

## ***Collocherides bleptus* n. sp. (Copepoda: Siphonostomatoida) associated with an intertidal ophiuroid in Madagascar**

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### **Abstract**

*Collocherides bleptus* n. sp. is associated with a brittle star, *Macrophiolithrix* sp., at Nosy Bé, in northwestern Madagascar. The new copepod differs from its two congeners by its larger size and by having leg 5 in the female with an elongate distal segment bearing only two setae.

### **Résumé**

*Collocherides bleptus* n. sp. est associée d'une Ophiure, *Macrophiolithrix* sp., à Nosy Bé, au nord-est de Madagascar. Le Copépode nouveau diffère de ses deux congénères par sa taille plus grande et par la cinquième patte de la femelle ayant un deuxième segment allongé portant deux soies seulement.

### **Introduction**

The siphonostomatoid genus *Collocherides* Stock, 1971, is close to *Collocheres* Canu, 1893, but differs in having reduced armature on the third segment of the exopod in legs 1–3. Two species are recognized in *Collocherides*. *Collocherides astroboae* Stock, 1971, is associated with *Astroboa nuda* (Lyman) in the Gulf of Aqaba and in the Dahlak Archipelago in the Red Sea (Stock, 1971) and in northwestern Madagascar (Humes, 1973). This species has also been reported from *Astroboa albatrossi* Döderlein in Indonesia (Stock, 1971). *Collocherides singularis* Humes, 1986, is an associate of *Astroboa nuda* in the Moluccas (Humes, 1986).

A new species of *Collocherides* associated with an ophiotrichid ophiuroid in Madagascar is herein described.

### **Taxonomic part**

Siphonostomatoida Thorell, 1859  
Asterocheridae Giesbrecht, 1895  
*Collocherides* Stock, 1971

*Collocherides bleptus* n. sp.  
(Figs. 1a–i, 2a–j, 3a–i)

Type material. – 520 specimens from 20 ophiuroids, *Macrophiolithrix* sp., intertidal, under dead coral, Befefika, Nosy Bé, northwestern Madagascar, 7 October 1964. Holotype ♀ (USNM 259327), allotype ♂ (USNM 259328), and 380 paratypes (265 ♀♀, 115 ♂♂) (USNM 259329) deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; 20 paratypes (10 ♀♀, 10 ♂♂) in the Zoölogisch Museum, University of Amsterdam (ZMA Crust. Co 200415); and the remaining paratypes and 27 copepodids in the collection of the author.

Female. – Body (Fig. 1a, b) slender. Specimens preserved in 70% ethanol, seen in lateral view, with urosome at 60° angle with prosome. Length 0.77 mm (0.75–0.78 mm) and greatest width 0.18 mm (0.17–0.20 mm), based on 10 specimens in lactic acid. (Length and width measured on specimens in depression slide with cover glass exerting minimal

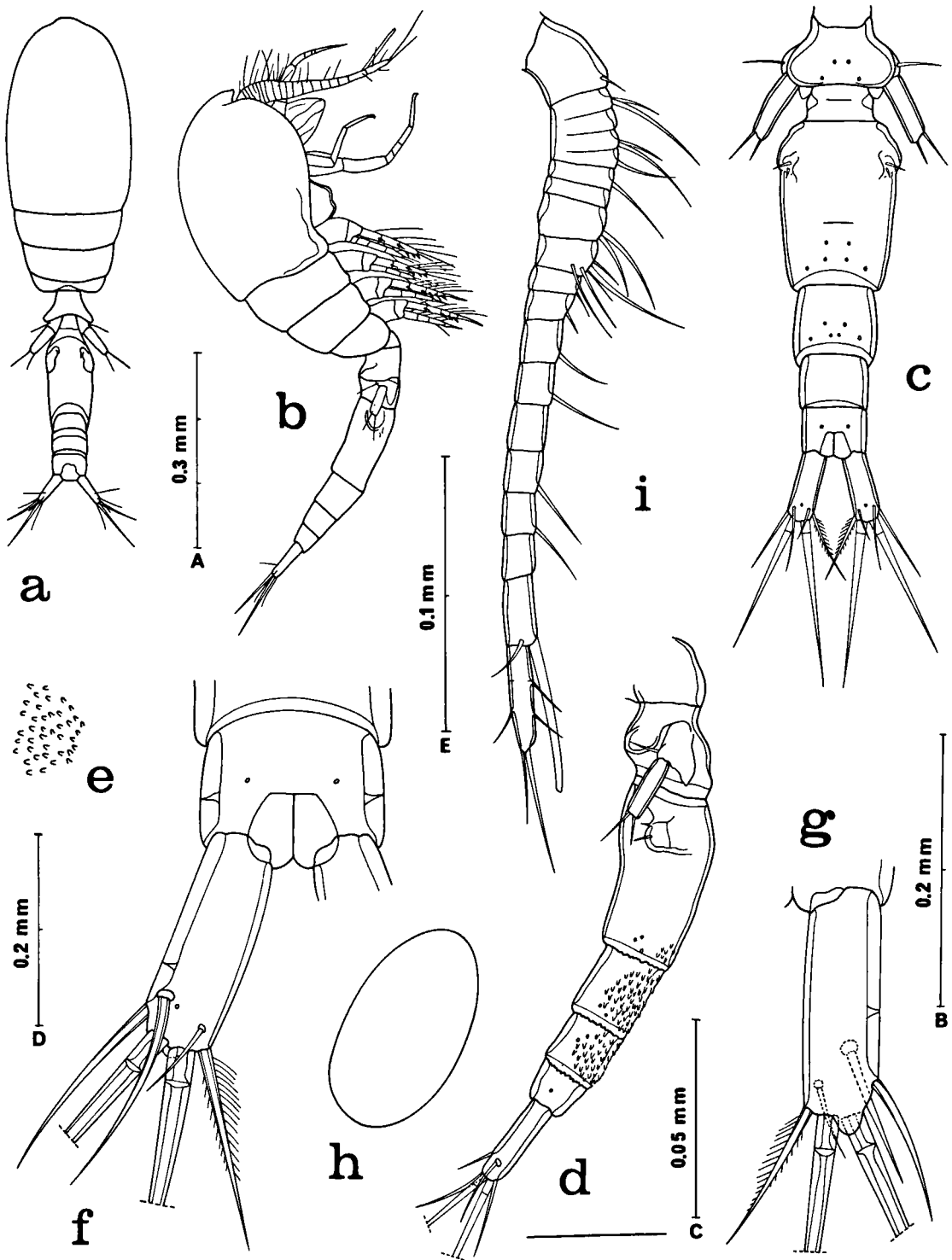


Fig. 1a–i. *Collocherides bleptus* n. sp., ♀: a, habitus, dorsal, foreshortened (scale A); b, lateral (A); c, urosome, dorsal (B); d, urosome, lateral (B); e, central part of second postgenital somite showing small surficial spines, ventral (C); f, anal somite and caudal ramus, dorsal (C); g, caudal ramus, ventral (C); h, egg, ventral (D); i, antennule, antero-outer (E).

pressure.) Greatest dorsoventral thickness of prosome at level of ventral prominence 0.20 mm. Somite bearing leg 1 fused with cephalosome. Ratio of length to width of prosome 2.2 : 1. Ratio of length of prosome to that of urosome 1.14 : 1.

Somite bearing fifth pair of legs (Fig. 1c)  $65 \times 86 \mu\text{m}$ . Genital double somite elongate,  $120 \mu\text{m}$  long,  $86 \mu\text{m}$  wide anteriorly, and  $70 \mu\text{m}$  wide at level of slight median dorsal transverse line of division. Genital areas located laterally (Fig. 1d) in anterior third of genital somite, each area bearing 2 minute setae. Three postgenital somites from anterior to posterior  $55 \times 57$ ,  $36 \times 47$ , and  $26 \times 44 \mu\text{m}$ .

Caudal ramus (Fig. 1f, g) elongate,  $55 \times 20 \mu\text{m}$ , ratio 2.75 : 1. Outer lateral seta, set somewhat dorsally,  $50 \mu\text{m}$ , dorsal seta  $15 \mu\text{m}$ , outermost terminal seta  $52 \mu\text{m}$ , 2 long terminal setae  $122 \mu\text{m}$  (outer) and  $138 \mu\text{m}$  (inner), all smooth. Innermost terminal seta  $52 \mu\text{m}$ , with lateral setules, those on inner margin longer. Distal end of caudal ramus with ventral rounded protrusion (Fig. 1g).

Body surface with few refractile points (sensilla?). Ventral and lateral surfaces of genital double somite and first 2 postgenital somites with numerous scalelike spines (Fig. 1d, e).

Egg sac (seen on 10 females) containing single relatively large egg  $220 \times 132 \mu\text{m}$  (Fig. 1h).

Rostral area slightly raised in lateral view (Fig. 1b), but weakly defined. Antennule (Fig. 1i)  $258 \mu\text{m}$  long, 20-segmented (though separation of segments 2–5 is incomplete and indistinct). Aesthete on segment 18. Armature: 1, 2, 0, 2, 1, 1, 0, 2, 5, 1, 1, 1, 0, 1, 1, 0, 1 + aesthete, 1, and 4, respectively. Lengths of segments (measured along their posterior or nonsetiferous margins): 14 ( $27 \mu\text{m}$  along anterior margin), 17.5 (comprising segments 2–5), 5.5, 6, 16.5, 10, 8, 12, 14, 14, 15, 15, 15, 16, 22, 13, and  $27 \mu\text{m}$ . Segments 2–5 distinctly separated on anterior margin but united on posterior margin. Antenna (Fig. 2a)  $156 \mu\text{m}$  long, basis elongate with exopod having minute free segment bearing 2 very small setae. Endopod 2-segmented, both segments with 1 seta, and terminal claw  $39 \mu\text{m}$  long with slightly recurved blunt tip.

Oral cone prominent in lateral view (Fig. 1b) but relatively short,  $104 \mu\text{m}$  long (Fig. 2b). Mandible (Fig. 2c) with long stylet ( $65 \mu\text{m}$ ), armed terminally

with minute teeth; palp 1-segmented with long seta. Maxillule (Fig. 2d) with broad outer lobe bearing 3 setae, more slender inner lobe having 2 unequal setae. Maxilla (Fig. 2e) 2-segmented with slender terminal claw. Maxilliped (Fig. 2f) slender, syncoxa and elongate basis without setae; endopod 3-segmented, each segment with 1 seta; terminal slender claw with blunt recurved tip.

Appendages of cephalosome arranged as in Fig. 2g. Ventral area between maxillipeds and first pair of legs with median protrusion (Fig. 2g, h).

Legs 1–4 (Figs. 2i, j, 3a, b) biramous with 3-segmented rami. Formula for armature as follows (Roman numerals indicating spines, Arabic numerals representing setae):

$P_1$  coxa 0–0 basis 1–1 exp I–1; I–1; III,2,2  
 enp 0–1; 0–2; 1,2,3  
 $P_2$  coxa 0–0 basis 1–0 exp I–1; I–1; III,I,4  
 enp 0–1; 0–2; 1,2,3  
 $P_3$  coxa 0–0 basis 1–0 exp I–1; I–1; III,I,3  
 enp 0–1; 0–2; 1,I,3  
 $P_4$  coxa 0–0 basis 1–0 exp I–1; I–1; III,I,3  
 enp 0–1; 0–2; 1,I,2

Basis of leg 1 with small inner seta. Endopods of legs 1–4 with second segment having 2 setae.

Leg 5 (Fig. 1d, 3c) with elongate unornamented distal segment  $44 \times 16 \mu\text{m}$ , bearing 2 terminal setae  $18 \mu\text{m}$  and  $26 \mu\text{m}$ . Proximal segment of leg 5 triangular with subacute tip, seta  $22 \mu\text{m}$ . All setae smooth.

Leg 6 represented by 2 small setae on genital area (Fig. 1c, d).

Color of living specimens in transmitted light opaque gray, eye dark red, egg sacs gray.

Male. – Body (Fig. 3d) resembling female in general form. Length 0.71 mm (0.68–0.77 mm) and greatest width 0.17 mm (0.15–0.18 mm), based on 10 specimens in lactic acid. Greatest dorsoventral thickness 0.17 mm. Ratios similar to those of female.

Somite bearing leg 5 (Fig. 3e)  $44 \times 75 \mu\text{m}$ . Genital somite  $75 \times 91 \mu\text{m}$ , wider than long with slightly rounded lateral margins. Four postgenital somites from anterior to posterior  $55 \times 65$ ,  $44 \times 56$ ,  $31 \times 47$ , and  $26 \times 42 \mu\text{m}$ .

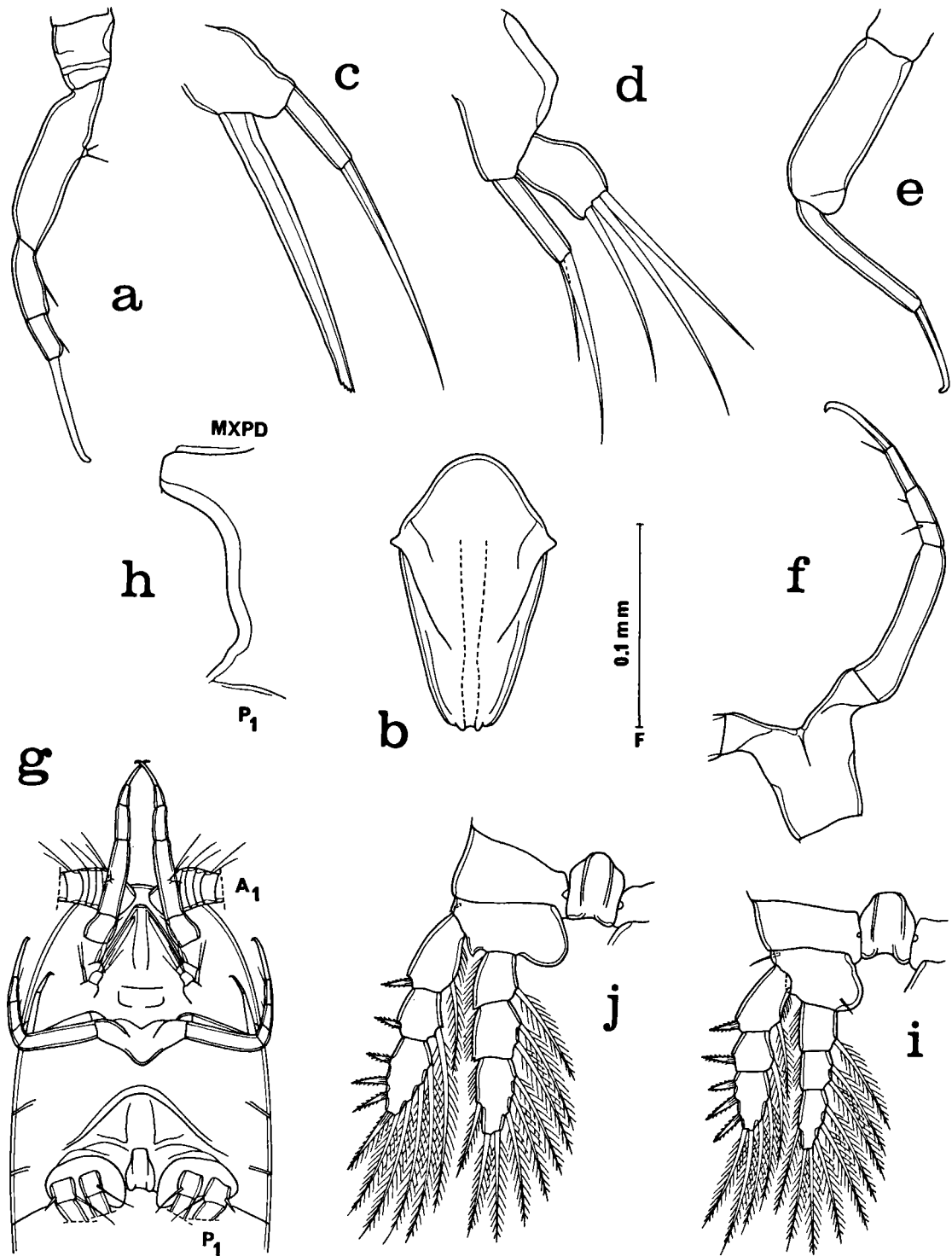


Fig. 2a–j. *Collocherides bleptus* n. sp., ♀: a, antenna, outer (scale E); b, siphon, posterior (E); c, mandible, posterior (C); d, maxillule, posterior (C); e, maxilla, posterior (E); f, maxilliped, posterior (F); g, cephalosome, ventral (B); h, outline of area between maxillipeds and first pair of legs, lateral (C); i, leg 1 and intercoxal plate, anterior (F); j, leg 2 and intercoxal plate, anterior (F). A<sub>1</sub> = antennule, MXPDP = maxilliped, P<sub>1</sub> = leg 1.

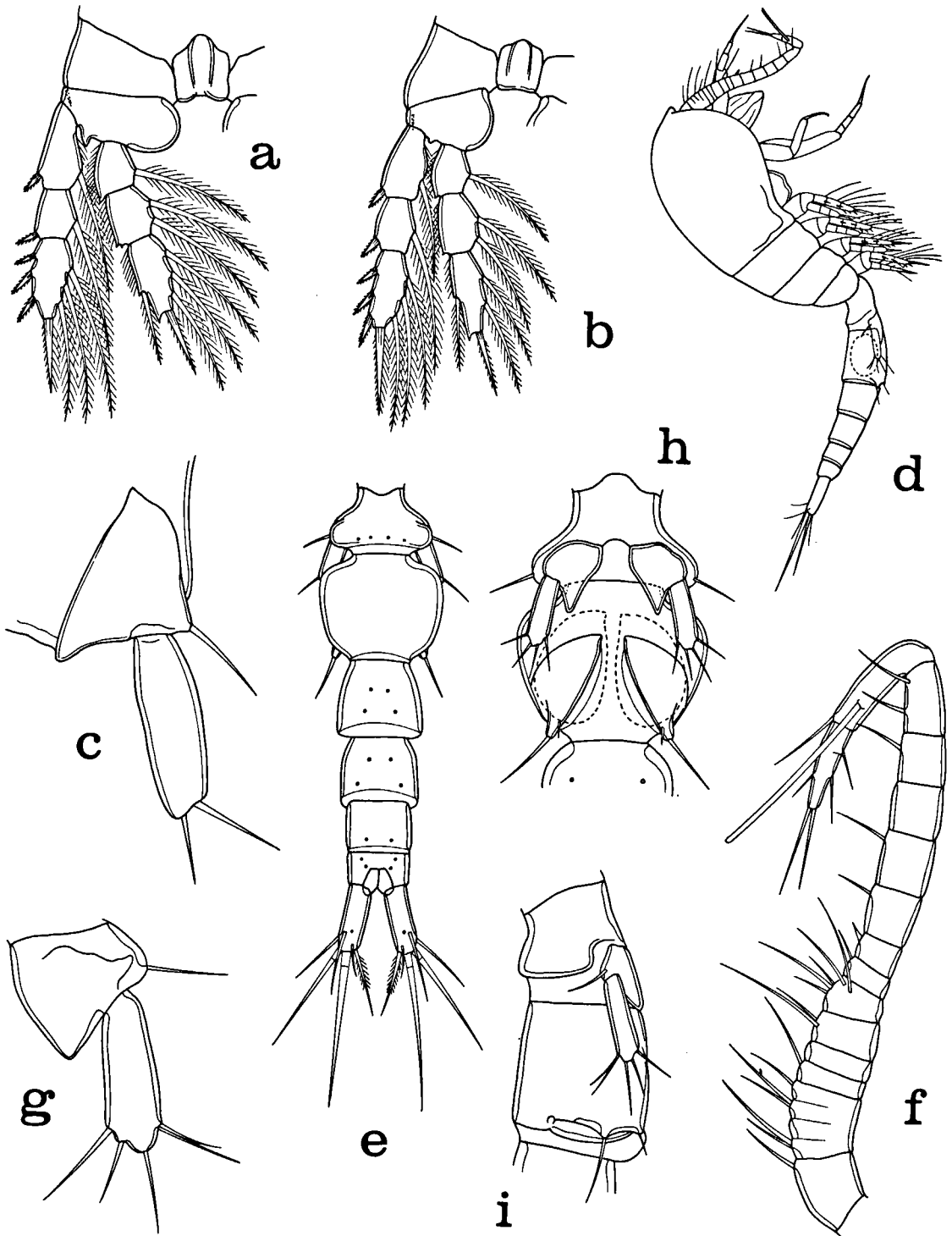


Fig. 3a–i. *Collocherides bleptus* n. sp. (a–c ♀, d–i ♂): a, leg 3 and intercoxal plate, anterior (scale F); b, leg 4 and intercoxal plate, anterior (F); c, leg 5, ventral (C); d, habitus, lateral (A); e, urosome, ventral (B); f, antennule, inner (E); g, leg 5, ventral (C); h, segment bearing fifth pair of legs and genital segment, showing leg 6, ventral (B); i, segment bearing fifth pair of legs and genital segment, showing leg 6, lateral (B).

Table I. Comparison of the three species of *Collocherides*.

	<i>C. astroboae</i>	<i>C. singularis</i>	<i>C. bleptus</i>
Length of female	0.61 mm (0.56–0.63 mm)	0.64 mm (0.63–0.65 mm)	0.77 mm (0.75–0.78 mm)
Length of male	0.52 mm (0.50–0.53 mm)	0.53 mm (0.52–0.54 mm)	0.71 mm (0.68–0.77 mm)
Posteroventral prominence on caudal ramus	spiniform	absent	rounded
Antennule, segments 2–5	entirely separated	entirely separated	not separated along posterior margin
Antenna, exopod	1 setule	1 seta	minute with 2 setae
Leg 5, distal segment, female	suboval	oval, 34 × 21 μm	elongate, 44 × 16 μm
Leg 5, number of setae on distal segment	4 in ♀, 5 in ♂	4 in ♀, 5 in ♂	2 in ♀, 5 in ♂
Leg 5, proximal segment, female	acutely pointed	bluntly rounded	subacutely pointed

Caudal ramus resembling that of female, dimensions 52 × 20 μm.

Rostrum like that of female. Antennule (Fig. 3f) 19-segmented, segment 16 apparently representing fusion of 2 segments seen in female. Last 2 segments incompletely separated. Armature: 1, 2, 0, 2, 1, 1, 0, 2, 5, 1, 1, 1, 1, 0, 1, 2, 1 + 1 aesthete, 1, and 4. Lengths of segments: 18 (26 μm along anterior side), 19 (comprising segments 2–5), 5, 7, 17, 9, 9, 14, 21, 21, 20, 19, 29, 65, 10, and 25 μm. Antenna as in female.

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

Leg 5 (Fig. 3g) with distal segment 41 × 16 μm, its 5 terminal setae from outer to inner 20, 26, 23, 17, and 35 μm. Lateral seta on proximal segment 24 μm. All setae smooth.

Leg 6 (Fig. 3h, i) posteroventral flap on genital somite bearing 2 very unequal setae, longer seta 33 μm.

Color as in female.

**Etymology.** – The specific name *bleptus* is from a Greek word meaning worth seeing.

**Remarks.** – *Collocherides bleptus* may be distinguished from both its congeners by features summarized in Table I.

Although all three species of *Collocherides* are associated with Ophiuroidea, the new species, unlike its two congeners living with subtidal basket stars, is found on an intertidal brittle star. The several features of *C. bleptus* listed in Table I may be a reflection of the differences in host and habitat.

Unfortunately, the specimens of the host ophiuroid on which *C. bleptus* was found, although preserved for identification at the time of collection, have, with the passage of a quarter of a century, been lost. However, based on field notes made when the brittle stars were collected, the host has been determined to be *Macrophiothrix* sp.

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