

Periclimenaeus fawatu spec. nov. (Crustacea: Decapoda: Pontoniinae), from Zanzibar

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Key words: Crustacea; Decapoda; Pontoniinae; *Periclimenaeus fawatu* spec. nov.; sponge associate; Zanzibar; Indian Ocean.

A new species of sponge-associated pontonine shrimp from Zanzibar is described and illustrated and its systematic position is discussed.

Introduction

Many years ago, the author presented two papers providing preliminary descriptions of several species of the genus *Periclimenaeus* Borradaile, 1915, mainly from East African waters (Bruce, 1969, 1970). The type material was generally deposited in the collections of the Rijksmuseum van Natuurlijke Historie, Leiden. Fuller descriptions of most of these species have since been made available. One species intended for inclusion in these papers was overlooked. The specimens have recently been located and are now deposited in the collections of the Nationaal Natuurhistorisch Museum-Naturalis, Leiden. No further specimens have been reported in the interval since its first collection in 1961. It is now described and illustrated as a new species, increasing to 46 the number of species of *Periclimenaeus* known from the Indo-West Pacific region, the second largest genus of the Pontoniinae.

CL refers to the postorbital carapace length; RMNH, Nationaal Natuurhistorisch Museum-Naturalis, Leiden.

Systematics

Periclimenaeus fawatu spec. nov. (figs 1-6)

Material.— Holotype ♂, CL 1.8 mm; allotype ovigerous ♀, CL 1.9 mm; off Fungu Fawatu, W coast of Unguja, Zanzibar, 8 vi 1961, trawl, 33-36.5 m, coll. A.J. Bruce, RMNH D 51593.

Diagnosis.— Rostral dentition 4-5/0, first abdominal segment tergite without anterior median lobe, dactyl of minor second pereiopod with cutting edge denticulate, third ambulatory dactyl biunguiculate, with rounded basal process, ventral margin of corpus concave, without denticles.

Description.— Female allotype: (fig. 1) a small sized pontonine shrimp of subcylindrical, slightly compressed body form, lacking major second pereiopod.

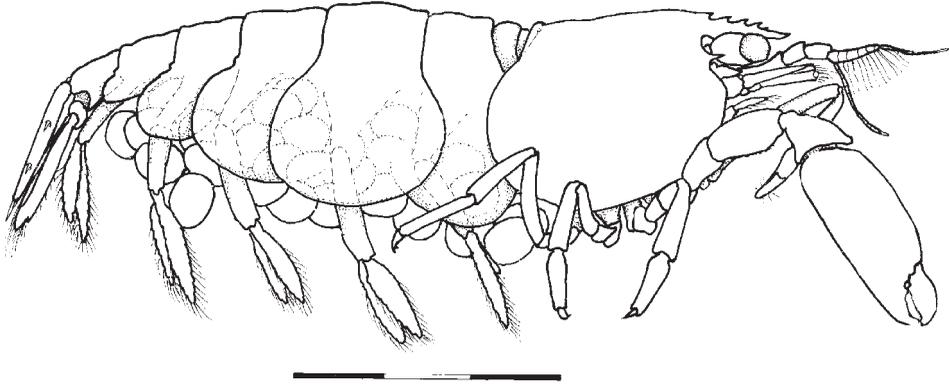


Fig. 1. *Periclimenaeus fawatu* spec. nov., allotype female, Fawatu, Zanzibar RMNH D 51593, major chela missing. Scale bar in millimetres.

Rostrum (fig. 2B) slender, without distinct midrib, about 0.5 of CL, reaching to about middle of intermediate segment of antennular peduncle, with four low acute teeth on proximal two thirds of rostral length, with sparse short setae interspersed, distal slightly up-turned, ventral margin without teeth.

Carapace (fig. 2A) glabrous, without epigastric, supraorbital or hepatic spines, antennal spine well developed, marginal, inferior orbital angle obsolete, anterolateral margin of branchiostegite feebly produced, rounded.

Abdomen glabrous, first segment tergite without anterior median lobe, sixth segment length subequal to fifth, depressed, about 1.5 times broader than long, posterolateral angle obsolete, posteroventral angle well developed, broadly acute; pleura enlarged, rounded, fourth and fifth posteriorly produced, fifth bluntly angular.

Telson (fig. 2J) about 2.1 times sixth segment length, 0.75 of CL, 2.5 times longer than anterior width, lateral margins feebly convex, posteriorly convergent, dorsal telson spines about 0.13 of telson length, at 0.25 and 0.65 of telson length, posterior margin broadly convex without median point, lateral posterior spines similar to dorsal spines (fig. 2K), intermediate spines well developed, about 0.27 of telson length, twice lateral spine length, submedian spines similar to intermediate spines in length, slender, setulose.

Eyes (fig. 2G) with globular cornea, without obvious pigmentation, stalk short, slightly broader than corneal diameter.

Antennule (fig. 2C) of normal form, proximal peduncular segment about twice as long as central width, anterolateral margin reduced, with small distolateral tooth, lateral margin concave, proximally angular, distally tapering, medial margin with well developed ventromedial tooth, stylocerite phylliform, distally acute, laterally with few short setae, statocyst normal with granular statolith; intermediate segment short, about 0.3 of proximal segment length, longer than wide, distal segment similar, upper flagellum biramous, five proximal segments fused, short ramus with single segment, about 12 groups of long aesthetascs, longer ramus slender, with 10 segments, lower flagellum similar, slender with 7 segments.

Antenna (fig. 2E) of normal form, basicerite short, laterally unarmed, carpoperite subcylindrical, about 4.6 times longer than width, reaching to distal margin of

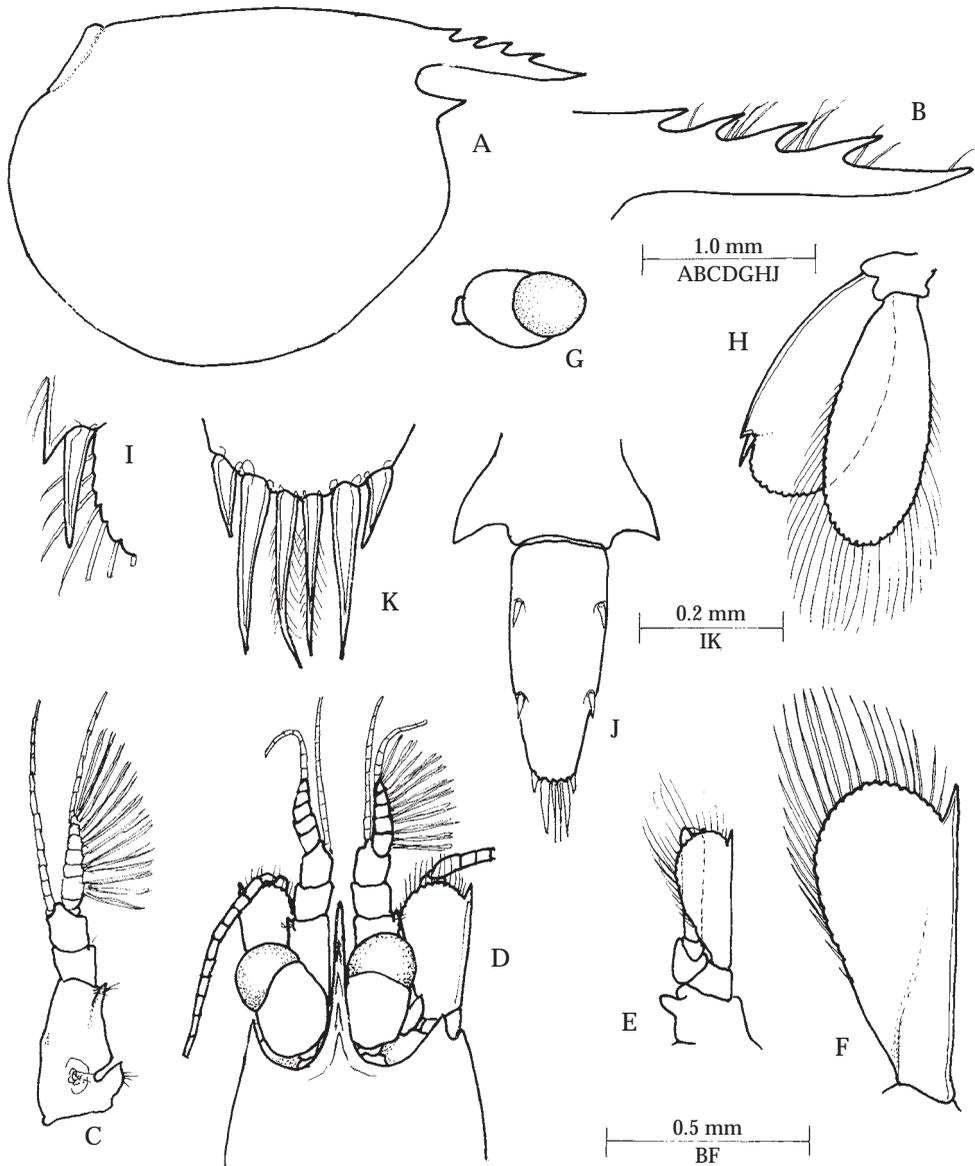


Fig. 2. *Periclimenaeus fawatu* spec. nov., allotype female, Fawatu, Zanzibar, RMNH D 51593. A, carapace and rostrum. B, anterior carapace and appendages, dorsal. C, rostrum. D, antennule. E, antenna. F, same, scaphocerite. G, eye. H, telson. I, same, posterior spines. J, uropod. K, same, posterolateral exopod.

scaphocerite lamella; scaphocerite (fig. 2F) 22.25 times longer than wide, greatest width distally at about 0.75 of length, anterior margin rounded, lateral margin straight, with well developed distal tooth at about 0.9 of scaphocerite length, reaching level of distal margin of lamella.

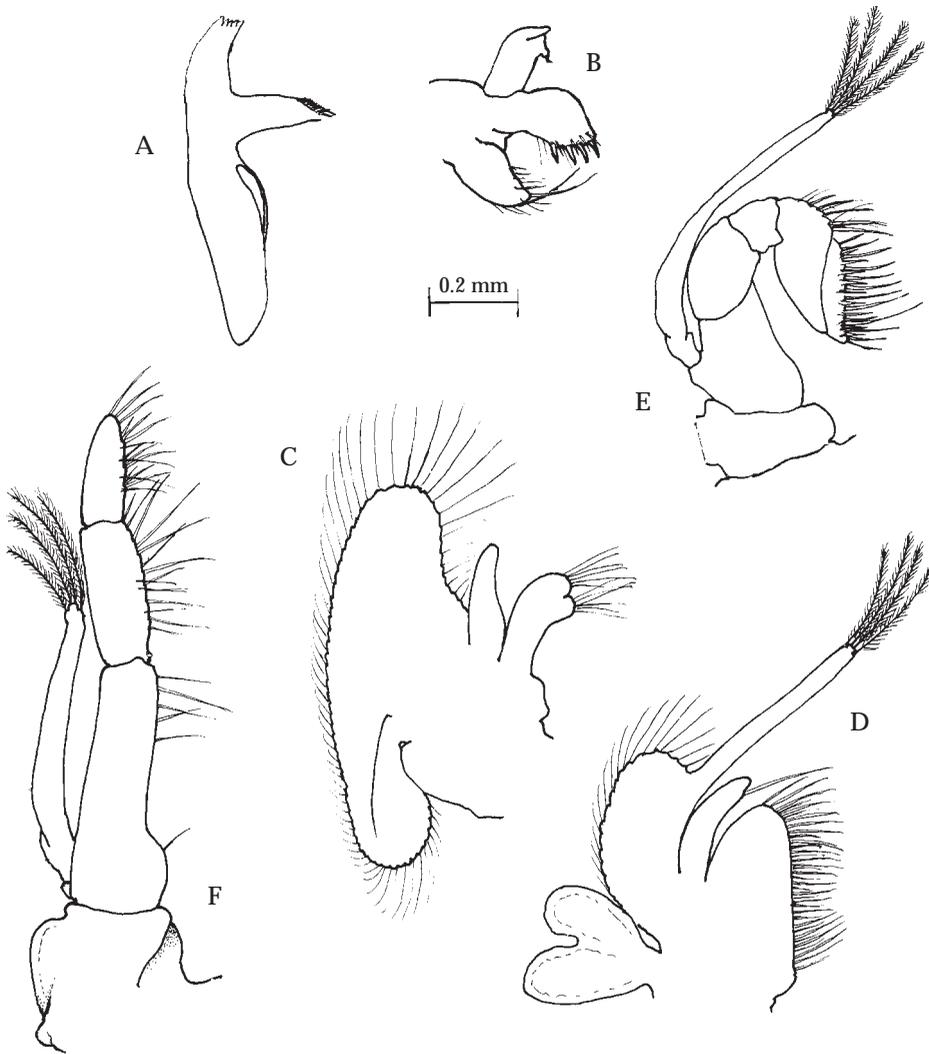


Fig. 3. *Periclimenaeus fawatu* spec. nov., allotype female, Fawatu, Zanzibar, RMNH D 51593. A, mandible. B, maxillula. C, maxilla. D, first maxilliped. E, second maxilliped. F, third maxilliped.

Thoracic sternites narrow and unarmed.

Mouthparts (fig. 3) of normal *Periclimenaeus* morphology.

Mandible (fig. 3A) without palp; incisor process (fig. 6C) slender, obliquely truncate distally, with six small acute teeth, lateral tooth slightly larger than others; molar process (fig. 6B) slender, subcylindrical, obliquely truncate distally, with two subacute teeth posteriorly, with dense brushes of short simple setae.

Maxillula (fig. 3B) with bilobed palp (fig. 6D), upper lobe (fig. 6E) short, glabrous, lower lobe shorter, with small hooked spinule; upper lacinia moderately broad, dorsal margin strongly convex, distal margin with four short simple spines, sparse spiniform

setae, margin confluent with sparsely setose ventral border; lower lacinia short, distally rounded, with two long terminal setae, several shorter setae.

Maxilla (fig. 3) with simple non-setose palp, tapering, distally rounded, of similar length to basal endite, distally expanded, feebly bilobed with short rounded lobes, distal lobe slightly larger than proximal, with 6 slender simple setae distally, proximal endite with similar setation; coxal endite obsolescent, medial margin slightly produced, irregular, non-setose; scaphognathite well developed, about 2.6 times longer than central width, anterior lobe broad, rounded, medial margin slightly excavate, posterior lobe well developed.

First maxilliped (fig. 3D) with elongate flattened subcylindrical palp, about 4.0 times longer than central width, exceeding anterior margin of basal endite, with single preterminal plumose seta medially; basal endite fused with coxal endite, combined medial margin straight, distal margin produced, rounded, margins with numerous long spiniform setae; exopod with normal flagellum with four plumose terminal setae, caridean lobe large; epipod well developed, sub-triangular, deeply bilobed, lobes rounded.

Second maxilliped (fig. 3E) with normally developed endopod, dactylar segment narrow, about five times longer than central depth, medial margin straight, with numerous serrulate spines, propodal segment normal, distomedial margin not produced, with several robust spines and shorter spiniform setae, carpus, merus and ischiobasis without special features; coxa, medially rounded; exopod normally developed with four plumose terminal setae; epipod (lost in dissection) small, subrectangular, without podobranch.

Third maxilliped (fig. 3F) with endopod reaching to about middle of carpocerite, ischiomerus fully fused to basis, combined segment about four times longer than central width, basal region expanded, medially rounded, with single short simple seta, ischiomerus portion sparsely setose distally only; penultimate segment about 0.55 of antepenultimate segment length, 2.6 times longer than wide, with numerous long simple setae medially; terminal segment about 0.8 of penultimate segment length, tapering distally, without strong terminal spine, with several transverse rows of spiniform setae medially; exopod normally developed with four plumose terminal setae, coxa not medially produced, with low rounded lateral plate, without arthrobranch.

First pereopods (fig. 4A) moderately slender, exceeding carpocerite by distal fifth of merus, chela (fig. 4BC) with palm subcylindrical, slightly compressed, 1.5 times longer than deep, fingers subequal to palm length, broad, distally rounded, with groups of short stiff setae, subspatulate, with small hooked unguis distally, with small adjacent tooth, cutting edges laminar, entire; carpus subequal to chela length, 3.5 times longer than distal width, tapering proximally; merus about 1.2 times carpus length, 4.3 times longer than maximal width at about 0.33 of length, tapering slightly distally; ischium about 0.65 of merus length; basis and coxa normal, without special features.

Second pereopod: minor pereopod only preserved, chela (fig. 4D) about 1.1 times CL, with palm smooth, oval in section, 1.9 times longer than maximal depth at about 0.25 of length, tapering slightly distally, fingers (fig. 4E) about 0.4 of palm length, dactylus compressed, distinctly exceeding fixed finger, about 2.2 times longer than maximal depth, dorsal margin convex, tip blunt, cutting edge (fig. 4F) convex, with numerous low blunt denticles (about 16-19); fixed finger about 1.3 times longer than basal

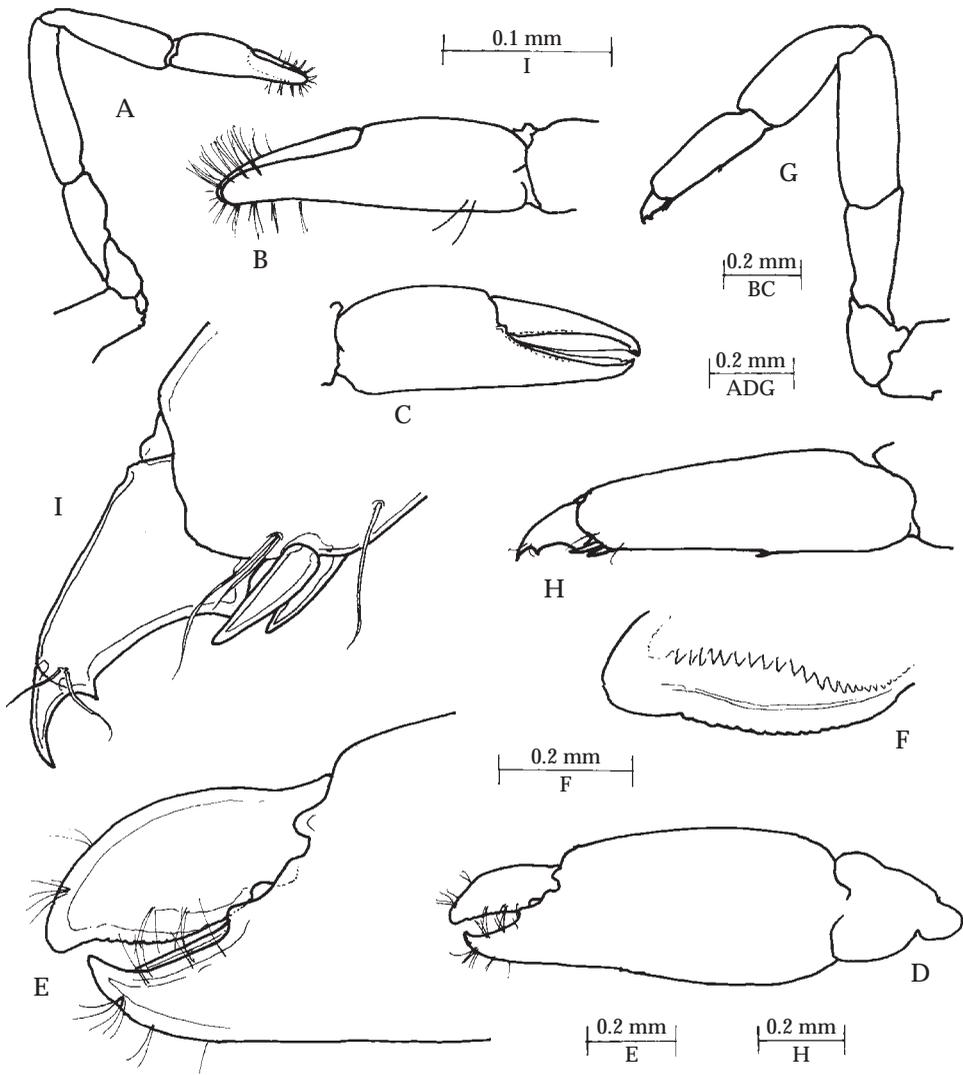


Fig. 4. *Periclimenaeus fawatu* spec. nov., allotype female, Fawatu, Zanzibar, RMNH D 51593. A, first pereiopod. B, same, chela, ventral. C, same, lateral. D, minor second pereiopod. E, same, fingers. F, same, cutting edge of dactylus. G, third pereiopod. H, same, propod and dactyl. I, same, distal propod and dactyl.

width, cutting edge distinctly grooved, with small blunt tooth at half of medial margin length; carpus short, stout, distally excavate about as wide as long, non-spinulate; merus about 0.45 of palm length, 1.6 times longer than central depth, ventral margin with five small acute tubercles; ischium 1.1 times meral length, ventrally non-spinulate; basis and coxa short, robust, without special features.

Ambulatory pereiopods robust; third pereiopod (fig. 4G) with dactyl (fig. 4I) 0.25 of

propod length, unguis distinctly demarkated, 2.4 times longer than basal width, curved, un-ornamented, corpus compressed, about 1.4 times longer than basal width, tapering strongly distally, dorsal margin feebly convex, ventral margin with small acute erect distal accessory tooth, protuberant rounded boss proximally, intervening ventral margin concave, unarmed; propod (fig. 3H) about 0.35 of CL, 3.4 times longer than proximal width, tapering distally, distoventral angle armed with two stout spines, about 0.5 of dorsal corpus length, one additional small spine at about 0.45 of ventral length; carpus stouter than propod, 2.3 times longer than maximal width, 1.1 times propod length, tapering proximally, unarmed; merus 1.3 times longer than propod, 2.8 times longer than wide, uniform, unarmed; ischium subequal to propod length, 2.4 times longer than distal width, tapering proximally; basis and coxa robust, without special features.

Uropods (fig. 2H) with protopodite posterolaterally unarmed; exopod subequal to telson length, 2.0 times longer than broad, lateral margin slightly convex, unarmed, sparsely setose, with small acute tooth distally, with adjacent straight spine (fig. 2I), about 3.0 times longer than tooth; endopod slightly longer than exopod, 2.5 times longer than broad, 2.8 times longer than width, subuniform, 1.2 times length of carpus, unarmed; ischium, subequal to carpal length, 2.5 times longer than distal width, tapering proximally; basis and coxa robust, without special features. Fourth and fifth pereopods similar, more slender.

Ova, about 90.

Male holotype: generally as for female allotype, distinctly smaller and more slender body form, with both second pereopods, lacking right third and fourth pereopods.

Rostrum (fig. 5A), about 0.55 of CL, with five dorsal teeth.

Major second pereopod (fig. 5B) with chela greatly enlarged, about 2.6 times CL, surface generally smooth, glabrous, ventral margin very feebly tuberculate, oval in section, about 2.3 times longer than central depth, tapering slightly distally, fingers (fig. 5C) compressed, strongly curved medially, dactylus almost semicircular, twice as long as maximal depth, lateral margin strongly convex, cutting edge with large molar process, slightly posteriorly produced, distal cutting edge sharp, entire, tip strongly curved, acute, fixed finger about 1.3 times longer than basal depth, cutting edge blunt, with deep oval fossa proximally, with well developed acute process more proximally, tip stoutly acute, curved; carpus about 0.33 of palm length, distally excavate, strongly tapered proximally, non-denticulate; merus about 0.33 of palm length, 1.8 times longer than width, ventral margin denticulate with 8 small acute tubercles (fig. 5D); ischium subequal to merus length, twice as long as distal width, ventral margin with small acute tubercles; basis and coxa robust, without special features.

Minor second pereopod similar to allotype, chela (fig. 5E) about 1.2 times CL, 0.5 of major chela length, palm about 3.3 times longer than central depth, fingers (fig. 5F) about 0.33 of palm length, dactylus (fig. 5G) similar to allotype, cutting edge sinuous, about 22 small sub-acute teeth.

Third pereopod (fig. 5H) generally as in allotype, propod about 0.4 of CL, dactyl similar to allotype specimen (fig. 5I).

Fifth pereopod similar to third, propod with single distoventral spine only, with numerous stiff distal ventral setae (fig. 5J), dactyl with less pronounced basal protuberance, ventral margin convex.

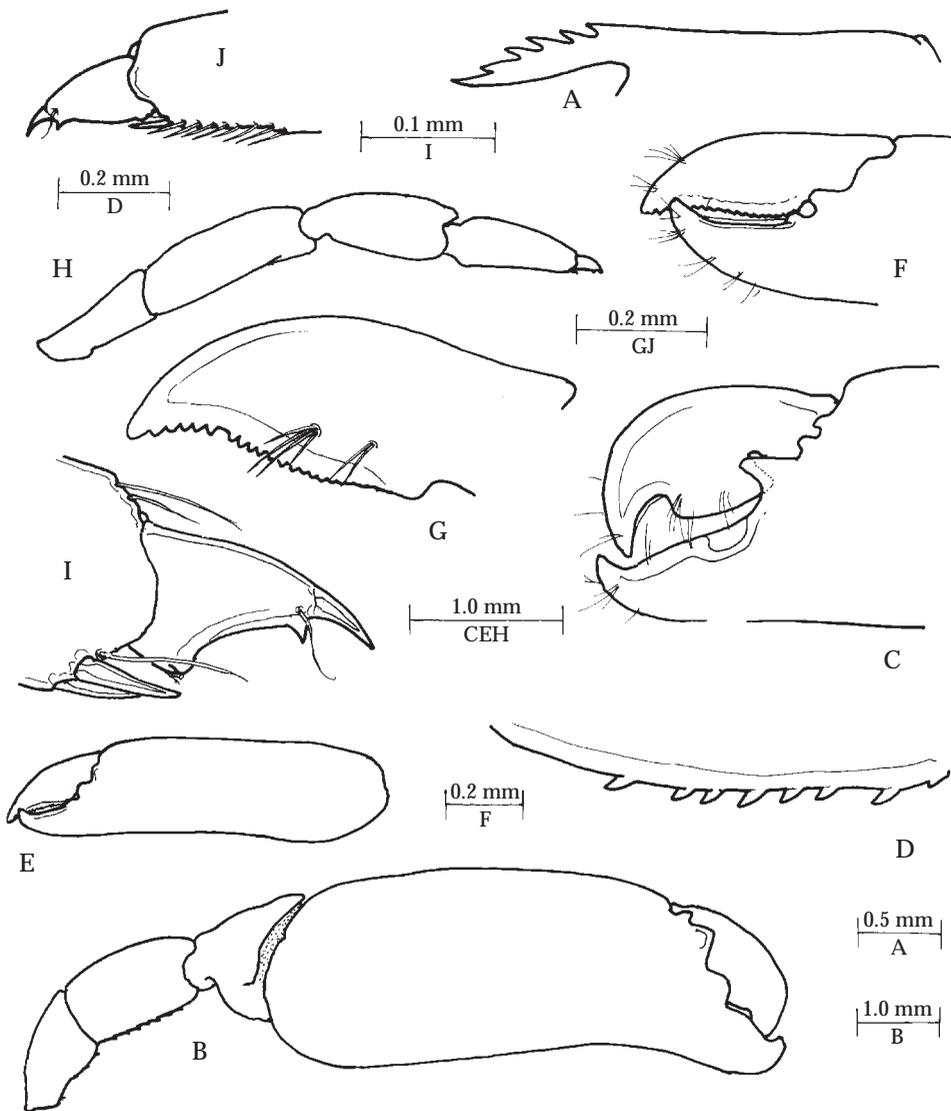


Fig. 5. *Periclimenaeus fawatu* spec. nov., holotype male, Fawatu, Zanzibar, RMNH D 51593. A, dorsal carapace and rostrum. B, major second pereiopod, chela. C, same, fingers. D, same, ventral merus. E, minor second pereiopod, chela. F, same, fingers. G, same, dactylus. H, third pereiopod. I, same, distal propod and dactyl. J, fifth pereiopod, distal propod and dactyl.

First pleopod (fig. 6G) normal, exopod 1.2 times basipodite length, 4.2 times longer than wide; endopod (fig. 6H) 0.4 of exopod length, 3.0 times longer than proximal width, tapering slightly distally, distally rounded with six short plumose setae, medial margin with five simple setiform spines, series increasing in length distally, longest about 0.4 of endopod length.

Second pleopod (fig. 6I) normal, exopod 1.2 times basipodite length, 4.0 times longer than wide; endopod 0.75 of exopod length, 4.0 times longer than wide, appendices (fig. 6J) at about 0.3 of median border length, appendix masculina subcylindrical, slightly swollen, about 2.5 times longer than wide, 0.15 of endopod length, with series four sparsely setulose spines along ventromedial margin, longest spine distally about 2.3 times corpus length; appendix interna slender, subcylindrical, 2.2 times corpus length, with few distal cincinnuli.

Measurements (mms).— Male holotype, CL, 1.8; carapace and rostrum, 2.8; total body length (approx.), 8.2; major second pereopod chela, 4.6 minor second pereopod chela, 2.3. Female holotype, CL, 1.9; carapace and rostrum, 2.9; total body length (approx.), 9.0; minor second pereopod chela, 2.3, length of ovum, 0.6.

Colouration. — Covered with minute white chromatophores except for distal merus, carpus, propod and dactyl of second to fifth pereopods, cornea golden; ovary light green.

Host. — Unidentified sponge.

Etymology. — From Fawatu, Zanzibar, the locality of capture.

Systematic position. — *Periclimenaeus fawatu* appears to most closely resemble *P. spongicola* Holthuis, 1952. It shares with this species the following characters:

Rostrum with 4-6 dorsal teeth, proximal tooth acute, not transversely flattened, without ventral teeth, without postorbital carina; carapace without supraorbital spines or tubercles, inferior orbital angle obsolete; first abdominal segment tergite without anterior median lobe; major second pereopod with well developed molar process and fossa, dactyl of minor second pereopod distinctly exceeding fixed finger, with cutting edge denticulate; third pereopod dactyl with distal accessory tooth but without acute basal tooth; unguis unarmed.

Periclimenaeus fawatu differs from *P. spongicola* in a number of small characters:

The dorsal rostral dentition is 4-5 (*vs* 6); teeth are short and acute, distally directed (*vs* long and slender, up-curved); scaphocerite lamella not exceeding tip of distolateral tooth, carapocerite not exceeding lamella (*vs* lamella clearly exceeding tip of distolateral tooth, carapocerite well exceeding lamella); first pereopod carpus shorter than merus (*vs* subequal); second pereopod merus and ischium spinulate (*vs* unarmed); third pereopod dactyl accessory tooth erect, ventral margin of corpus concave, unarmed (*vs* recurved, and straight and denticulate); dorsal telson spines about 0.11, intermediate posterior spines about 0.25 of telson length (*vs* 0.16 and 0.11 of telson length); posterolateral tooth of exopod of uropod about 0.33 of adjacent spine length, spine not exceeding distal margin of exopod lamella (*vs* about 0.5 of adjacent spine length, spine reaching level of distal margin of exopod lamella).

Remarks.— The minor second pereopod of the female allotype shows the form of the freshly moulted dactyl within the exoskeleton. This indicates that the denticles on the cutting edge are much abraded and would be much more acute in a freshly moulted specimen and about 20 in number. The tip of the dactylus may also have been subjected to abrasion.

Periclimenaeus spongicola was originally described from a single specimen from the Java Sea at 4°41'S 113°02'E, from 28-32 m (Holthuis, 1952), collected in 1908. The only other report of this species is from Kat O Chau, Hong Kong, at 1 m, in the sponge *Mycale*

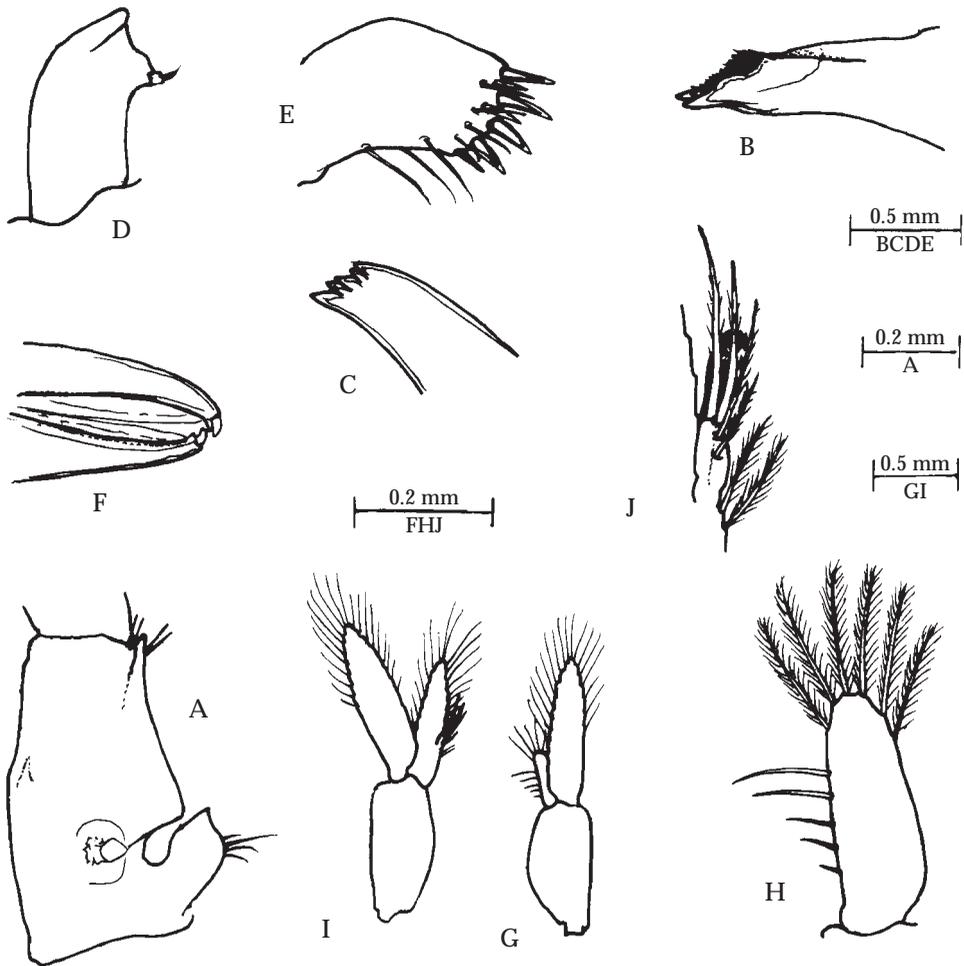


Fig. 6. *Periclimenaeus fawatu* spec. nov., Fawatu, Zanzibar, RMNH D 51593. A, antennule, proximal segment. B, mandible, molar process. C, same, incisor process. D, maxillula, palp. E, same, upper lacinia. F, first pereopod chela, tips of fingers. G, first pleopod. H, same, endopod. I, second pleopod. J, same, appendices. A-F, allotype female; G-J, holotype male

philippensis (Dendy) by Bruce (1975). This record is erroneous and the specimens should be referred to *P. rastrifer* Bruce, 1980. More recently Fransen (in press) has reported *Periclimenaeus* aff. *spongicola* from an ascidian host, *Exostoma ianthinum* (Sluiter, 1908) from the Caroline Islands and Papua New Guinea, with the proviso that the specimens may represent an as yet undescribed species on account of the presence of several characteristic features of which the well developed inferior orbital angle is particularly impressive. The specimens were not described as new as they both unfortunately lacked the major second pereopod. They may be readily distinguished from *P. fawatu* by the presence of the distinct inferior orbital angle and the denticulations present on the ventral margin of the third pereopod dactylar corpus.

Acknowledgements

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