

Copepoda (Siphonostomatoida) associated with Ophiuroidea in Jamaica, Puerto Rico, and Barbados

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Three new siphonostomatoid copepods are associated with Ophiuroidea in the tropical western Atlantic. *Collocheres verwoorti* spec. nov., from *Ophiothrix angulata* in Jamaica, has an elongate, gently tapered genital double-somite in the female and the second segment of leg 5 has a distal outer notch. *Collocheres lunulifer* spec. nov., an associate of *Ophiothrix angulata* and *Ophiothrix suensonii* in Barbados, has sclerotized lunules on the basis and first segment of the endopod of leg 1. *Ophiurocheres bellulus* gen. nov., spec. nov., living on *Ophiomyxa flaccida* in Puerto Rico, has the third segment of the exopod of leg 1 armed with II,2,2 and the second segment of leg 5 bears 2 setae in the female and 3 setae in the male.

Introduction

Several species of Copepoda are associated with Ophiuroidea on the Atlantic side of North America. In the Poecilostomatoida, *Pseudanthessius deficiens* Stock, Humes & Gooding, 1963, is associated with *Ophioderma cinereum* Müller & Troschel, 1842, in Curaçao, St. Martin, and Puerto Rico (Stock, Humes & Gooding, 1963a); *Pseudanthessius limatus* Humes, 1978, lives with *Ophiopsila* spec. on the eastern coast of Panama; *Critomolgus astrophyticus* (Humes & Stock, 1973), is an associate of *Astrophyton muricatum* (Lamarck, 1816) in Barbados, Puerto Rico, and Jamaica (Humes & Stock, 1973; Williams & Wolfe-Waters, 1990); and *Presynaptiphilus amphiopli* Humes & Hendler, 1972, occurs on *Amphioplus abditus* (Verrill, 1899) in Connecticut and on *Amphioplus* spec. (= *Amphioplus sepultus* Hendler, 1995; Hendler et al., 1995) at Virginia Key, Miami, Florida (Humes & Hendler, 1972). In the Siphonostomatoida, *Ophiophilus reductus* Stock, Humes & Gooding, 1963, occurs with *Ophiocoma echinata* (Lamarck, 1816) in Curaçao (Stock, Humes & Gooding, 1963b), and with *Ophiocomella ophiac-toides* (H.L. Clark, 1901) in Jamaica (Emson, Mladenov & Wilkie, 1985). In addition, Fewkes (1987, 1988a, 1988b) mentioned a copepod (which he did not name) living in the brood sacs of *Amphiura squamata* Delle Chiaje, 1828, at Newport, Rhode Island.

The members of the genus *Collocheres* are typically associated with various crinoids and ophiuroids. Species are known from northern Europe, the Mediterranean, the Gulf of Aqaba, Madagascar, Sri Lanka, Japan, the Moluccas, northeastern Australia, and New Caledonia.

This paper includes the description of three siphonostomatoid copepods, two new species of *Collocheres* and a new genus and species, associated with Ophiuroidea in Barbados, Puerto Rico, and Jamaica.

Materials and methods

The ophiuroids were isolated in plastic bags in sea water immediately after collection. In the laboratory, a sufficient amount of 95% ethanol was added to make approximately a 5% solution. After a few hours, the ophiuroids were gently rinsed and the sea water was passed through a fine net (openings approximately 125 per cm). The copepods were then recovered from the sediment retained in the net and preserved in 70% ethanol.

All measurements and dissections were made on specimens in lactic acid, following the method described by Humes & Gooding (1964). The length of the body includes the caudal rami, but not their setae. The length of the segments of the antennules were measured along their posterior nonsetiferous margins. In the formulas for the armature of legs 1-4, Arabic and Roman numerals indicate setae and spines, respectively. The letter after the explanation of each figure indicates the scale at which it was drawn.

Systematics

Siphonostomatoida Thorell, 1859

Asterocheridae Giesbrecht 1899

Collocheres Canu, 1893

Collocheres vervoorti spec. nov.

(figs 1a-j, 2a-j, 3a-g)

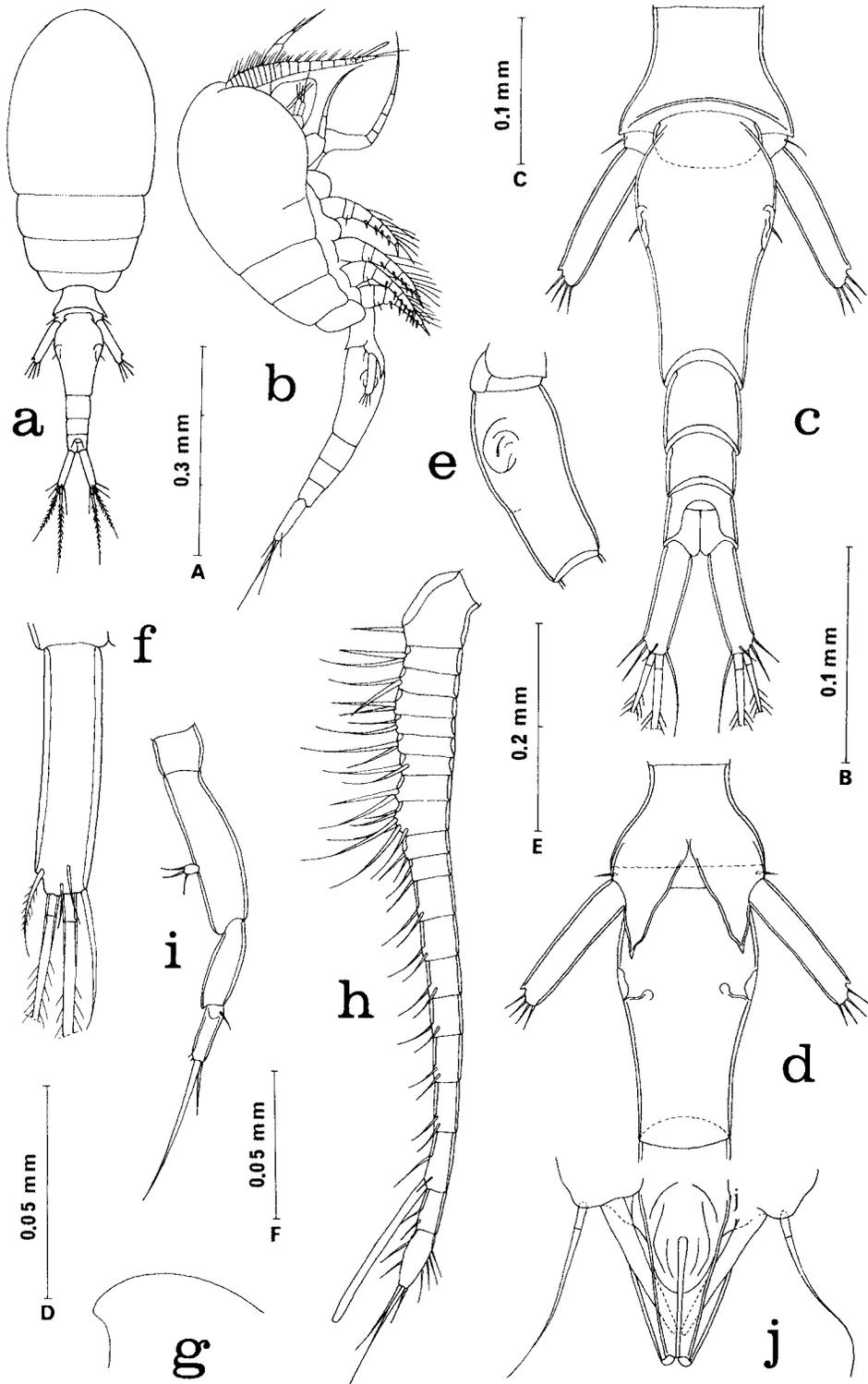
Type material.— 106 ♀♀, 97 ♂♂ from 65 *Ophiothrix angulata* (Say, 1825), in 1 m, on piling, near tide guage, Port Royal, Jamaica, 1 September 1959. Holotype ♀ (USNM 285500), allotype ♂ (USNM 285501), and 198 paratypes (103 ♀♀, 95 ♂♂) (USNM 285502), deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Remaining paratypes (dissected) in the collection of the author.

Female.— Body slender (fig. 1a, b), in specimens preserved in 70% ethanol bent at angle at junction of prosome and urosome. Length 0.62 mm (0.59-0.65 mm) and greatest width 0.20 mm (0.19-0.21 mm), based on 10 specimens. Greatest dorsoventral thickness 0.19 mm. Epimeral areas of metasomal somites rounded. Ratio of length to width of prosome 1.84:1. Ratio of length of prosome to that of urosome 1.64:1.

Somite bearing leg 5 (fig. 1c) $47 \times 50 \mu\text{m}$. Genital double-somite (fig. 1c-e) elongate, $125 \times 65 \mu\text{m}$, broadest in anterior half and gently tapered posteriorly. In lateral view (fig. 1e) $125 \times 52 \mu\text{m}$. Genital areas located laterally near midregion of double-somite. Each genital area bearing 1 minute seta. Three postgenital somites from anterior to posterior 42×40 , 29×35 , and $30 \times 34 \mu\text{m}$.

Caudal ramus (fig. 1f) moderately elongate, unornamented, $57 \times 13 \mu\text{m}$, ratio 4.39:1. Outer lateral seta, placed dorsally, $22 \mu\text{m}$, small dorsal seta $13 \mu\text{m}$, outermost

Fig. 1. *Collocheres vervoorti* spec. nov. Female. a, body, dorsal (scale A); b, body, lateral (A); c, urosome, dorsal (B); d, somite bearing leg 5 and genital double-somite, ventral (B); e, genital double-somite, lateral (C); f, caudal ramus, dorsal (D); g, outline of rostrum, lateral (E); h, antennule, ventral (F); i, antenna, posteroventral (F); j, oral cone and mandibles, anteroventral (B).



terminal seta 28 μm , innermost terminal seta 50 μm , and 2 median terminal setae 86 μm (outer) and 125 μm (inner).

Body surface without visible sensilla.

Egg sac not seen.

Rostrum (fig. 1g) small, bluntly rounded. Antennule (fig. 1h) 20-segmented, 236 μm long, not including terminal setae. Armature: 1, 2, 2, 2, 2, 2, 2, 2, 6, 2, 2, 2, 2, 2, 2, 2, 2 + 1 aesthetasc (55 μm long), 2, and 8, respectively. Lengths of segments: 14 (36 μm along anterior margin), 8, 8, 7, 7, 7, 7, 8, 10, 7, 7, 12, 12, 12, 12, 13, 14, 17, 12, and 19 μm . All setae smooth. Antenna (fig. 1i) 156 μm long. Coxa short, basis elongate, exopod minute with 3 setae, endopod 2-segmented, first segment unarmed, second segment with 1 small proximal inner seta, 2 unequal terminal setae, longer of these 52 μm , and 2 minute subterminal setules.

Oral cone prominent in lateral view (fig. 1b); in anterolateral view approximately 75 μm long (fig. 1j).

Mandible (fig. 2a), lying along sides of oral cone (fig. 1j), with slender blade 75 μm bearing several small subterminal dentiform spines (fig. 2b). Palp long, 1-segmented, with terminal seta. Maxillule (fig. 2c) with outer lobe bearing 1 seta and inner lobe with 4 setae. Maxilla (fig. 2d) 2-segmented, first segment stout with 2 proximal inner setae, second segment slender, terminal clawlike seta 57 μm . Maxilliped (fig. 2e) 5-segmented. First segment short with 1 small seta, second segment elongate with minute inner seta, third segment short with 1 seta, fourth and fifth segments subequal and both with 1 seta, terminal smooth clawlike seta 52 μm .

Ventral area between maxillipeds and first pair of legs protuberant (fig. 1b).

Legs 1-4 (fig. 2f-i) with 3-segmented rami. Spine and setal formula as follows:

P ₁	coxa 0-1	basis 1-I	exp I-1; enp 0-1;	I-1; 0-2;	II,1,5 1,2,3
P ₂	coxa 0-1	basis 1-0	exp I-1; enp 0-1;	I-1; 0-2;	III,I,5 1,2,3
P ₃	coxa 0-1	basis 1-0	exp I-1; enp 0-1;	I-1; 0-2;	III,I,4 1,I,3
P ₄	coxa 0-1	basis 1-0	exp I-1; enp 0-1;	I-1; 0-2;	III,I,3 1,I,2

Leg 5 (figs 1d, 2j) with first segment incompletely set off from body somite, produced inwardly as large irregular triangular process, bearing 1 outer distal seta and having pointed tip; second segment elongate, 64 \times 15 μm , ratio 4.27:1, with small outer subterminal notch and having 4 short distal setae.

Leg 6 probably represented by seta on genital area (fig. 1c,e).

Male.— Body (fig. 3a) resembling that of female in general form. Length 0.47 mm (0.46-0.55 mm) and greatest width 0.16 mm (0.15-0.17 mm), based on 10 specimens. Greatest dorsoventral thickness 0.14 mm.

Somite bearing leg 5 (fig. 3b) 36 \times 57 μm . Genital somite 55 \times 68 μm , slightly wider than long, with rounded sides. Four postgenital somites from anterior to posterior 50 \times 39, 29 \times 34, 22 \times 30, and 23 \times 30 μm .

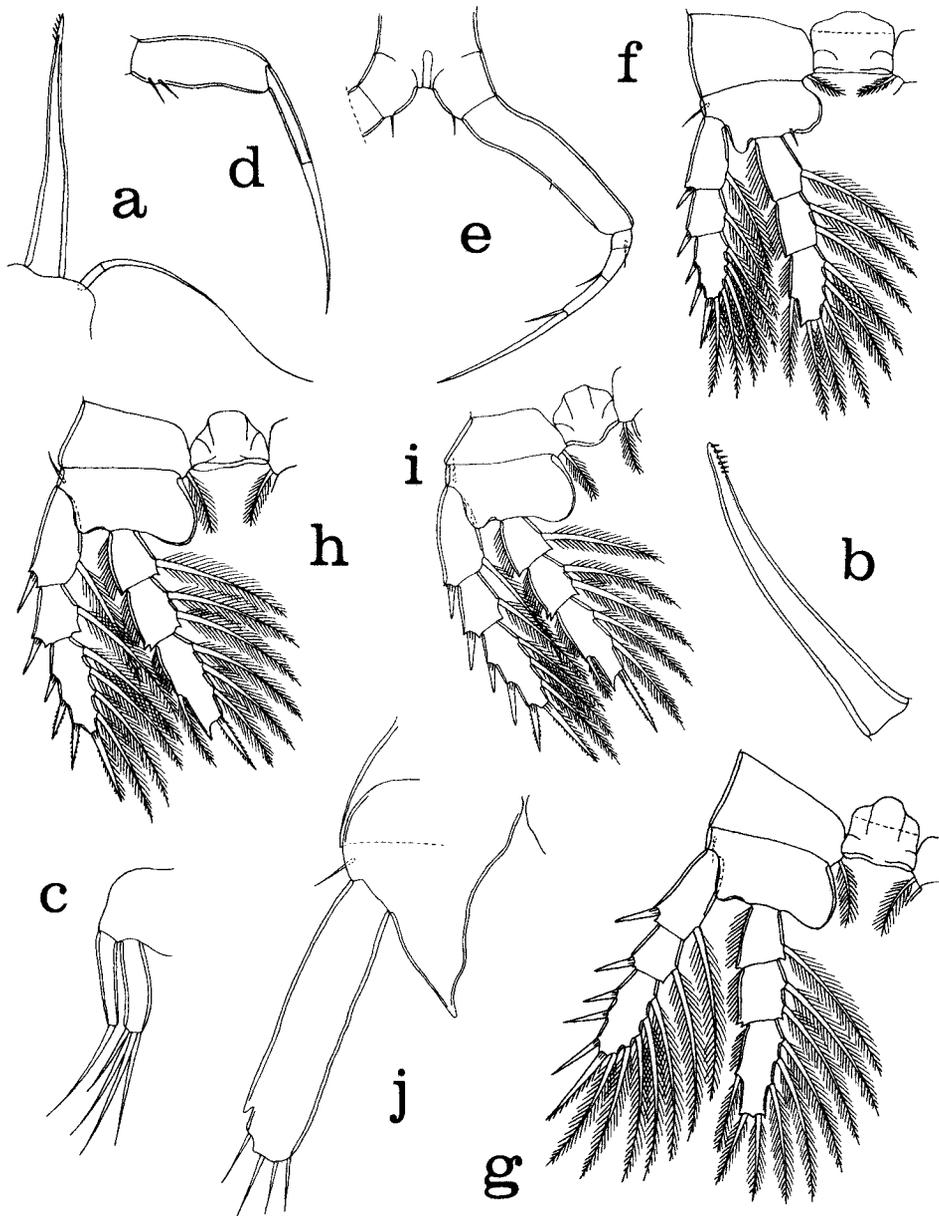


Fig. 2. *Collocheres vervoorti* spec. nov. Female. a, mandible, anterior (scale F; for scales, see fig. 1); b, blade of mandible, lateral (D); c, maxillule, anterior (F); d, maxilla, posterior (B); e, maxilliped, posterior (B); f, leg 1 and intercoxal plate, anterior (B); g, leg 2 and intercoxal plate, anterior (B); h, leg 3 and intercoxal plate, anterior (B); i, leg 4 and intercoxal plate, anterior (B); j, leg 5, ventral (D).

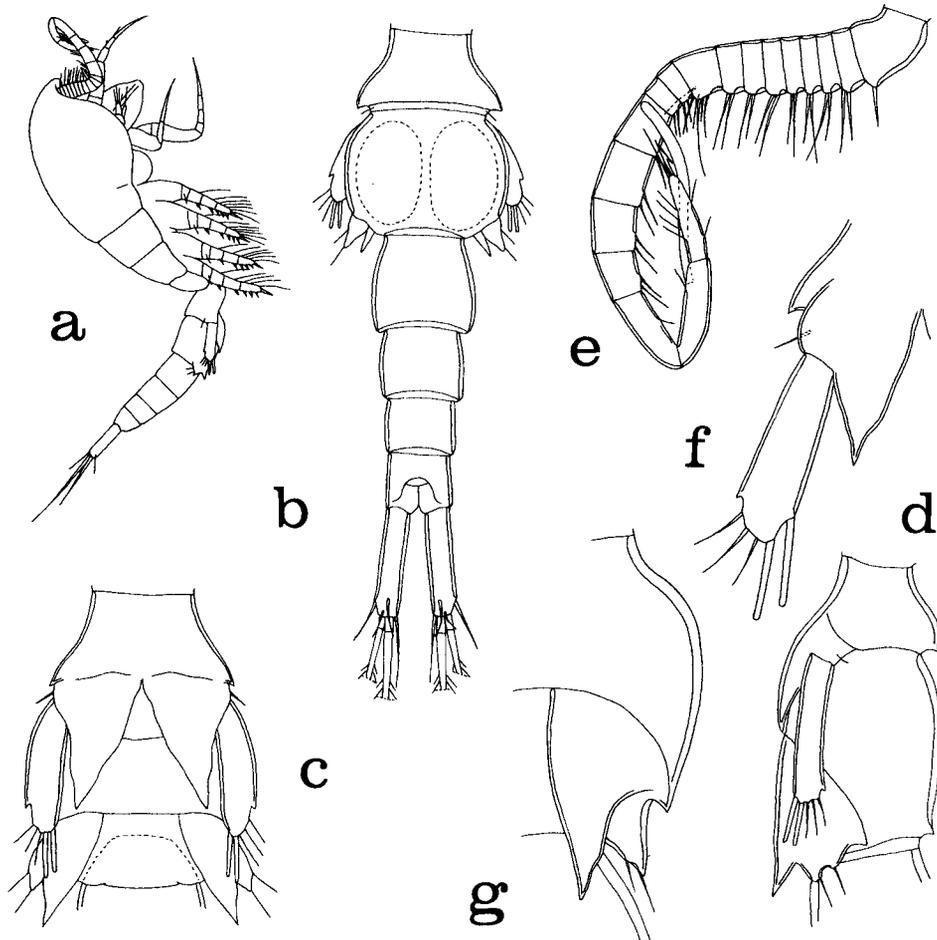


Fig. 3. *Collocheres vervoorti* spec. nov. Male. a, body, lateral (scale A; for scales, see fig. 1); b, urosome, dorsal (B); c, somite bearing leg 5 and genital somite, ventral (F); d, somite bearing leg 5 and genital somite, lateral (F); e, antennule, anterior (F); f, leg 5, ventral (D); g, leg 6, ventral (D).

Caudal ramus (fig. 3b) resembling that of female but smaller, $44 \times 13 \mu\text{m}$.

Body surface as in female.

Rostrum like that of female. Antennule (fig. 3e) 18-segmented, geniculate. Armature: 1, 2, 2, 2, 2, 2, 2, 2, 6, 2, 2, 2, 2, 2, 2, 1, 1 + aesthetasc, and 9, respectively. Lengths of segments: 13 ($24 \mu\text{m}$ along anterior margin), 5.5, 5.5, 5.5, 5.5, 5.5, 5.5, 7, 13, 5, 5, 12, 14, 14, 11, 26, 28, and $28 \mu\text{m}$. Antenna as in female.

Oral cone, mandible, maxillule, maxilla, maxilliped, ventral prominence, and legs 1-4 like those of female.

Leg 5 (fig. 3c,f) resembling that of female, but second segment shorter, $39 \times 12 \mu\text{m}$, bearing distally 3 small outer setae and 2 inner hyaline stout setae.

Leg 6 (fig. 3d,g) posteroventral, with larger inner pointed flap and small outer process bearing 2 setae.

Spermatophore not seen.

Colour as in female.

Etymology.— The species is named for Prof. W. Vervoort in recognition of his many important contributions to zoology, and to the study of Copepoda in particular.

Remarks.— *Collocheres vervoorti* may be distinguished from most congeners by its smoothly tapered genital double-somite in the female. Of the 15 known species in the genus, six approach the new species in having a smoothly tapered double-somite. These species may be separated from the new species as follows. In *Collocheres giesbrechti* Thompson & A. Scott, 1903, the free segment of leg 5 lacks a distal outer notch and the caudal ramus is shorter (their fig. XVIII, 1). In *Collocheres gracilicauda* (Brady, 1880), *Collocheres breei* Stock, 1966, *Collocheres gracilipes* Stock, 1966, and *Collocheres canui* Giesbrecht, 1899, the caudal ramus of the female is much longer, at least 7:1. *Collocheres elegans* A. Scott, 1896, is much larger than the new species, with the length of the female 1 mm.

Collocheres lunulifer spec. nov.

(figs 4a-j, 5a-h, 6a-e)

Type material.— 49 ♀♀, 60 ♂♂ from 44 *Ophiothrix angulata* (Say, 1825), in 5 m, Carlisle Bay, near Bridgetown, St. Michael, Barbados, 16 July 1959. Holotype ♀ (USNM 285503), allotype ♂ (USNM 285504), and 103 paratypes (46 ♀♀, 57 ♂♂) (USNM 285505) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Remaining paratypes (dissected) in the author's collection.

Additional specimens collected.— 3 ♂♂, 1 ♀ copepodid (USNM 285509), from 2 *Ophiothrix suensonii* Lütken, 1856, in 11 m, near Holetown, St. James, Barbados, 3 July 1959.

Body.— (fig. 4a, b) slender. Length 0.82 mm (0.80-0.83 mm) and greatest width 0.25 mm (0.24-0.26 mm), based on 10 specimens. Greatest dorsoventral thickness 0.21 mm. Somite bearing first pair of legs fused with cephalosome. Epimeral areas of metasomal somites rounded. Ratio of length to width of prosome 1.93:1. Ratio of length of prosome to that of urosome 1.36:1.

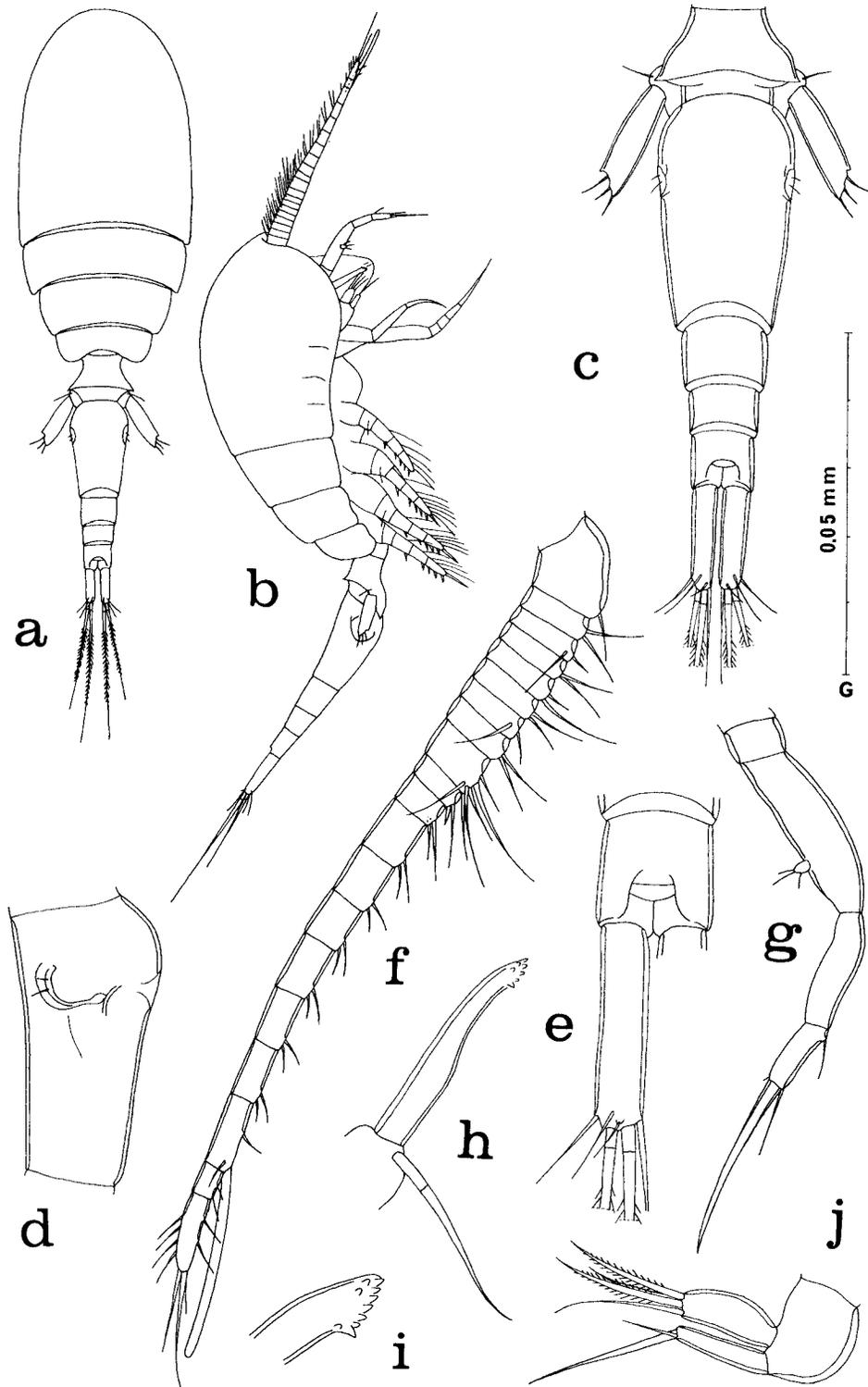
Somite bearing leg 5 (fig. 4c) 55 × 94 μm. Genital double-somite elongate, 140 μm long, in dorsal view wider anteriorly (75 μm) than posteriorly (65 μm), in lateral view (fig. 4d) nearly straight dorsally but swollen ventrally in anterior third. Genital areas located laterally, each with 2 very small setae. Three postgenital somites from anterior to posterior 49 × 52, 31 × 42, and 34 × 39 μm.

Caudal ramus (fig. 4e) elongate, unornamented, 68 × 18 μm, ratio 3.78:1. Outer lateral seta, placed dorsally, 33 μm, dorsal seta 17 μm, outermost terminal seta 39 μm, innermost terminal seta 65 μm, and 2 median terminal setae 156 μm (outer) and 208 μm (inner). All setae smooth.

Body surface without visible sensilla.

Egg sac not seen.

Rostrum as in *C. vervoorti*. Antennule (fig. 4f) 20-segmented, 275 μm long, not including terminal setae. Armature as in *C. vervoorti*. Lengths of segments: 13 (33 μm along anterior margin), 7, 7, 7, 7, 7, 9, 11, 7.5, 11, 17, 17, 18, 17.5, 17.5, 21, 23, 13, and 22 μm, respectively. Antenna (fig. 4g) 177 μm long, resembling that of *C. vervoorti*, terminal seta 58 μm.



Oral cone prominent in lateral view (fig. 4b).

Mandible (fig. 4h) with tip of blade bearing several small blunt teeth as in fig. 4i. Maxillule (fig. 4j), maxilla (fig. 5a), maxilliped (fig. 5b), and ventral area between first pair of legs and maxillipeds (fig. 4b) similar to those of *C. vervoorti*.

Legs 1-4 (fig. 5c, e-g) segmented and armed as in *C. vervoorti*, with same spine and setal formula. Leg 1 having small sclerotized lunule on posterior surface of basis and first segment of endopod (fig. 5d). Outer spine on first segment of exopod noticeably more slender than more distal spines. Legs 2-4 having row of minute spines along outer sides of exopodal segments.

Leg 5 (fig. 5h) with elongate second segment $75 \times 26 \mu\text{m}$, ratio 2.88:1. Outer margin concave with small subterminal notch. Three terminal short setae, outermost larger than other two. Fourth seta short, subterminal, inserted on dorsal surface of segment.

Leg 6 probably represented by 2 small setae on genital area (fig. 4d).

Colour of living specimens unknown.

Male.— Body (fig. 6a) slender. Length 0.56 mm (0.53-0.57 mm) and greatest width 0.17 mm (0.16-0.18 mm), based on 10 specimens. Greatest dorsoventral thickness 0.13 mm. Ratio of length to width of prosome 1.95:1. Ratio of length of prosome to that of urosome 1.40:1.

Somite bearing leg 5 (fig. 6b) $29 \times 60 \mu\text{m}$. Genital somite wider than long, $60 \times 78 \mu\text{m}$, with strongly rounded lateral margins. Length including leg 6 $64 \mu\text{m}$. Four post-genital somites from anterior to posterior 36×44 , 26×35 , 16×31 , and $21 \times 31 \mu\text{m}$.

Caudal ramus (fig. 6b) similar to that of female but smaller, $39 \times 15 \mu\text{m}$, ratio 2.6:1.

Body surface as in female.

Rostrum resembling that of female. Antennule (fig. 6c) 18-segmented, $221 \mu\text{m}$ long as drawn, weakly geniculate, armature as in *C. vervoorti*. Segments 12-14 slightly swollen. Lengths of segments: 8 ($25 \mu\text{m}$ along anterior margin), 5, 5, 5, 5, 6, 7, 10, 5, 5, 14, 14, 18, 15, 32, 32, and $24 \mu\text{m}$, respectively. Antenna as in female.

Oral cone, mandible, maxillule, maxilla, maxilliped, ventral prominence, and legs 1-4 as in female.

Leg 5 (fig. 6d) with first segment having pointed prominence (but in 1 specimen this prominence rounded on left side). Second segment $39 \times 13 \mu\text{m}$, ratio 3:1. Four short setae as in female, but in addition 2 terminal inner blunt stout hyaline setae

Leg 6 (fig. 6e) posteroventral flap on genital somite terminating in inner point and outer process with 2 setae.

Spermatophore not seen.

Colour unknown.

Etymology.— The specific name *lunulifer*, from Latin *lunula*, a small lunule or half-moon, and *fero*, to bear, alludes to the lunules on leg 1.

Remarks.— *Collocheres lunulifer* may be distinguished from congeners which also have a relatively untapered, more or less barrel-shaped genital double-segment in the female by the shorter length of the caudal ramus in such species. The presence in leg 1 of a small sclerotized lunule on the posterior surface of the basis and the first segment of the endopod is distinctive.

Fig. 4. *Collocheres lunulifer* spec. nov. Female. a, body, dorsal (scale A; for scales, see fig. 1); b, body, lateral (A); c, urosome, dorsal (C); d, genital double-somite, lateral (B); e, anal somite and caudal ramus, dorsal (F); f, antennule, posteroventral (F); g, antenna, posteroventral (F); h, mandible, antero-outer (F); i, tip of blade of mandible, antero-outer (G); j, maxillule, anterior (F).

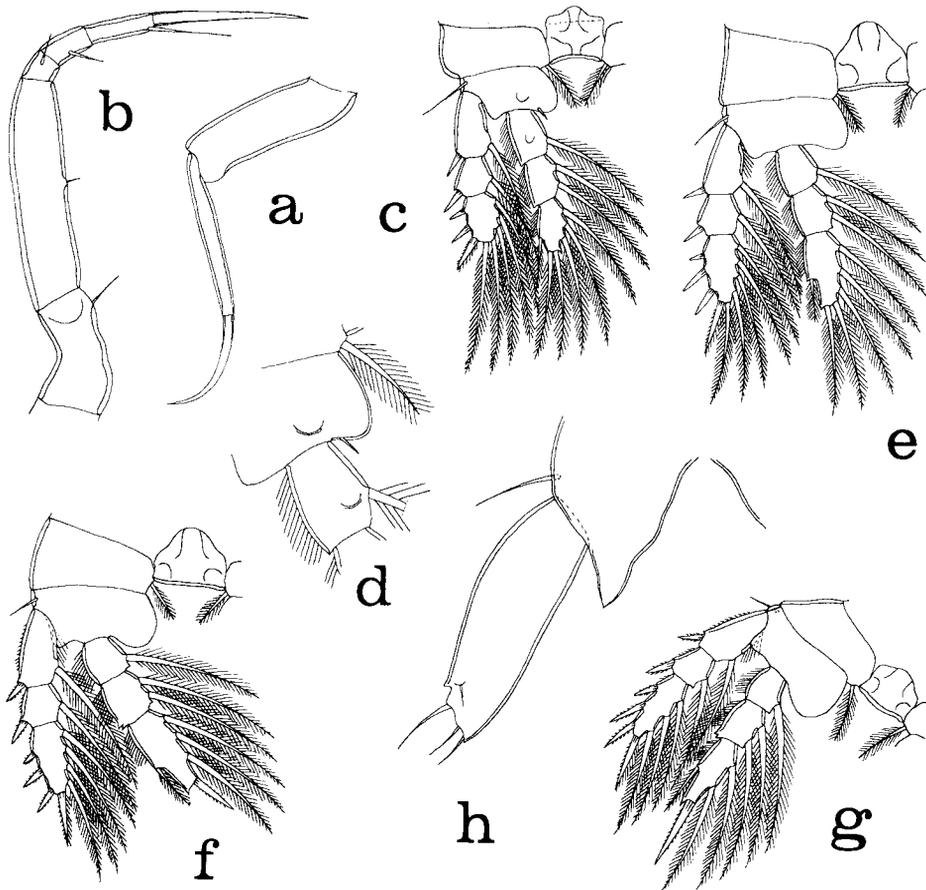


Fig. 5. *Collocheres lunulifer* spec. nov. Female. a, maxilla, posterior (scale B; for scales, see fig. 1); b, maxilliped, posterior (B); c, leg 1 and intercoxal plate, posterior (C); d, detail of inner part of basis and first segment of endopod of leg 1, posterior (F); e, leg 2 and intercoxal plate, posterior (C); f, leg 3 and intercoxal plate, posterior (C); g, leg 4 and intercoxal plate, anterior (C); h, leg 5, ventral (F).

The presence of an inner seta on the basis of leg 1 is characteristic of many species of the genus *Collocheres*. Although Humes (1987) indicated the absence of this seta, a re-examination of paratypes has shown that such a seta is present in all seven species of *Collocheres* described in that report. This seta is very small and weak, and may be easily overlooked unless high magnification with an oil immersion objective is used.

Ophiurocheres gen. nov.

Diagnosis.— A genus in the family Asterocheridae. Urosome in female 5-segmented, in male 6-segmented. Caudal ramus with 6 setae. Antennule in female 20-segmented with aesthetasc on segment 18, in male 18-segmented with aesthetasc on segment 17. Antenna 4-segmented with exopod probably represented only by small interruption in wall of basis. Mouthparts of asterocherid type. Legs 1-4 of female with

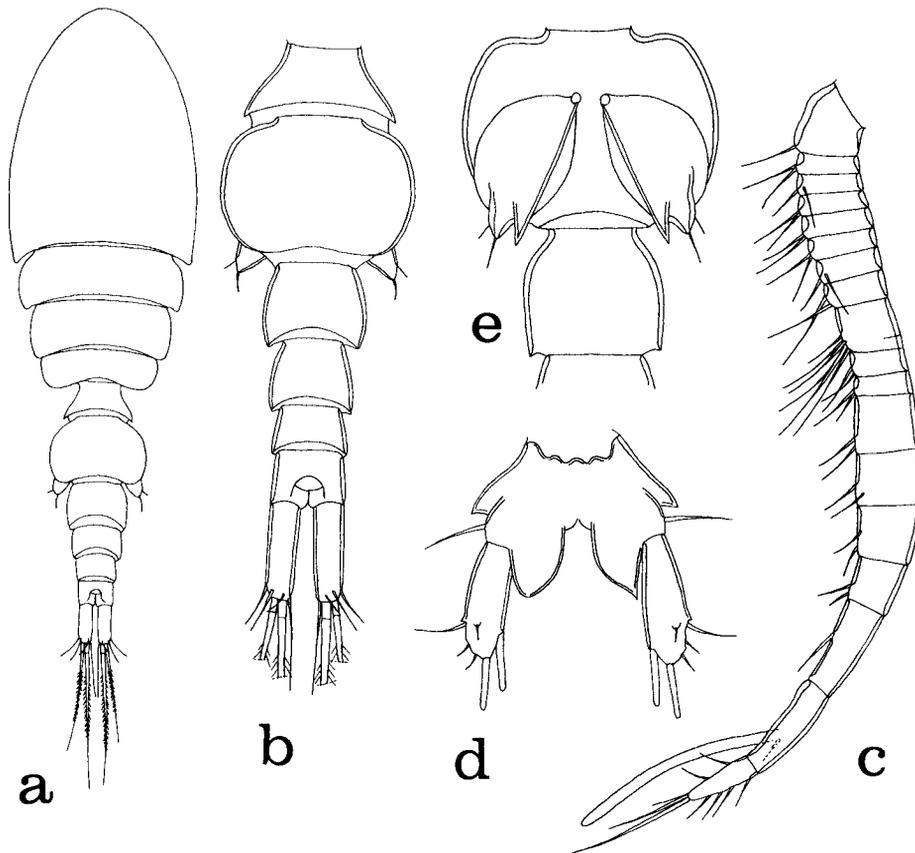


Fig. 6. *Collocheres lunulifer* spec. nov. Male. a, body, dorsal (scale E; for scales, see fig. 1); b, urosome, dorsal (B); c, antennule, anterior (F); d, fifth pair of legs, ventral (F); e, genital somite, showing sixth pair of legs, and first postgenital somite, ventral (F).

third segment of exopods armed with II,2,2; II,1,4; II,1,3; and II,1,3; third segment of endopods with 1,5; 1,5; 1,1,3; and 1,1,2. Leg 1 of male with third segment of endopod sexually dimorphic in having stouter setae than in female. Leg 5 with free segment bearing 2 setae in female, 3 setae in male.

Etymology.— The generic name is a combination of part of the word Ophiuroidea, alluding to the host of the copepod, and *-cheres*, a combining form frequently used in siphonostomatoid copepods.

Ophiurocheres bellulus spec. nov.
(figs 7a-1, 8a-f, 9a-g)

Type material.— 105 ♀♀, 16 ♂♂ from 78 *Ophiomyxa flaccida* (Say, 1825), in 0.5 m, Corona del Diablo, small reef between Caballo Ahogado and shore to north, near La Parguera, western Puerto Rico, 22 August 1959. Holotype ♀ (USNM 285506), allotype ♂ (USNM 285507), and 114 paratypes (100 ♀♀, 14 ♂♂) (USNM 285508) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Remaining paratypes (dissected) in the collection of the author.

Female.— Body (fig. 7a) with moderately broad prosome. Length 0.47 mm (0.41–0.52 mm) and greatest width 0.26 mm (0.23–0.29 mm), based on 10 specimens. Greatest dorsoventral thickness 0.16 mm. Somite bearing leg 1 fused with cephalosome and having moderately pointed epimera. Somite bearing leg 2 with pointed epimera. Somites bearing legs 3 and 4 with rounded epimera. Ratio of length to width of prosome 1.38:1. Ratio of length of prosome to that of urosome 2.93:1.

Somite bearing leg 5 (fig. 7b) $31 \times 59 \mu\text{m}$. Genital double-somite broad, $61 \times 86 \mu\text{m}$, wider than long, broadly rounded in anterior two-thirds, tapered in posterior third. Genital areas located dorsolaterally in posterior half of rounded section. Each genital area with 2 minute setae. Copulatory pores visible on ventral side of double-somite (fig. 7c). Three postgenital somites from anterior to posterior 17×40 , 12×37 , and $13 \times 35 \mu\text{m}$.

Caudal ramus (fig. 7d) minute, $14 \times 13 \mu\text{m}$. Lateral seta, displaced to dorsal surface of ramus, and dorsal seta held erect and not measurable. Outermost terminal seta $18 \mu\text{m}$, innermost terminal seta $24 \mu\text{m}$, and 2 median terminal setae $78 \mu\text{m}$ (outer) and $156 \mu\text{m}$ (inner). All setae smooth.

Body surface without visible sensilla.

Egg sac (fig. 7e), seen only on one side of one female, $273 \mu\text{m}$ long, but somewhat damaged. Anteriormost egg $96 \times 73 \mu\text{m}$.

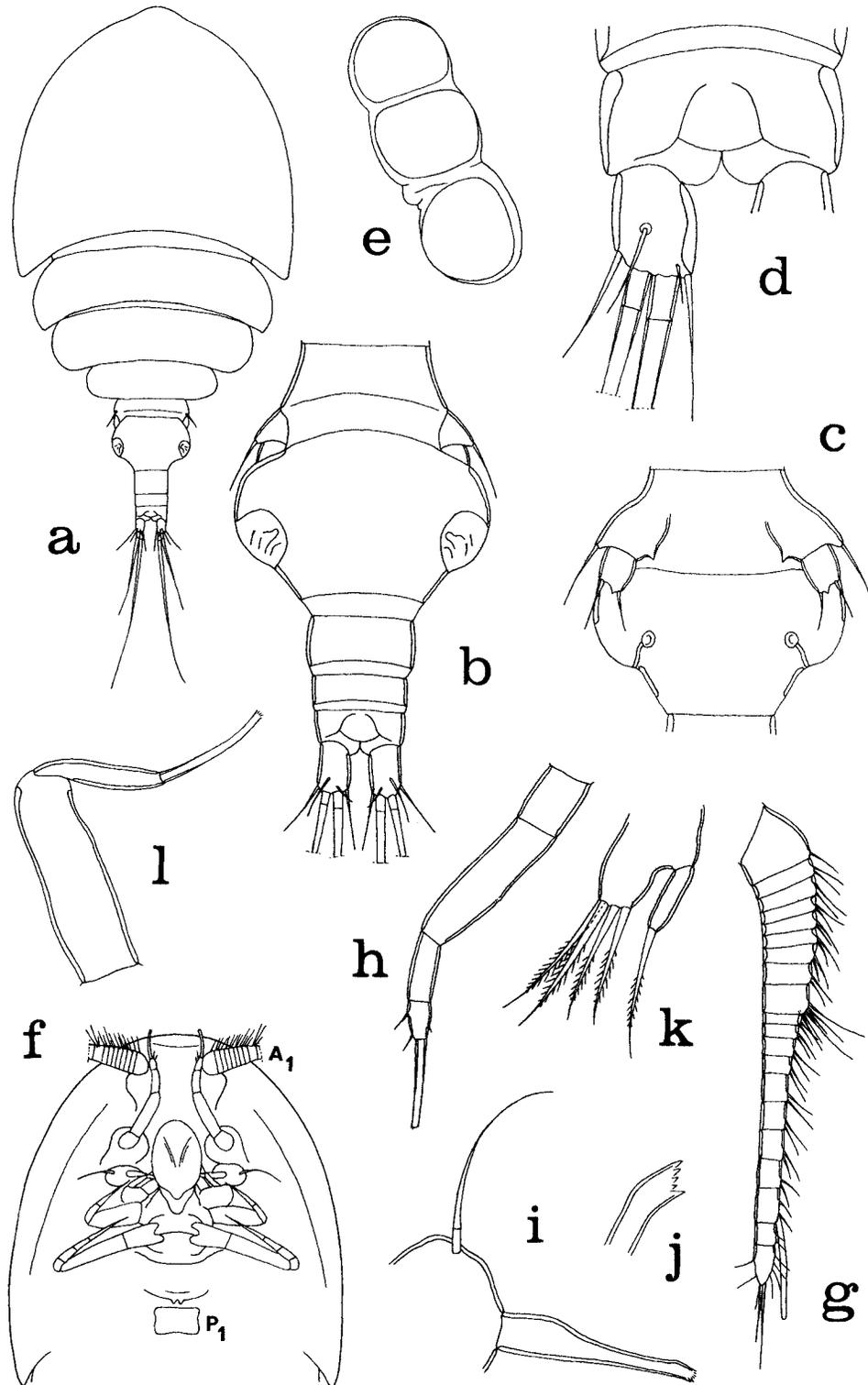
Rostrum (fig. 7f) weak. Antennule (fig. 7g) $153 \mu\text{m}$ long, 20-segmented. Armature: 1, 2, 2, 2, 2, 2, 2, 2, 6 (?), 2, 2, 2, 2, 2, 2, 2 + aesthetasc, 2, and 9. Lengths of segments: 6 ($17 \mu\text{m}$ along anterior margin), 3, 3, 3, 3, 3, 4, 5, 7, 2, 2, 7, 7, 8, 8, 9, 12, 14, 8, and $15 \mu\text{m}$. All setae smooth. Antenna (fig. 7h) $86 \mu\text{m}$ long, coxa short and unarmed, basis elongate, exopod probably represented by slight interruption in sclerotization; endopod 2-segmented, first segment unarmed, second segment with 2 inner setae, 1 outer setule, and large terminal stout seta, $16 \mu\text{m}$, with truncate tip bearing row of minute setules.

Oral cone (fig. 7f) in ventral view oval, $75 \mu\text{m}$ long, protruding in lateral view.

Mandible (fig. 7i) with blade $47 \mu\text{m}$ long, swollen proximally, slender distally, with tip obliquely truncate, bearing several small teeth (fig. 7j); palp 1-segmented, $9 \mu\text{m}$ long, bearing terminal seta $40 \mu\text{m}$. Maxillule (fig. 7k) with outer lobe bearing 1 seta, inner lobe with 4 setae. Maxilla (fig. 7l) 2-segmented, second segment slender with 1 seta, $26 \mu\text{m}$, tip with minute brushlike setules. Maxilliped (fig. 8a) with short first segment (syncoxa) bearing 1 inner seta, long second segment (basis) with small inner seta, endopod with first 2 segments bearing 1 seta and third segment with 1 subterminal seta and large stout terminal seta, $26 \mu\text{m}$, having blunt tip with minute brushlike setules.

Ventral area between maxillipeds and first pair of legs (fig. 7f) only slightly protuberant.

Fig. 7. *Ophiurocheres bellulus* gen. nov. & spec. nov. Female. a, body, dorsal (scale E; for scales, see fig. 1); b, urosome, dorsal (F); c, somite bearing leg 5 and genital double-somite, ventral (F); d, anal somite and caudal ramus, dorsal (G); e, egg sac, ventral (E); f, cephalosome, ventral (C); g, antennule, ventral (D); h, antenna, posterior (D); i, mandible, posterior (D); j, tip of blade of mandible, ventral (G); k, maxillule, anterior (D); l, maxilla, anterior (D).



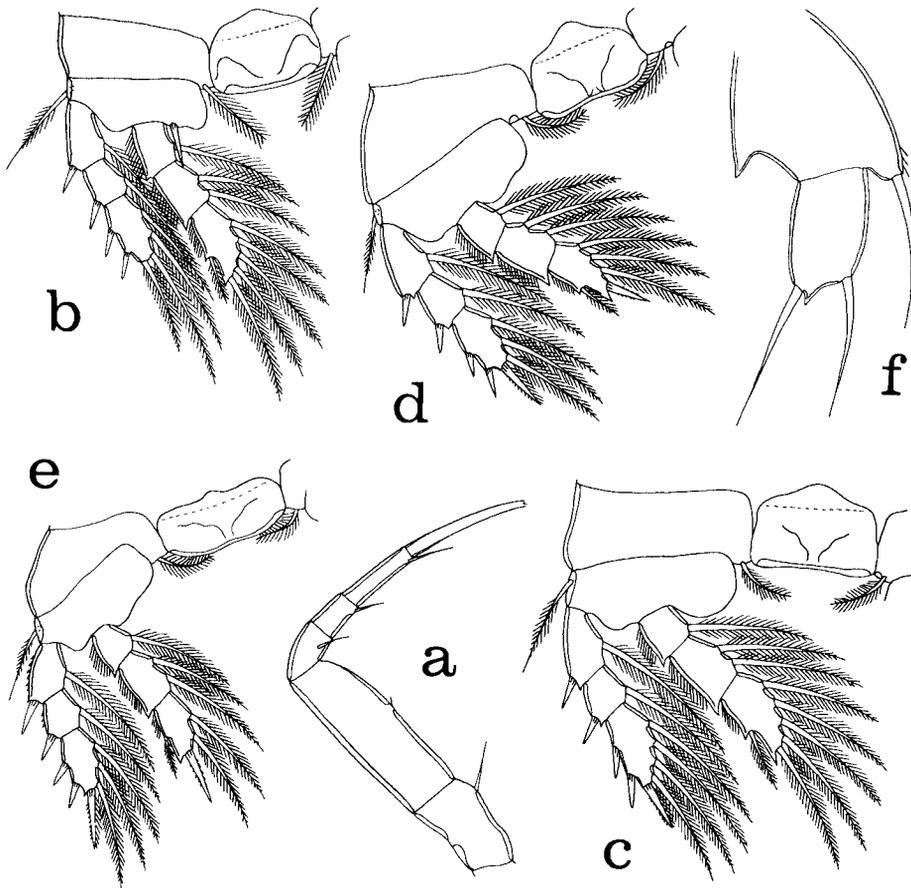


Fig. 8. *Ophiurocheres bellulus* gen. nov. & spec. nov. Female. a, maxilliped, anterior (scale D; for scales, see fig. 1); b, leg 1 and intercoxal plate, anterior (F); c, leg 2 and intercoxal plate, posterior (F); d, leg 3 and intercoxal plate, anterior (F); e, leg 4 and intercoxal plate, anterior (F); f, leg 5, ventral (G).

Legs 1-4 (fig. 8b-e) with 3-segmented rami. Spine and setal formula as follows :

P ₁	coxa 0-1	basis 1-I	exp I-1; enp 0-1;	I-1; 0-2;	II,2,2 1,5
P ₂	coxa 0-1	basis 1-0	exp I-1; enp 0-1;	I-1; 0-2;	II,1,4 1,5
P ₃	coxa 0-1	basis 1-0	exp I-1; enp 0-1;	I-1; 0-2;	II,1,3 1,1,3
P ₄	coxa 0-1	basis 1-0	exp I-1; enp 0-1;	I-1; 0-2;	II,1,3 1,1,2

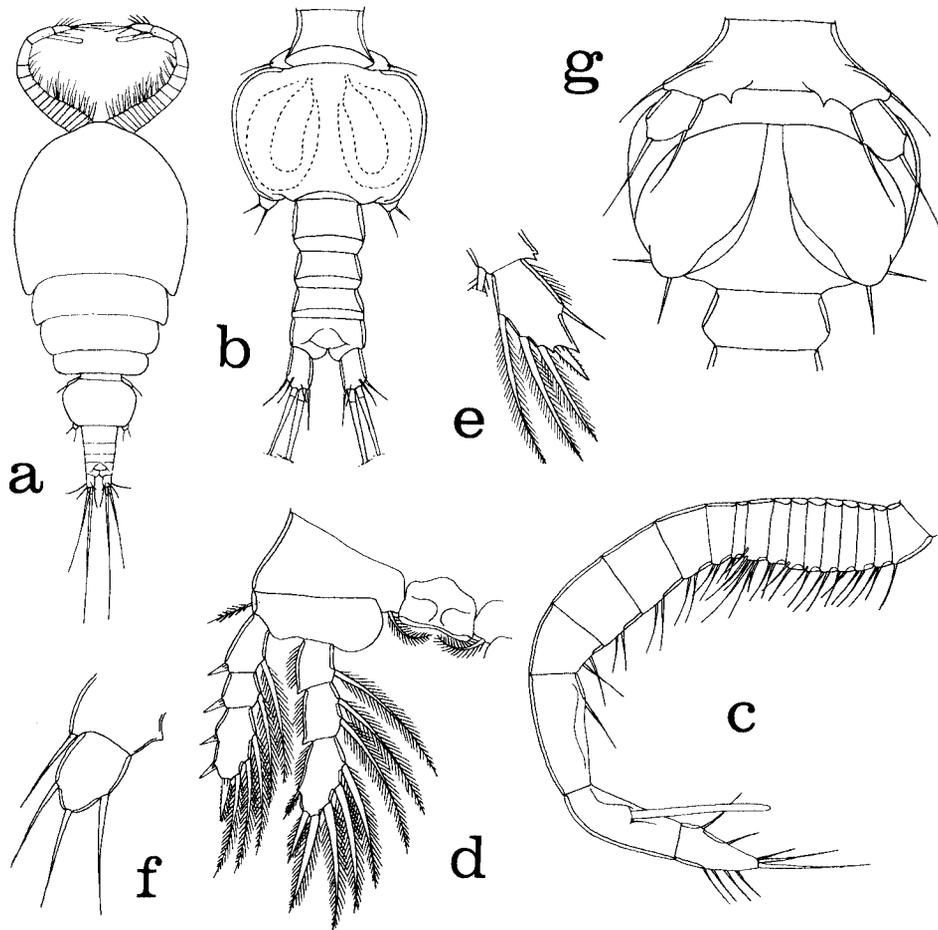


Fig. 9. *Ophiurocheres bellulus* gen. nov. & spec. nov. Male. a, body, dorsal (scale E; for scales, see fig. 1); b, urosome, dorsal (F); c, antennule, posterior (D); d, leg 1 and intercoxal plate, anterior (F); e, third segment of endopod of leg 3, anterior (D); f, leg 5, dorsal (G); g, somite bearing leg 5, genital somite, and first postgenital somite, ventral (D).

Leg 1 with inner spine on basis $14\ \mu\text{m}$.

Leg 5 (figs 7c, 8f) with first segment incompletely separated from body somite, bearing outer distal seta $23\ \mu\text{m}$ with few adjacent small spinules, produced inwardly in sharply pointed process. Second segment $18 \times 11\ \mu\text{m}$, bearing 2 setae $29\ \mu\text{m}$ and $23\ \mu\text{m}$, with small spiniform process between them.

Leg 6 bearing 2 small setae (fig. 7b).

Colour of living specimens in transmitted light opaque white, eye pale red.

Male.— Body (fig. 9a) resembling that of female in general form. Length $0.31\ \text{mm}$ ($0.30\text{--}0.34\ \text{mm}$) and greatest width $0.15\ \text{mm}$ ($0.14\text{--}0.17\ \text{mm}$), based on 10 specimens. Greatest dorsoventral thickness $0.11\ \text{mm}$. Ratio of length to width of prosome 1.32:1. Ratio of length of prosome to that of urosome 2.09:1.

Somite bearing leg 5 (fig. 9b) $12 \times 33 \mu\text{m}$. Genital somite $39 \times 62 \mu\text{m}$, much wider than long, lateral margins with slight shoulders anteriorly, tapered posteriorly. Four postgenital somites from anterior to posterior 13×25 , 10×23 , 6×22 , and $11 \times 24 \mu\text{m}$.

Caudal ramus (fig. 9b) resembling that of female, but slightly smaller, $13 \times 10.5 \mu\text{m}$.

Body surface as in female.

Rostrum like that of female. Antennule (fig. 9c) 18-segmented, in all males preserved in 70% ethanol extended forward as in fig. 9a. Armature: 1, 2, 2, 2, 2, 2, 2, 6, 2, 2, 2, 2, 2, 1, 1 aesthetasc, and 9, respectively. Lengths of segments: 5 ($8 \mu\text{m}$ along anterior margin), 4, 4, 4, 4, 5, 5, 5, 7, 3, 7, 8, 12, 13, 11, 24, 23, and $18 \mu\text{m}$. Aesthetasc on segment 17. Antenna as in female.

Oral cone, mandible, maxillule, maxilla, maxilliped, and ventral area between maxillipeds and first pair of legs as in female.

Leg 1 like that of female. Leg 2 (fig. 9d) similar to that of female, but showing sexual dimorphism in having stout setae on third segment of endopod. Leg 3 similar to that of female but showing very slight sexual dimorphism in slightly stouter setae on third segment of endopod (fig. 9e). Leg 4 as in female.

Leg 5 (fig. 9f) with first segment having small inner prominence and outer seta, second segment small, $11 \times 9 \mu\text{m}$, bearing 3 setae.

Leg 6 (fig. 9g) posteroventral flap on genital somite bearing 2 small setae.

Spermatophore not seen.

Colour as in female.

Etymology.— The specific name *bellulus*, Latin meaning rather pretty or neat, refers to the general form of the body.

Remarks.— The 44 presently known genera in the Asterocheridae have been described in varying detail and thoroughness. However, the new genus may be distinguished from all these genera by a few selected characters. In 37 asterocherid genera the female has two postgenital somites, unlike *Ophiurocheres*, which has three such somites. The remaining seven genera (with three postgenital somites in the female) may be separated from the new genus as follows: in *Asterocheroides* Malt, 1991, *Cheromyzon* Humes, 1989, *Collocheres* Canu, 1893, *Dermatomyzon* Claus, 1889, and *Glyptocheres* Humes, 1987, the free segment of leg 5 bears more than two setae; in *Australomyzon* Nicholls, 1994, the siphon is elongate, and in *Collocherides* Stock, 1971, the third segment of the exopod of leg 1 bears III,4, and the same segment of leg 3 has III,I,3.

In six genera the endopod of leg 4 has fewer than three segments or is absent (thus distinguishing them from *Ophiurocheres*): 2-segmented in *Discopontius* Nicholls, 1944, *Pelatomyzon* Stock, 1975, and *Siphonopontius* Malt, 1991; a single lobe in *Cystomyzon* Stock, 1981, and *Oedomyzon* Stock, 1981; or absent in *Tuphocheres* Stock, 1965. *Ophiurocheres* possesses two characters which in combination distinguish it from all remaining genera, the third segment of the exopod of leg 1 with II,2,2, and the third segment of the endopod of leg 4 with 1,I,2.

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