoid seta; molar truncate, bearing numerous simple short setae. Maxilla 1, inner ramus with 3 stout fringed setae distally; outer ramus with about 11 distal spine-like setae, some dentate. Maxilla 2, inner ramus bearing about 9 stout fringed setae on mesial and distal margins; lobes of outer ramus each with 6 fringed distal setae. Maxillipedal palp of 5 articles, article 1 short, article 2 largest, articles 2–4 bearing setose lobe mesiodistally; article 5 slender, almost 4 times longer than wide, with distal cluster of setae; endite with 3 mesial coupling hooks, several circum-plumose setae on distal margin.

Pereopods generally covered with very short dense pile of fine setules (not shown in figures). Pereopod 1 ambulatory, merus bearing 2 robust setae posterodistally; carpus triangular, with very short free anterior

margin, bearing 3 robust setae on posterior margin; propodus twice longer than wide, with 4 robust dentate setae on posterior margin; dactylus with unguis more than half length of rest of article, with strong accessory setae at its base. Pereopods 2–4 similar, with merus bearing 2 robust setae on posterior margin; carpus with anterior margin only slightly shorter than posterior, latter with 3 robust setae, single setae anterodistally; propodus about 2.5 times longer than wide, with 3 robust setae on posterior margin; dactylus with strong accessory setae at base of unguis. Pereopods 5–7, ischium becoming more elongate than in anterior pereopods, about 3.5 times longer than distal width; merus with single robust seta on posterior margin; carpus with 3 robust spines on posterior margin, group of about 7 dentate robust setae on distal margin; propodus with 5 setae on posterior margin; dactylus with unguis half length of rest of article, with accessory seta at its base.

Penes separate, elongate-tapering, about 5 times as long as basal width, distally rounded. Pleopod 1, endopod elongate-triangular, exopod broadly ovate, both rami bearing marginal plumose setae. Pleopod 2, appendix masculina articulating basally on endopod, stylet slender, just reaching beyond apex of ramus, distally rounded; endopod distally triangular, reaching well beyond ovate exopod, both rami bearing plumose marginal setae; pleopod 3, endopod distally triangular, reaching well beyond exopod; latter ovate, both rami with marginal plumose setae. Pleopods 4 and 5, rami lamellar, of similar size, lacking folds and marginal plumose setae. Pleopod 5 exopod with incomplete suture in distal third, with three scale patches on lateral margin. Scale patches thin-walled, scales poorly defined, more like surface striations, and with few distal points. Uropod consisting of fused protopod and endopod, latter a short immobile triangular lobe; exopod articulating, terete, gently tapering, very slightly curved, about 4.5 times longer than basal width.

Ovigerous female: External morphology very similar to male, but cephalic, pereonal and pleonal dorsal rounded tubercles slightly smaller. Number, size, and distribution of finer granulations very similar. Apart from the secondary sexual structures, the only difference between the male and female that could be discerned was a small variation in the number of robust setae on the posterior margins of the pereopod articles, i.e., five, rather than four setae on the propodus of pereopod 1, and two, rather than three setae on the carpus of some pereopods.

*Remarks.*—There are some differences between the holotype from Georgia, and the Caribbean specimens, the most noticeable being the shape of the uropodal exopod. In the holotype, these are distinctly curved, the tips being laterally directed. In the Caribbean specimens, the uropodal exopod has a barely noticeable curve. In the recent specimens, integumental tubercles are much stronger and more prominent, while the dorsal integument generally is more rugose, than in the type. With the limited material available, and in comparison to variation shown by other sphaeromatid species, this variation can, at present, be only considered as regional or possibly related to the relative maturity of the specimens.

Richardson (1906) described (and figured) pleopod 4 as having "transverse folds, fleshy". Close examination of all specimens here reveal that is not the case and that the rami of pleopods 4 and 5 are lamellar.

#### Acknowledgments

We are grateful to Dr. Linda Pequegnat of La Jolla, California, Dr. Kathryn Vaughn, Texas A&M University, and Professor and Mrs. Ivan Goodbody, University of the West Indies, Jamaica, for donating material of *Dynameniscus* to the Smithsonian Institution. We thank Dr. Danny Eibye-Jacobsen, Zoologisk Museum, University of Copenhagen, for the loan of material.

#### Literature Cited

- Bruce, N. L. 1991. New records of marine isopod crustaceans (Sphaeromatidae, Cirolanidae) from south-eastern Australia—*Memoirs of the Museum of Victoria* 52:263–275.
- . 1993. Two new genera of marine isopod crustaceans (Flabellifera: Sphaeromatidae) from southern Australia, with a reappraisal of the Sphaeromatidae.—*Invertebrate Taxonomy* 7: 151–171.
- . 1994. The Cassidininae (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.
- Hansen, H. J. 1905. On the propagation, structure and classification of the family Sphaeromidae.—*Quarterly Journal of Microscopical Science* 49 (new series):69–135.
- Harrison, K. 1984. The morphology of the sphaeromatid brood pouch (Crustacea: Isopoda: Sphaeromatidae).—*Zoological Journal of the Linnean Society* 82:363–407.
- , & J. P. Ellis. 1991. The genera of the Sphaeromatidae (Crustacea: Isopoda): a key and distribution list.—*Invertebrate Taxonomy* 5:915–952.
- , & D. M. Holdich. 1982. New eubranchiate sphaeromatid isopods from Queensland waters.—*Memoirs of the Queensland Museum* 20: 421–446.
- , & ———. 1984. Hemibranchiate sphaeromatids (Crustacea: Isopoda) from Queensland, Australia, with a world-wide review of the genera discussed.—*Zoological Journal of the Linnean Society* 81:275–387.
- Holdich, D. M., & K. Harrison. 1984. Sphaeromatid isopods (Crustacea) from brackish waters in Queensland, Australia.—*Zoologica Scripta* 12: 127–140.
- Richardson, H. 1900. Synopses of North American invertebrates, 8. The Isopoda. Part 1, Chelifera, Flabellifera, Valvifera.—*The American Naturalist* 34(399):207–230.
- . 1901. Key to the isopods of the Atlantic coast of North America with descriptions of new and little known species.—*Proceedings of the United States National Museum* 23:493–579.
- . 1905. A monograph on the isopods of North America.—*Bulletin of the United States National Museum* 54:i–liii, 1–727.
- . 1906. Descriptions of new isopod crustaceans



- of the Family Sphaeromidae.—Proceedings of the United States National Museum 31:1–22.
- Schultz, G. A. 1969. How to know the marine isopod crustaceans. Wm. C. Brown Co., Dubuque, Iowa, 359 pp.
- Stebbing, T. R. R. 1893. A history of Crustacea. Recent Malacostraca. Keegan Paul, Trench, Trubner & Co., London, 466 pp.
- Tattersall, W. M. 1905. Some new and rare Isopoda taken in the British area.—Report of the British Association for the Advancement of Science 1904:601–602.