



Communication

# A New Octocorallia-Associated Shrimp of the Genus *Periclimenes* (Crustacea, Caridea, Palaemonidae) from West Africa<sup>†</sup>

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**Abstract:** A new shrimp species of the genus *Periclimenes* is described based on specimens collected in the Bissagos Islands, Guinea-Bissau. Specimens were collected from an unidentified octocoral. This is the ninth species in the genus known to be from the East Atlantic and Mediterranean.

**Keywords:** *Periclimenes*; Palaemonidae; Guinea Bissau; West Africa; Octocorallia-associated shrimp

## 1. Introduction

The caridean shrimp genus *Periclimenes* Costa, 1844 [1], is currently represented by eight species in the eastern Atlantic Ocean and Mediterranean Sea: *P. aegylios* Grippa and d'Udekem d'Acoz, 1996 [2]; *P. amethysteus* (Risso, 1827) [3]; *P. andresi* MacPherson, 1988 [4]; *P. eleftherioui* Koukouras and Turkey, 1996 [5]; *P. granulatus* Holthuis, 1950 [6]; *P. kornii* (Lo Bianco, 1903) [7]; *P. sagittifer* (Norman, 1861) [8]; and *P. scriptus* (Risso, 1822) [9,10]. *Periclimenes wirtzi* d'Udekem d'Acoz, 1996 [10] was recently transferred to the genus *Michaelimenes* Okuno, 2017 [11], by Anker et al. (2023) [12].

Recent collecting (2023) by the second author and collaborators in the Bissagos Islands, Guinea-Bissau, yielded a yet undescribed species of *Periclimenes* associated with unidentified Octocorallia. The species is herein described and illustrated.

## 2. Materials and Methods

Material was collected while scuba diving during fieldwork in the Bissagos Islands, Guinea-Bissau, in May 2023 by the second author. Specimens were studied with a dissecting stereomicroscope (Zeiss Discovery.V8) and a compound microscope (Olympus BX53) both provided with a drawing tube. All figures were drawn by the first author. Drawings were scanned (Canon CanoScan 9000F) with a resolution of 600 dpi and subsequently mounted into plates using Adobe Photoshop software version 25.1.0 (Adobe Systems). Post-orbital carapace length (pocl.) was measured from the posterior margin of the orbit to the posterior margin of the carapace; rostral characters (R) are formulated as R = number of postorbital dorsal teeth + number of dorsal teeth on rostrum proper/number of ventral rostral teeth. Specimens were deposited in the Naturalis Biodiversity Center (formerly Rijksmuseum van Natuurlijke Historie (RMNH)), Leiden, The Netherlands.

## 3. Systematic Account

Genus *Periclimenes* Costa, 1844 [1].

*Periclimenes africanus* sp. nov.

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Figures 1–6.

Type material. RMNH.CRUS.D.59333: holotype female, pocl. 1.7 mm, R = 2 + 7/2; Guinea-Bissau, Bissagos Islands, 11.1785° N 16.5217° W, 5.v.2023, 12 m depth, scuba diving



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to wreck, on Octocorallia, collected by Peter Wirtz. RMNH.CRUS.D. 59334: paratypes: male, pocl. 2.5 mm,  $R = 2 + 7/1$ ; male, pocl. 2.5 mm, rostrum broken; female, pocl. 1.5 mm,  $R = 2 + 6/2$ ; male, pocl. 2.8 mm,  $R = 2 + 8/2$ ; male, pocl. 1.7 mm,  $R = 2 + 6/1$ ; specimen, second pleopods missing, pocl. 1.6 mm,  $R = 2 + 6/1$ ; male, pocl. 1.4 mm,  $R = 2 + 5/2$ : same data as holotype.

Comparative material *P. sagittifer* (Norman, 1861) [8]: RMNH.CRUS.D.37932: ovigerous female, pocl. 6.1 mm; France, SW coast, Quéthary, depth of 1–4 m, 22.vii.1986, collected by J.C. den Hartog.

Comparative material *P. scriptus* (Risso, 1822) [9]: RMNH.CRUS.D.15121: ovigerous female, pocl. 4.1 mm; France, Alpes-Maritimes, Villefranche sur Mer, -vi.1957, collected by A. Portmann.

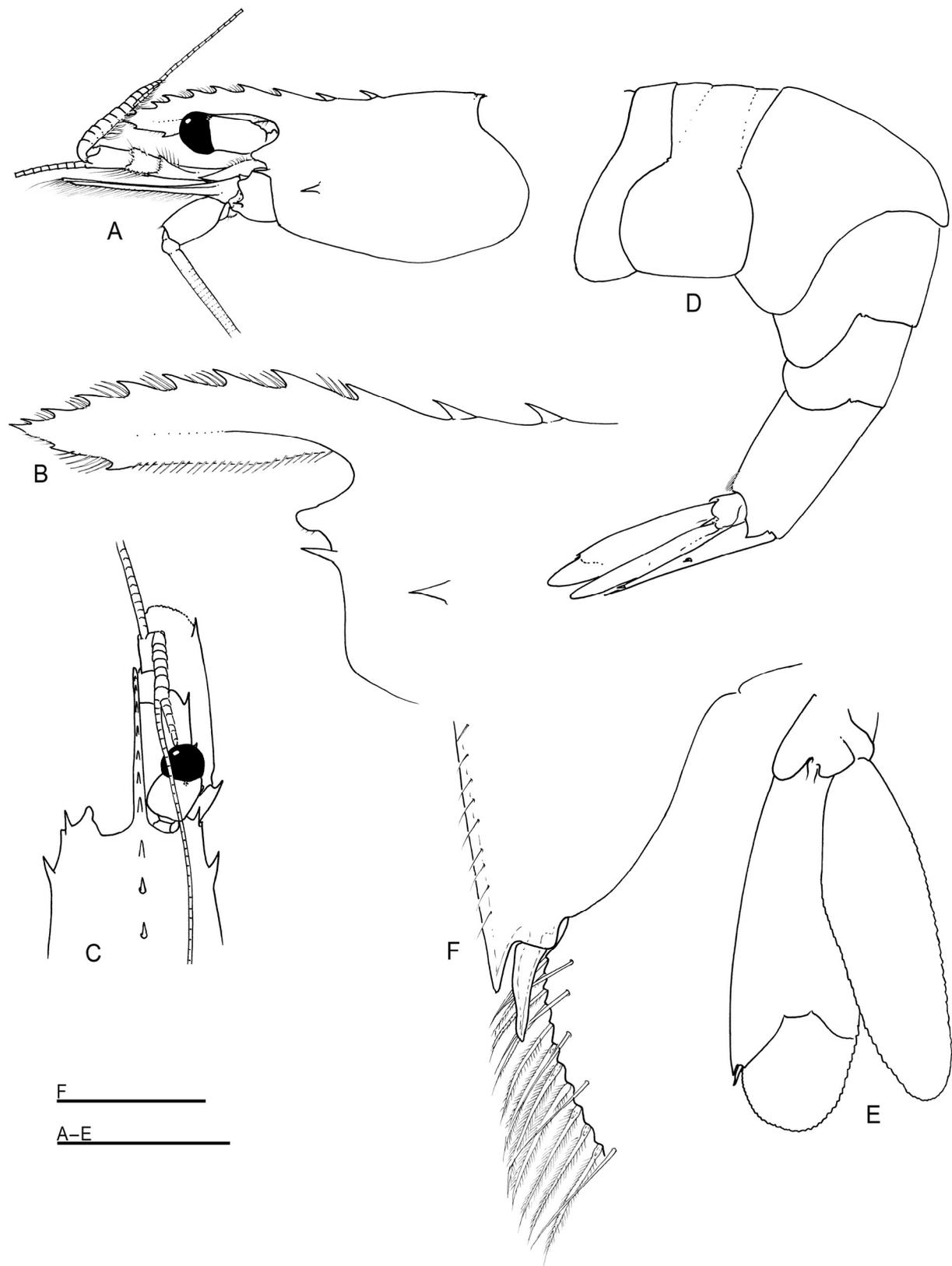
Description. Small-sized, rather slender shrimp, with slender pereopods. Carapace smooth. Rostrum (Figure 1A,B and Figure 6D,E) well-developed, reaching from distal margin of intermediate segment to middle of distal segment of antennular peduncle; lamina moderately deep, lateral carina distinct proximally, situated near ventral margin; ventral margin slightly sinuous with one or two teeth in distal third with double row of plumose setae proximally; dorsal margin convex, slightly elevated, strongly compressed, with eight or nine subequal teeth of which posterior two teeth situated well behind posterior margin of orbit, both (seldom one) separated from carapace by suture, without plumose setae in front; teeth on rostrum proper slightly more closely spaced than postorbital articulating teeth, with few plumose setae in front. Supra-orbital teeth absent. Inferior orbital angle well-developed, produced, broadly rounded in lateral view. Antennal tooth strong, acute, marginal, situated well below inferior orbital angle. Hepatic tooth approximately as strong as antennal tooth, situated well behind level of posterior orbital margin and slightly below level of antennal tooth. Anterolateral angle of carapace (Figure 1A,B) bluntly rounded, not produced.

Pleon (Figure 1D) smooth. Third pleonite produced posterodorsally. Pleura all broadly rounded. Sixth abdominal pleonite twice as long as fifth; posteroventral angle feebly produced, rounded; posterolateral angle acute.

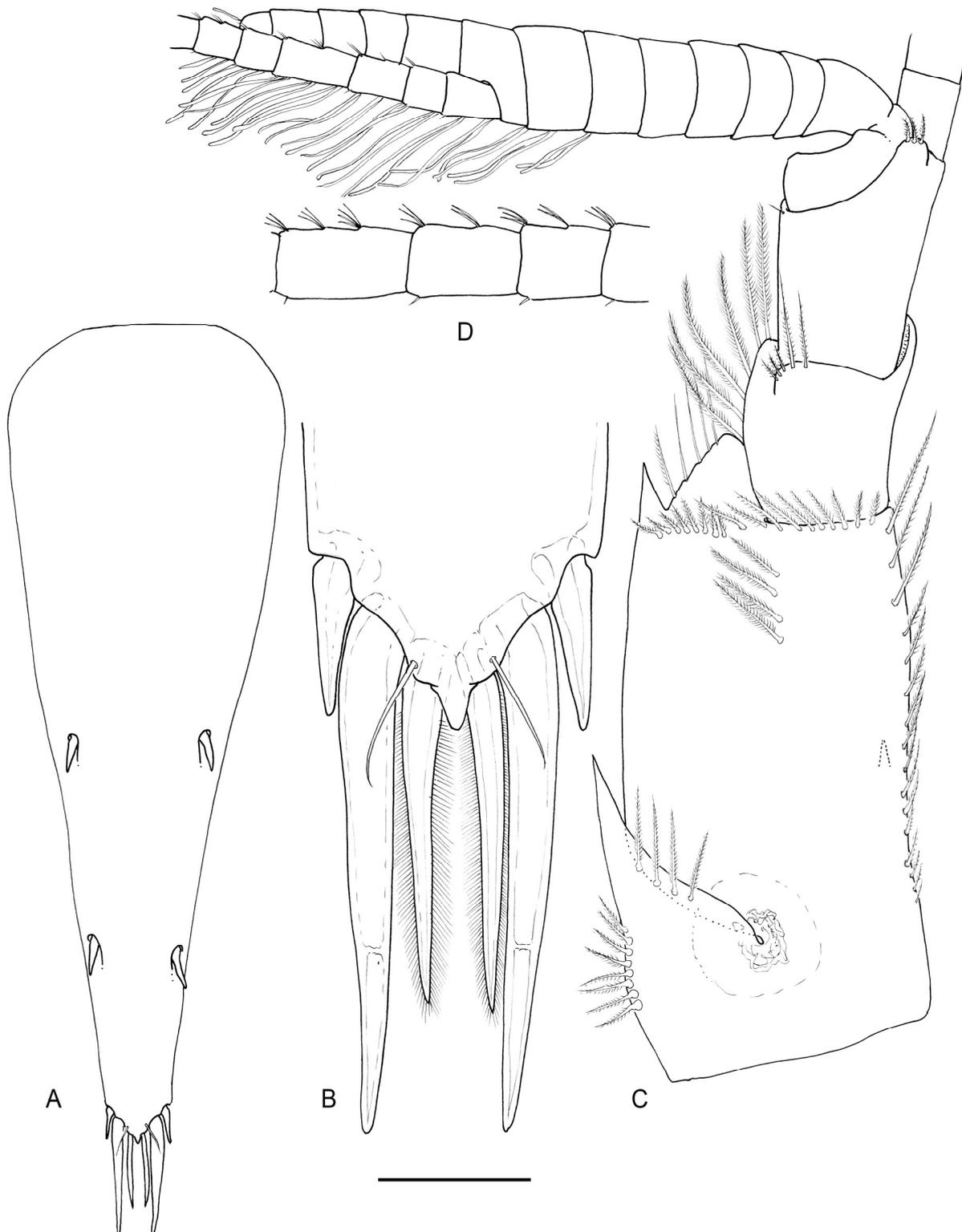
Telson (Figure 2A) 0.95 times as long as sixth pleonite and 3.1 times longer than anterior width; lateral margins slightly converging posteriorly; two pairs of medium-sized submarginal dorsal cuspidate setae present at 0.50 and 0.75–0.80 of telson length; posterior margin (Figure 2B) 0.25 of anterior width, with median acute process, with three pairs of spiniform setae; lateral pair short, about as long as dorsal cuspidate setae; intermediate spiniform setae well-developed, about 0.07 of telson length, 1.5 times length of submedian, spiniform, with plumose setae.

Eyes (Figure 1A) well-developed; cornea globular, with distinct accessory pigment spot dorsolaterally; eyestalks twice as long as proximal width.

Antennular peduncle (Figure 2C) with proximal segment twice as long as wide; lateral margin slightly convex, almost straight; anterolateral margin produced, with strong distolateral tooth and row of setae; medial ventral margin with tooth; stylocerite slender, acute, reaching middle of segment; statocyst containing granular statolith; intermediate segments short, slightly longer than wide; distal segment twice as long as wide; upper outer flagellum biramous, with first seven or eight segments fused; short free ramus with six segments; longer free ramus long and slender; lower inner flagellum slender, approximately as long as upper flagellum; flagella with brushes of two or three short setae (Figure 2D).



**Figure 1.** *Periclimenes africanus* sp. nov., male, pocl. 2.8 mm. (A) Carapace and anterior appendages, lateral view; (B) rostrum, lateral view; (C) anterior appendages, dorsal view; (D) abdomen, lateral view; (E) left uropod, dorsal view; (F) idem, detail distolateral part exopod. Scales (A,C–E) = 2 mm; (B) = 1 mm; (F) = 0.25 mm.



**Figure 2.** *Periclimenes africanus* sp. nov. (A,B) male, pochl. 2.5 mm; (C,D) male, pochl. 2.8 mm. (A) Telson, dorsal view; (B) idem, detail tip; (C) left antennula, dorsal view; (D) idem, detail of outer ramus of outer flagellum. Scales (A,C) =0.5 mm; (B) =0.125 mm; (D) =0.25 mm.

Antennal basicerite (Figure 3A) with moderately developed lateral tooth; ischiocerite and merocerite normal; carpuccerite about twice as long as wide, reaching 0.35 of length of scaphocerite; scaphocerite three times longer than maximal width, with lamella reaching

distal margin of antennular peduncle; lateral border straight, ending in acute, large distolateral tooth; lamella extending beyond distolateral tooth, feebly angulated distomedially.

Epistome and labrum without special features.

Second and third thoracic sternites unarmed. Fourth thoracic sternite without medial process, with shallow lateral carinae posteromedial of first pereopods. Fifth thoracic sternite with shallow lateral plates posteromedial of second pereopods. Sixth to eighth thoracic sternites unarmed.

Mandible (Figure 3B) with cylindrical molar process bearing four large blunt teeth distally and few brushes of setae in between; incisor process slender, with three well-developed teeth distally in left mandible, of which lateralmost and medialmost teeth slightly enlarged; without palp.

Maxillula (Figure 3C) with upper lacinia subrectangular with row of few spines and serrulate setae medially; lower lacinia slenderer, with few serrulate setae distally; palp bilobed, medial lobe with single short recurved simple seta.

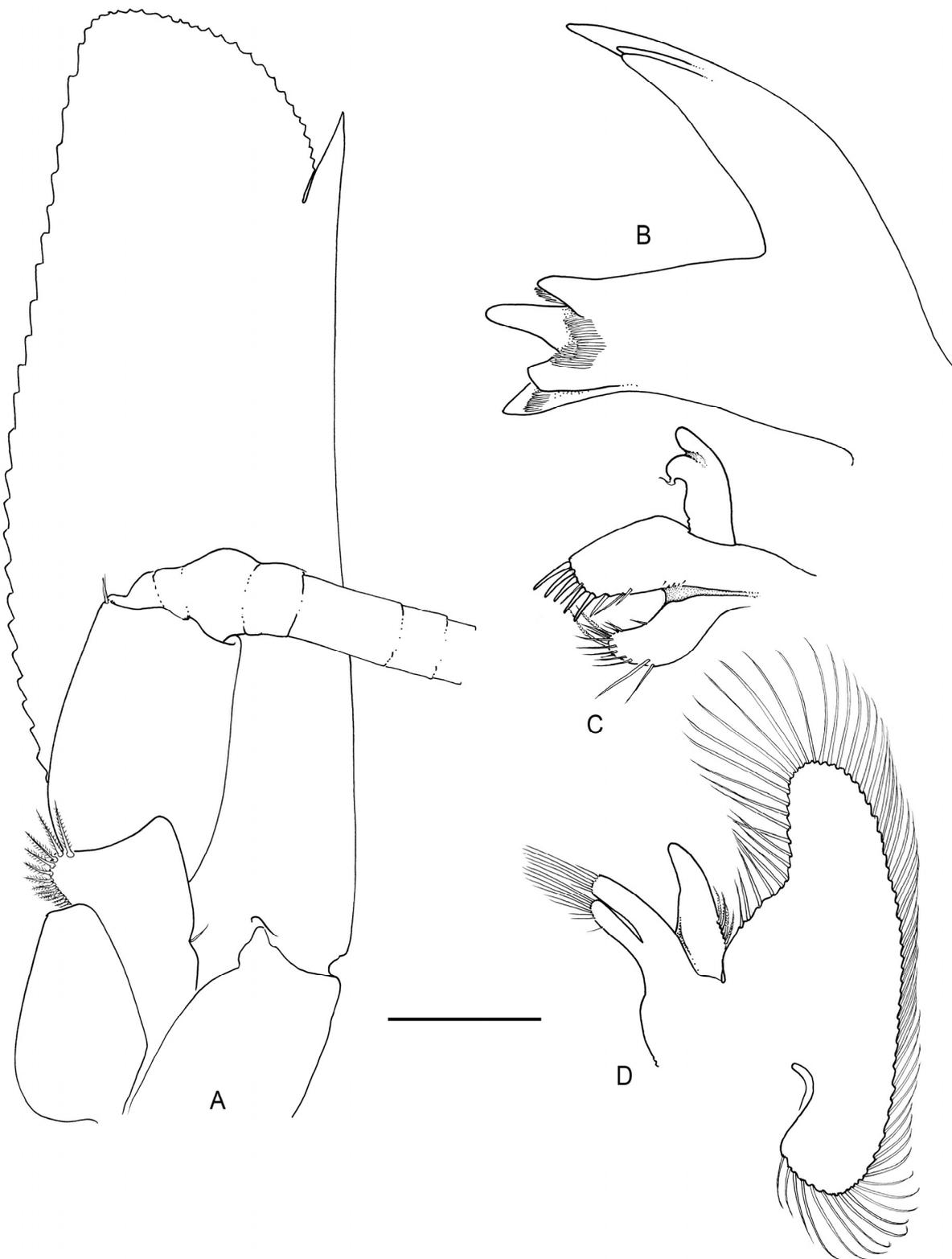
Maxilla (Figure 3D) with short tapering non-setose palp with few plumose setae laterally; basal endite well-developed, distinctly bilobed, with long simple setae medially; coxal endite obsolete, median margin convex, without setae; scaphognathite normal, widest centrally, about 2.3 times longer than broad, with marginal plumose setae.

First maxilliped (Figure 4A) with slender, tapering palp with one plumose seta distally; basal region broad, not distinctly separated from coxal region; median margin of coxa and basis provided with setulose and slender simple setae; caridean lobe distinct, with coarsely setulose plumose marginal setae; flagellum of exopod well-developed with four long plumose distal setae and few short subdistal setae; epipod triangularly bilobed.

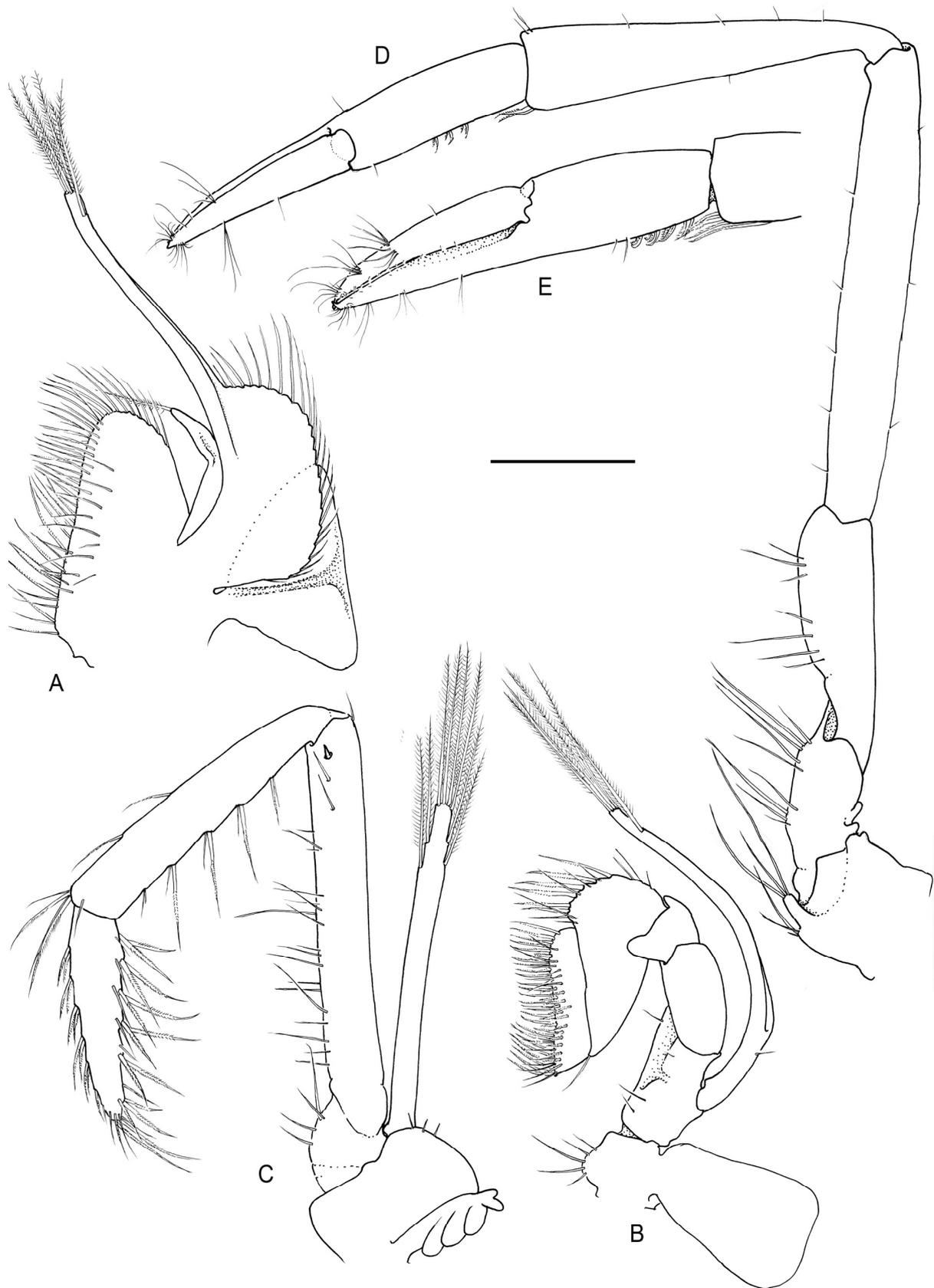
Second maxilliped (Figure 4B) with dactylar segment narrow, about four times longer than wide, straight medially, densely fringed with numerous coarsely serrulate, spiniform, and long curled, finely serrulate setae medially; propodal segment longer than dactylar segment, almost twice as long as wide; distomedial margin rounded, with few long serrulate and simple setae; carpal segment short, unarmed; meral segment short, posteriorly excavate; ischium excavate, fused to basis; basis with long slender exopod exceeding length of endopod, with four long plumose setae distally and few plumose setae subdistally; coxa produced medially, with rounded oblong rectangular epipod laterally.

Third maxilliped (Figure 4C) slender; terminal segment 4.0 times longer than proximal width, 0.7 times length of penultimate segment, with rows of serrulate and simple setae medially; penultimate segment slender, 5.8 times longer than wide; meral and ischial segments fused, 1.3 times longer than penultimate segment, with long setae along medial margin; basal segment short; medial margin convex with few long setae; exopod reaching 0.8 of ischiomerid segment, with four plumose setae distally and few subdistally; coxa slightly produced medially, with rounded lateral plate, with arthrobranch.

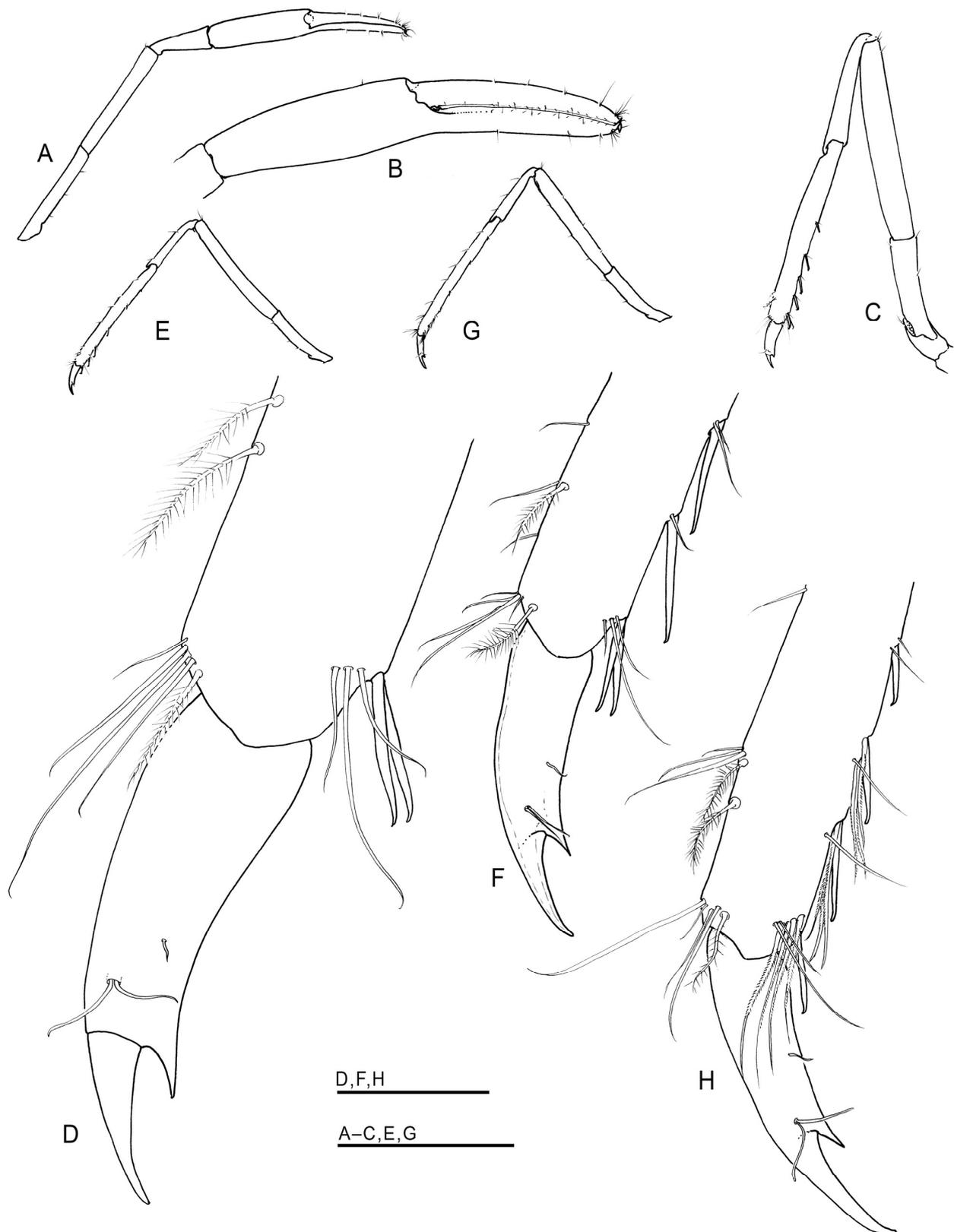
First pereopod (Figure 4D) slender, almost reaching distal margin of scaphocerite; chela (Figure 4E) with palm subcylindrical, straight, twice as long as height; fingers slightly longer than palm, straight, not subspatulate, with brushes of few setae in distal part, cutting edges entire, tips of fingers hooked; carpo-propodal brush well-developed; carpus 1.1 times length of chela, 4.4 times longer than distal width; merus 1.3 times carpus length, about twice length of ischium; ischium with few long simple setae medially; basis short, with few long simple setae medially; coxa with small medial protuberance with long simple seta.



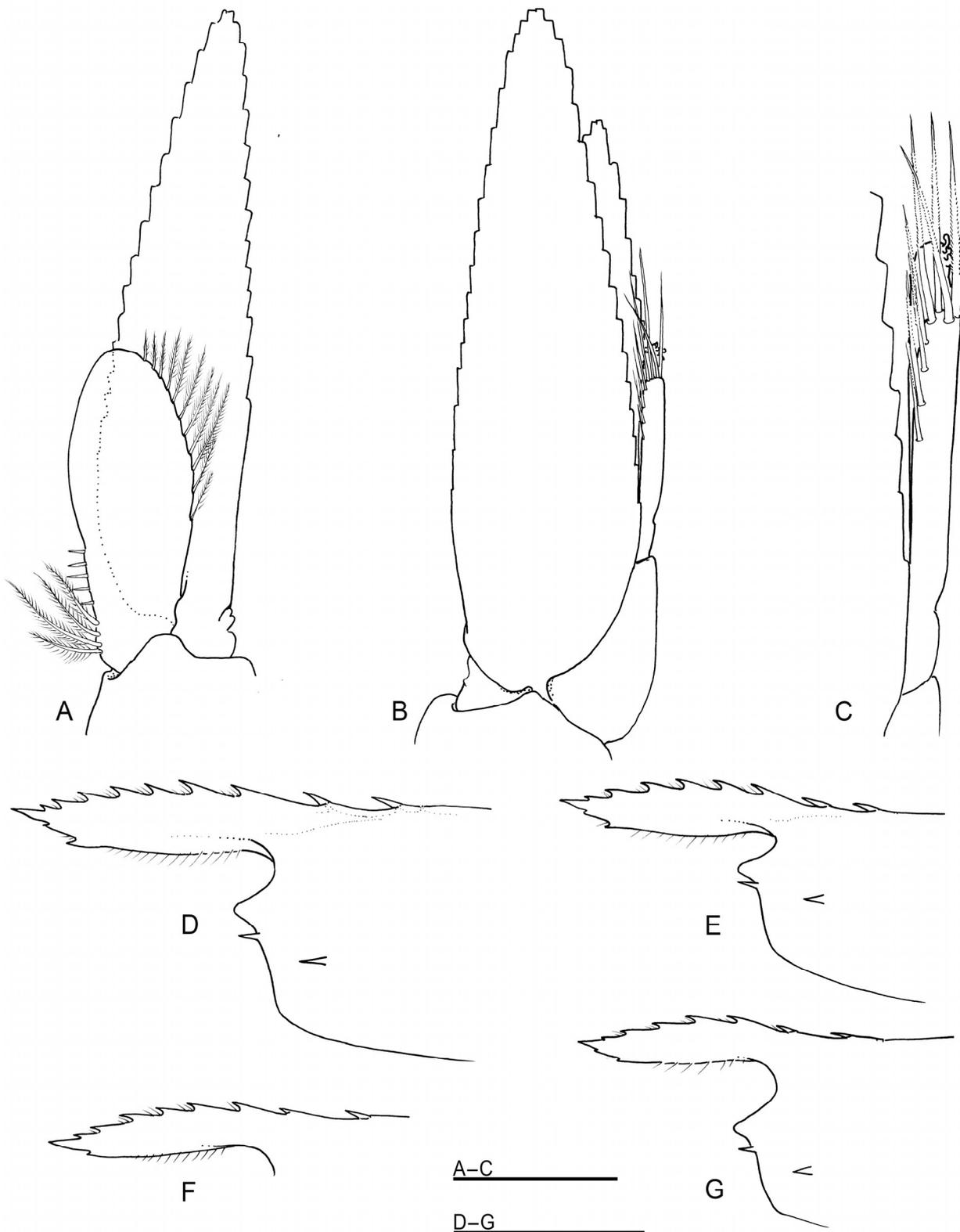
**Figure 3.** *Periclimenes africanus* sp. nov., male, pocl. 2.8 mm. (A) Left antenna, ventral view; (B) left mandible, ventral view; (C) left maxillula, ventral view; (D) left maxilla, ventral view. Scales (A,C,D) =0.5 mm; (B) =0.25 mm.



**Figure 4.** *Periclimenes africanus* sp. nov., male, post-larval stage 2.8 mm. (A) Left first maxilliped, ventral view; (B) left second maxilliped, ventral view; (C) left third maxilliped, ventral view; (D) left first pereopod, ventral view; (E) idem, chela, medial view. Scale = 0.5 mm.



**Figure 5.** *Periclimenes africanus* sp. nov. (A) Detached, right second cheliped, ventral view; (B) idem, chela, medial view; (C) left third pereiopod, lateral view, male, pocl. 2.5 mm; (D) idem, dactylus; (E) detached third or fourth pereiopod, lateral view; (F) idem, dactylus; (G) detached fifth pereiopod, lateral view; (H) idem, dactylus. Scales (A,E,G) = 2 mm; (B,C) = 1 mm; (D) = 0.125 mm; (F,H) = 0.25 mm.



**Figure 6.** *Periclimenes africanus* sp. nov. (A–C) male, pocl. 2.8 mm; (D) holotype female, pocl. 1.7 mm; (E) female, pocl. 1.5 mm; (F) damaged specimen, pocl. 1.6 mm; (G) male, pocl. 1.4 mm. (A) left first pleopod; (B) left second pleopod; (C) idem, detail appendix masculina and appendix interna; (D–G) rostrum. Scale (A,B) =0.5 mm; (C) =0.25 mm; (D–G) =1 mm.

Second pereopods (Figure 5A) equal in length, similar, extending beyond intermediate segment of antennular peduncle with chela; chela with palm subcylindrical, straight; palm about four times as long as wide; fingers (Figure 5B) as long as palm, with straight, entire cutting edges, with few brushes of setae in distal part; tips strongly hooked; dactylus about as wide as fixed finger; carpus, merus, and ischium unarmed, with their length ratios of 0.53, 1.18, and 1.12 times length of palm; basis and coxa without special features.

Ambulatory pereopods (Figure 5C,E,G) slender, similar in form, slightly increasing in length from third to fifth; dactylus (Figure 5D) of third pereopod slender, uniformly tapering, about 0.25 of propodus length, 3.4 times as long as proximal width, with slender unguis 0.5 times as long as corpus, with short accessory tooth, 0.38 times unguis length; dactylus of fourth and fifth pereopods (Figure 5F,H) similar; propodus of third pereopod about nine times longer than wide, with two distoventral spiniform setae and few simple spiniform seta on ventral border, with few plumose and simple setae distally on distodorsal margin; carpus, merus, and ischium 0.58, 1.05, and 0.54 of propodus length, respectively, unarmed; basis and coxa without special features; fourth pereopod similar to third; propodus with two distoventral spiniform setae and few simple spiniform setae on ventral border, with few plumose and simple setae distally on distodorsal margin; fifth pereopod (Figure 5G) propodus with three rows of serrulate cleaning setae in distoventral part, six spiniform setae on ventral border, and one distoventrally.

Endopod of first pleopod in ovigerous female short, about fourth of length of exopod, with long plumose setae along its entire margin. Endopod of first pleopod in male (Figure 6A) short, 0.52 times length of exopod, distally rounded, with row of plumose setae along lateral margin and four long plumose setae in proximal part of medial margin with five small, short setae somewhat more anteriorly. Endopod of second pleopod in male (Figure 6B), 0.85 times length of exopod. Appendix masculina (Figure 6C) almost as long as appendix interna, with long setae (sub)distally.

Uropods (Figure 1E) extending beyond tip of telson; protopodite unarmed laterally; exopod with lateral border slightly convex, entire, 3.1 times longer than wide, slightly longer than endopod, terminating in small tooth with mobile spiniform seta medially (Figure 1F).

Coloration. Not recorded.

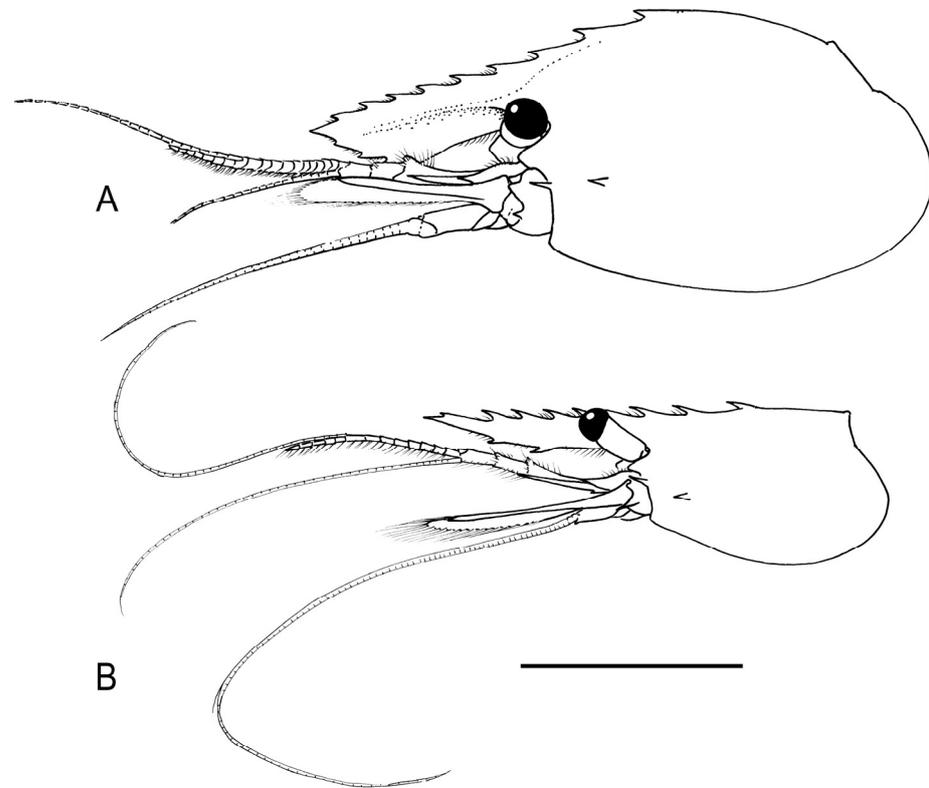
Host. Unidentified Octocorallia.

Etymology. The species is named after its African origin.

Remarks. Unfortunately, many of the pereopods were detached. Therefore, the most complete specimen was selected as the holotype.

The new species shares the biunguiculate dactyli of the ambulatory pereopods with six other eastern Atlantic species: *P. aegylios*, *P. amethysteus*, *P. andresi*, *P. granulatus*, *P. sagittifer*, and *P. scriptus*. The ambulatory pereopods of *P. eleftherioui* are unknown. However, none of these species have the posteriormost rostral one or two teeth separated from the carapace by a suture. Furthermore, the new species differs from *P. andresi* and *P. granulatus* in having the second chela smooth (Figure 5A,B) versus granulated in *P. andresi* (see Macpherson (1988: 57, Figure 3) [4]) and *P. granulatus* (see Holthuis (1950: 115, Figure 1) [6]). *Periclimenes africanus* sp. nov. differs from *P. amethysteus* in having the fingers of the second chela as long as the palm (Figure 5A,B) versus fingers longer than the palm in *P. amethysteus* (see Grippa and d'Udekem d'Acoz (1996: 404, Figure 4D) [2]). The new species differs from *P. scriptus* in having the rostrum falling short of the antennular peduncle (Figure 1A) versus far overreaching the antennular peduncle in *P. scriptus* (Figure 7B). As noted by d'Udekem d'Acoz [10], *P. scriptus* seems to be confined to the Mediterranean, and specimens recorded as *P. scriptus* along the West African coast (see Holthuis, 1949 [13], 1951 [14]; also including *Urocaris demani* Balss, 1916 [15] might be another species. The specimens figured by Balss [15] and Holthuis [13] also have the rostrum distinctly longer than the antennular peduncle, also differing in this respect from the present new species. The specimens described by Holthuis [13] show a large variety in rostral length. However, Holthuis makes

no mention of the posteriormost rostral one or two teeth being separated from the carapace by a suture.



**Figure 7.** (A) *Periclimenes sagittifer* (Norman, 1861), ovigerous female, pochl. 6.1 mm, RMNH.CRUS.D.37932; (B) *P. scriptus* (Risso, 1822), ovigerous female, pochl. 4.1 mm, RMNH.CRUS.D.57271. (A,B) Carapace and anterior appendages, lateral view. Scale = 4 mm.

The new species is most similar to *P. sagittifer* and *P. aegylios*. It differs from these species in the following: (1) having the rostrum falling short of the antennular peduncle (Figure 1A) versus overreaching the antennular peduncle in both *P. sagittifer* (see Norman (1861: pl. 13 Figure 8) [8], and Figure 7A) and *P. aegylios* (see Grippa and d’Udekem d’Acoz (1996: 406, Figure 1) [2]); (2) having the posteriormost one or two rostral teeth separated by a suture from the carapace without plumose setae in front (Figure 1A,B and Figure 6D–G) versus all teeth fixed with plumose setae in front in *P. sagittifer* (see Norman (1861: 278, pl. 13 Figures 8 and 9) [8] and Figure 7A) and having the posterior rostral tooth separated by a suture from the carapace and all dorsal rostral teeth with plumose setae in front in *P. aegylios* (see Grippa and d’Udekem d’Acoz (1996: 406, Figure 1) [2]); (3) having one or two ventral rostral teeth (Figure 1A,B and Figure 6D–G) versus three ventral rostral teeth in *P. sagittifer* (see Norman (1861: 278, pl. 13 Figures 8 and 9) [8] and Figure 7A) and three or four ventral rostral teeth in *P. aegylios* (see Grippa and d’Udekem d’Acoz (1996: 406, Figure 1) [2]).

Twenty-one species of *Periclimenes* from the West Atlantic are presently known [16]. None of these, however, have the posteriormost teeth on the rostrum separated from the carapace by a suture.

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