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A NEW PONTONIINE SHRIMP FROM THE GREAT BARRIER REEF
(CRUSTACEA. DECAPODA. PALAEMONIDAE)

A. J. BRUCE

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Periclimenes kallisto sp. nov., a pontoniine shrimp new to the Australian fauna, is described from Keeper and Swains Reefs, at the central region and southeastern end of the Great Barrier Reef. The specimens were found in association with unidentified antipatharian hosts at depths of 38 and 10 metres. *Periclimenes brocketti* Borradaile, 1915, is formally synonymised with *P. affinis* (Zehntner, 1902). □ *Periclimenes kallisto*, new species, Pontoniinae, Great Barrier Reef, antipatharian associate, Australia.

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In 1978, the R.V. *Kallisto*, of the Russian Academy of Sciences Far East Science Center, Vladivostok, visited the Great Barrier Reef. During this cruise the Heron Island Research Station (HIRS) on the southern end of the Great Barrier Reef was visited and through the kindness of the Cruise Leader, Dr Boris V. Preobrazhensky, staff at the HIRS were able to participate in the subsequent leg of the cruise. The specimens upon which this report is based were collected in SCUBA activities whilst cruising. Specimens are deposited in the collections of the Queensland Museum, Natural History Museum-Naturalis, Leiden and Muséum National d'Histoire Naturelle, Paris.

ABBREVIATIONS. CL = postorbital carapace length; QM = Queensland Museum, Brisbane; MNHN = Muséum National d'Histoire Naturelle, Paris; RMNH = Natural History Museum-Naturalis, Leiden.

TAXONOMY

Crustacea Decapoda

Family Palaemonidae Rafinesque, 1815

Subfamily Pontoniinae Kingsley, 1879

Periclimenes Costa, 1844

Periclimenes kallisto sp. nov.

(Figs 1–6)

MATERIAL. HOLOTYPE, QMW28066, ovig. female, R.V. *Kallisto*, Keeper Reef, Queensland, 18°44'S, 147°16'E, 38m, D. Fisk, 30 June 1978.

PARATYPES. QMW28067, male allotype, RMNH D51733 male, ovig. female; MNHN Na16344, male, ovig. female, QMW 28068, 51 (incl.16 ovig.

females), all with same data as holotype; QMW28069, 46 (incl. 12 ovig. females, R.V. *Kallisto*, Swains Reef, 21°30'S 152°00'E, Queensland, 10m, D. Fisk, 26 June 1978.

DIAGNOSIS. Rostral dentition. 7–9/0–2 (ovig. female), posterior tooth frequently epigastric, straight, reaching to or beyond distal segment of antennular peduncle; inferior orbital angle without ventral flange; cornea globular, not produced. fourth thoracic sternite with transverse ridge with median notch, first pereopod with simple fingers, cutting edges entire, carpus subequal to palm, second pereopod chelae unequal, dissimilar, smooth, carpus and merus unarmed, fingers of major second pereopod feebly dentate proximally, without distinct distal diastema, fingers of minor second pereopod unarmed; third pereopod slender, propod spinulate, spines slender, acute, dactyl slender, simple, unguis long, slender.

DESCRIPTION. A slenderly built *Periclimenes* (Fig. 1) of subcylindrical body form, body smooth, glabrous.

Rostrum. (Fig. 4A) Straight, horizontal, about 0.9 of CL, reaching from middle of distal segment of antennular peduncle to well beyond anterior margin of distal segment, with low dorsal carina, lateral carinae feebly developed, ventral carina obsolete, dorsal margin with 6–8 acute teeth, evenly spaced, first tooth posterior to orbital margin (with additional minute preterminal distal tooth (Fig. 6A) in one specimen), with sparse short interdental setae, ventral margin with single small acute tooth distally, ventral margin straight with median plumose setae. Male rostrum (Fig. 5A) similar to female.

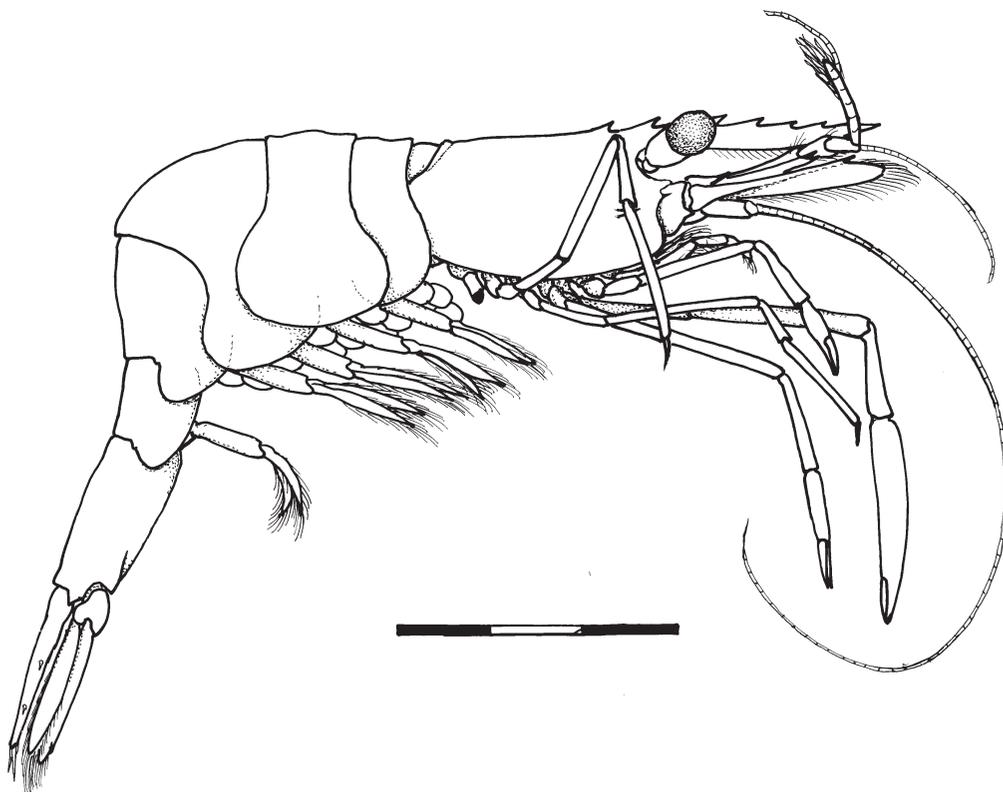


FIG. 1. *Periclimenes kallisto* sp. nov., ovig. female holotype, QMW28066, Swain Reefs. Scale bar in millimeters.

Carapace. (Fig. 2AB) with epigastric spine at about 0.2–0.3 of CL, generally posterior to level of hepatic spine, usually separated from first dorsal rostral tooth by distinctly larger interval than between first and second rostral teeth, without supraorbital spine or postorbital ridge, inferior orbital angle (Fig. 2C) produced, acute, without ventral flange, antennal spine slender, marginal, exceeding inferior orbital angle, hepatic spine similar to antennal, anterolateral angle rounded, not produced.

Abdomen. Third tergite not posteriorly produced, posterior margin entire, about 0.75 of CL, sixth segment 2.2 times longer than deep, 1.6 times fifth segment length, posterolateral angle angular, acute, posteroventral angle slightly produced, blunt, pleura of first three segments broadly rounded, fifth and sixth (Fig. 2D) posteriorly produced, rounded.

Telson. About 0.9 of CL (Fig. 2H), 3.0 times longer than anterior width, lateral margins posteriorly

convergent, anterior third feebly concave, posterior two thirds straight, with two pairs of small dorsal spines, about 0.04 of telson length at 0.55 and 0.75 of telson length, posterior margin (Fig 3H) about 0.28 of anterior margin width, angular, central portion slightly produced, without acute median point, lateral spines small, subequal to dorsal spines, intermediate spines long, slender, about 0.2 of telson length, submedian spines shorter, robust, densely setose, about 0.4 of intermediate spine length.

Antennule. Normal form (Fig. 2E), proximal segment about 2.0 times longer than central width, tapering slightly distally, median margin straight, setose, with small acute ventromedial tooth at about 0.4 of length, lateral margin feebly convex, sparsely setose, anterolateral margin (Fig. 3G) produced with small rounded medial lobe and acute lateral tooth, distinctly exceeding medial lobe, stylocerite slender, acute, reaching to about 0.5 of segment length, proximal lateral margin with plumose setae, statocyst normally

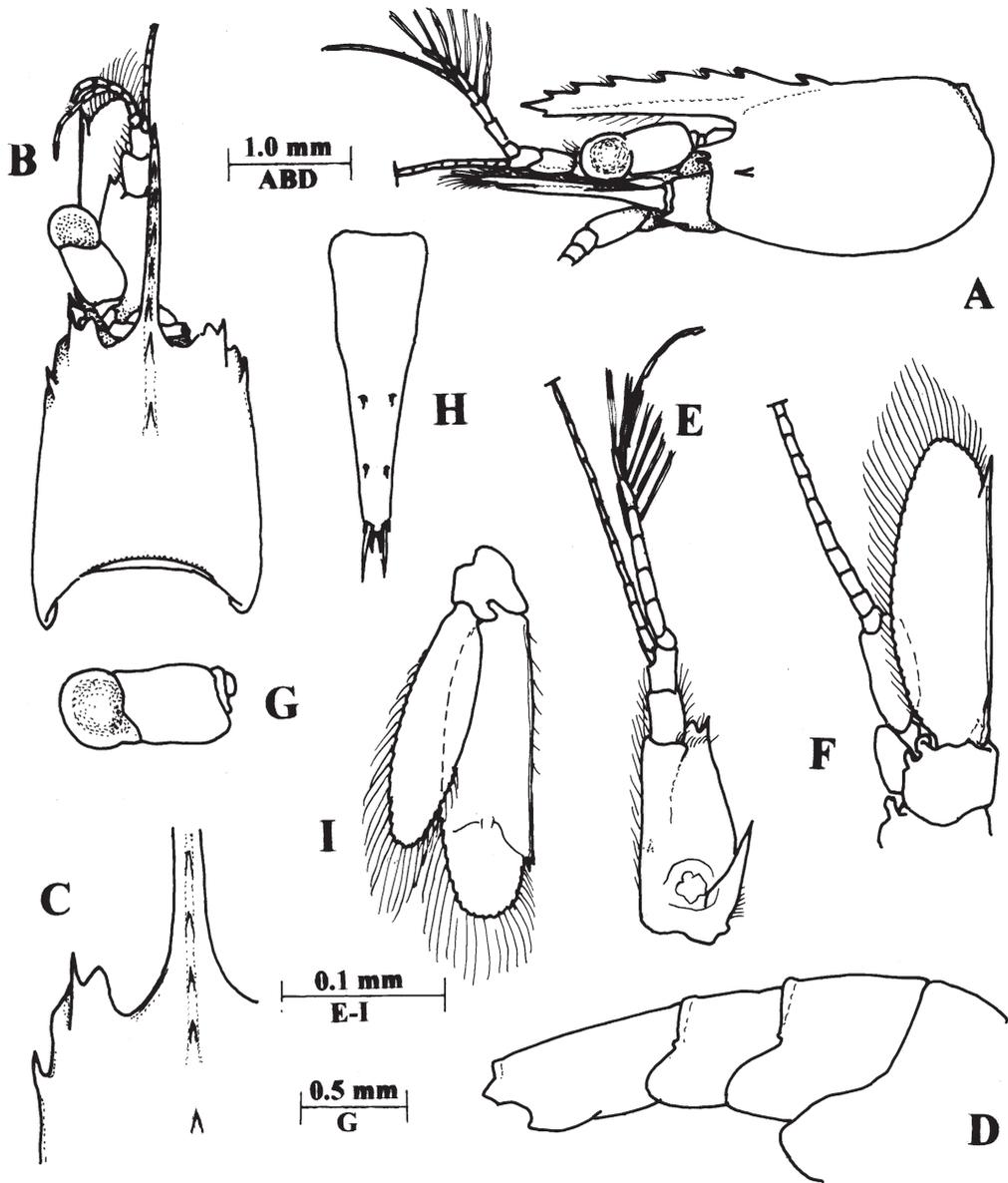


FIG. 2. *Periclimenes kallisto* sp. nov., ovig. female paratype, QMW28069, Swain Reefs. A, carapace and appendages, lateral view; B, carapace and appendages, dorsal view; C, left orbital region, dorsal view; D, third to sixth abdominal segments, lateral view; E, antennular peduncle; F, antennal peduncle; G, eye; H, telson; I, uropod.

developed, with granular statolith; upper flagellum biramous, proximal three segments fused, shorter free ramus with three segments, about six groups of aesthetascs, longer ramus slender, short, filiform, lower flagellum longer, slender, filiform.

Antenna. Normal form (Fig. 2F), basicerite robust with strong acute distolateral tooth, distomedial angle with reflected lamina, with short subcylindrical process proximally, ischicerite and merocerite without special features, carpo-cerite about 0.4 of scaphocerite length, 2.5 times longer

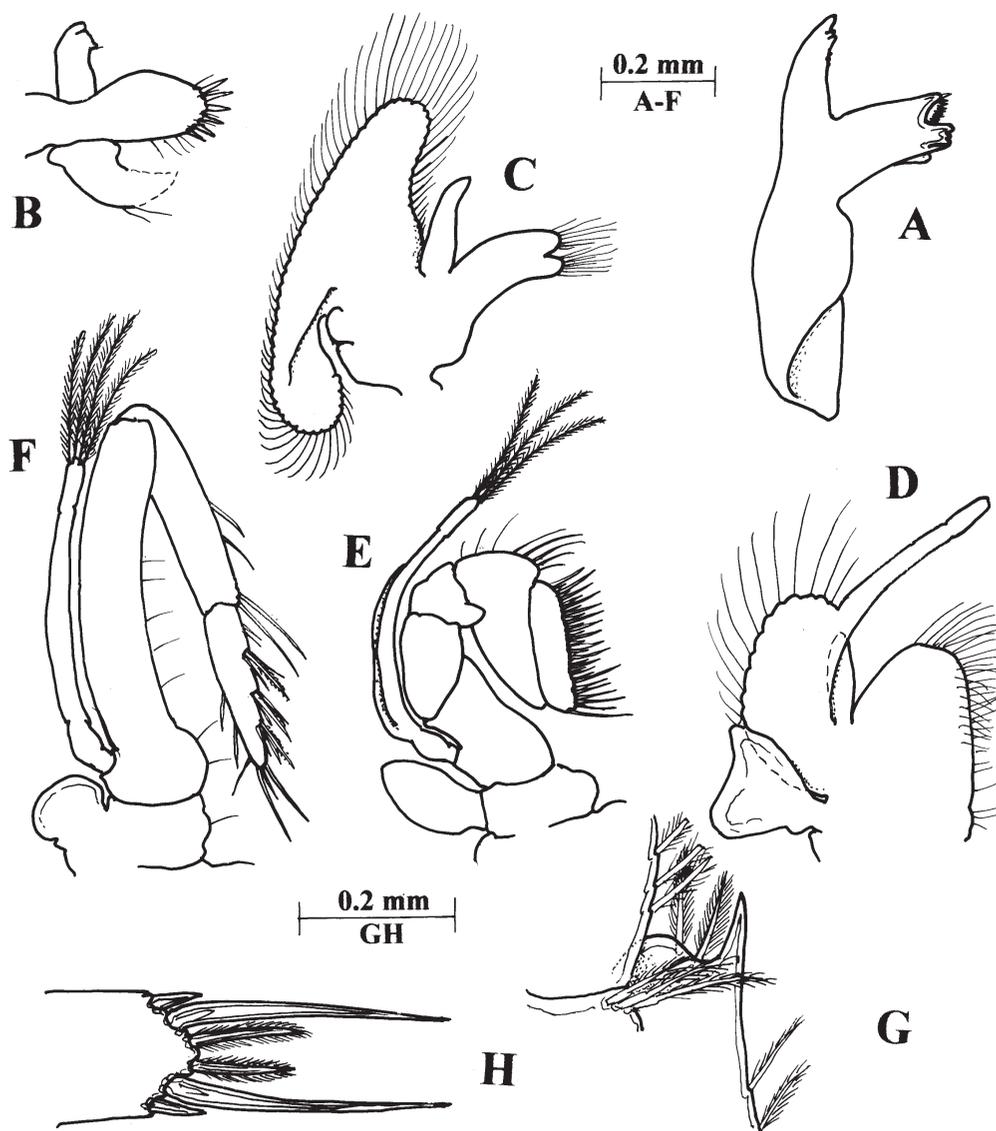


FIG. 3. *Periclimenes kallisto* sp. nov., ovig. female paratype, QMW28069, Swain Reefs. A, mandible; B, maxillula; C, maxilla; D, first maxilliped; E, second maxilliped; F, third maxilliped; G, antennule, proximal segment, distolateral angle; H, telson, posterior spines.

than central width, reaching to about 0.45 of scaphocerite length, flagellum well developed, scaphocerite well exceeding antennular peduncle, 3.0 times longer than central width, tapering slightly distally, anterior margin bluntly angular (Fig. 6B), lateral margin straight, with well developed distolateral tooth (Fig. 6C), about 0.14 of scaphocerite length, at 0.85 of length; coxa with

subcylindrical process distomedially, terminally swollen, containing small spherical mass of (?) glandular cells.

Ophthalmic somite. Without median process, or median pigment spot.

Eye. Cornea globular (Fig. 2G), oblique, appearing whitish, unpigmented, without accessory spot,

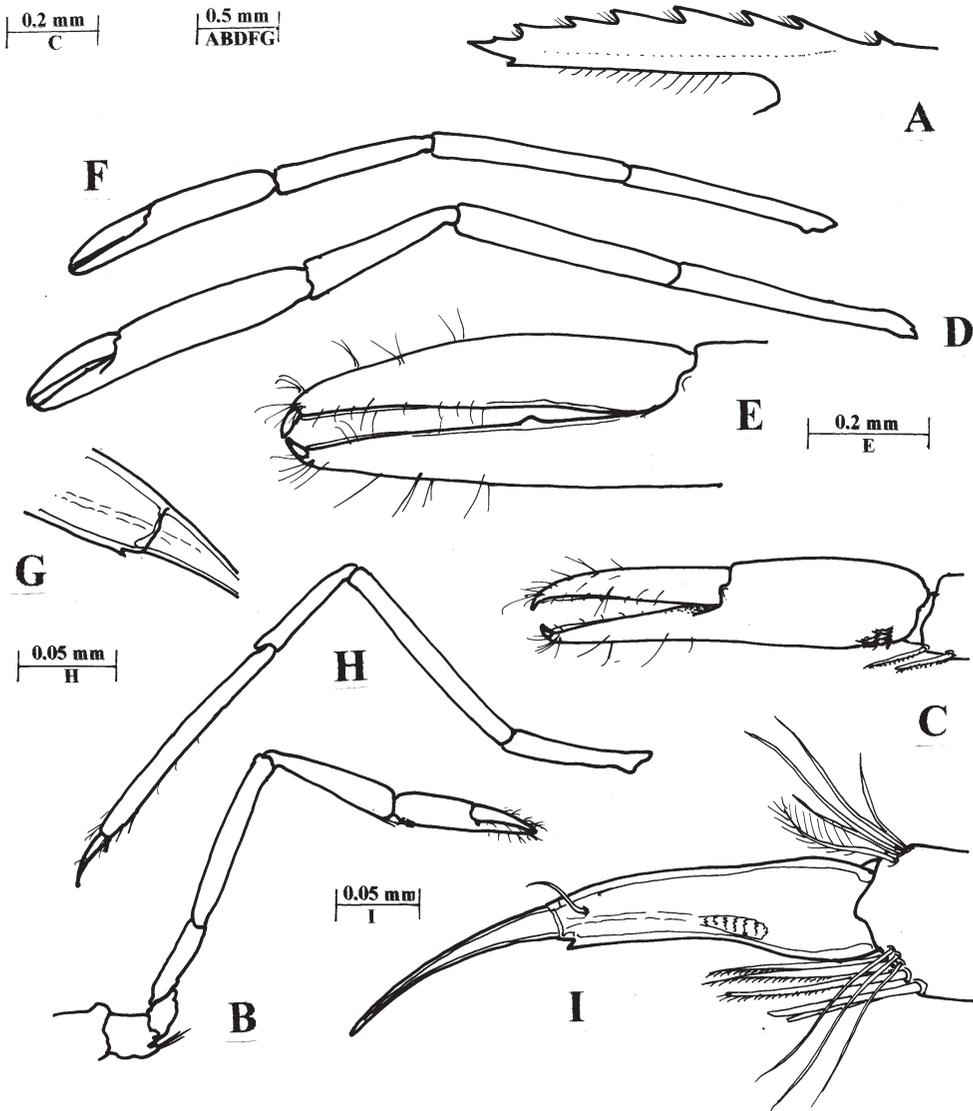


FIG. 4. *Periclimenes kallisto* sp. nov., ovig. female paratype, QMW28069, Swain Reefs. A, rostrum; B, first pereiopod; C, chela of same; D, major second pereiopod; E, fingers of same; F, minor second pereiopod; G, fourth pereiopod, unguinal-corporal articulation of dactylus; H, third pereiopod; I, dactylus of fifth pereiopod.

stalk subcylindrical, 1.5 times longer than proximal width, tapering slightly distally.

Epistome. Unarmed.

Mandible. (Fig. 3A) Corpus robust, without palp, incisor process (Fig. 6E) slender, tapering distally, obliquely truncate, with three acute teeth, lateral tooth larger, central tooth smallest, medial margin

with three minute denticles distally, molar process (Fig. 6D) stout, subcylindrical, distally truncate, with tridentate ventral lobe, blunt anterior and posterior lobes, spinulate dorsal lobe.

Maxillula. (Fig. 3B) Normal form, palp (Fig. 6F) feebly bilobed, with ventral tubercle bearing small simple seta, upper lacinia distally rounded (Fig. 6G) with seven stout simple spines, several

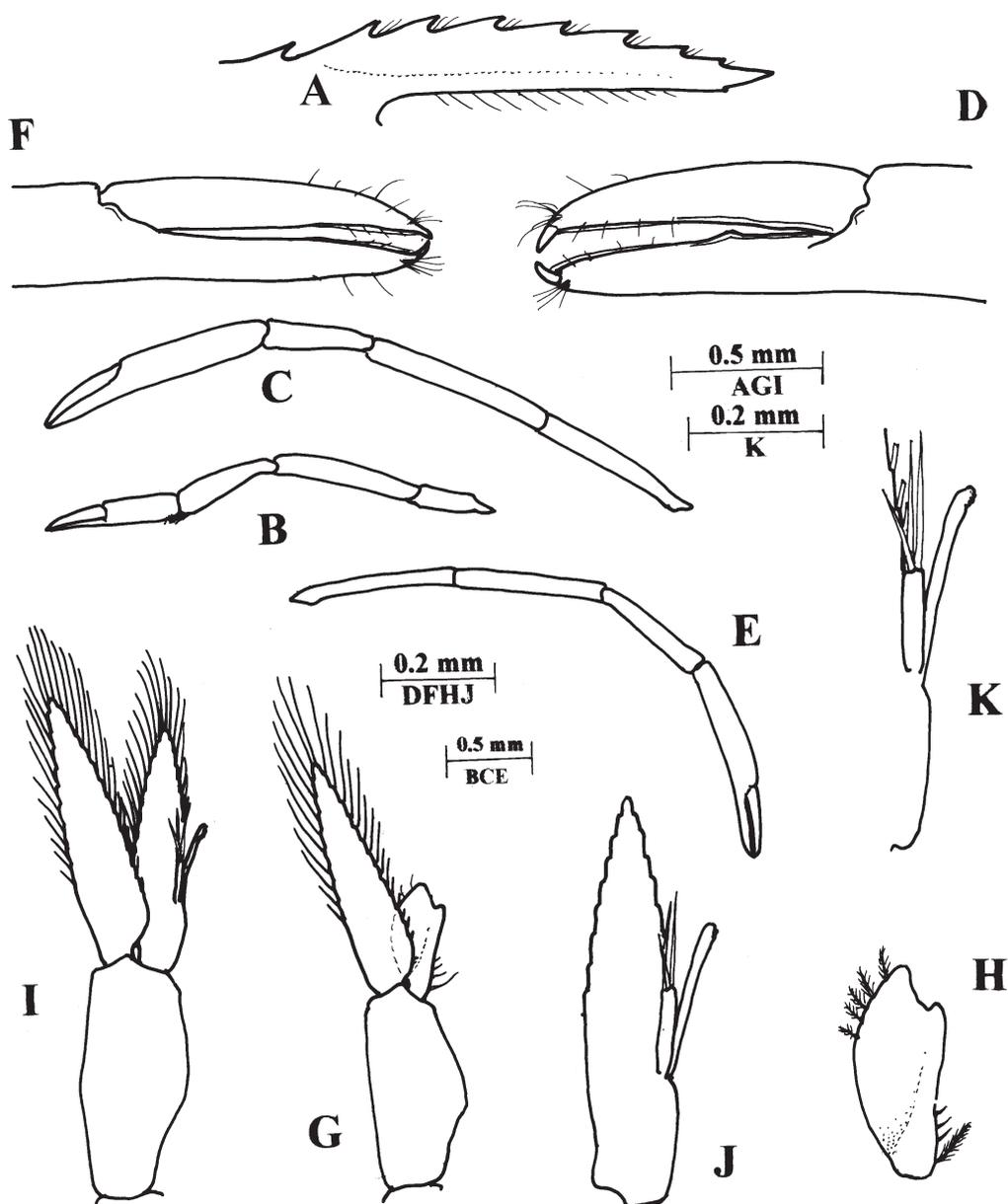


FIG. 5. *Periclimenes kallisto* sp. nov., male allotype, QMW28067, Swain Reefs. A, rostrum; B, first pereiopod; C, major second pereiopod; D, fingers of same; E, minor second pereiopod; F, fingers of same; G, first pleopod; H, endopod of first pleopod; I, second pleopod; J, endopod of second pleopod; K, appendices masculina and interna of second pleopod.

simple spiniform setae, lower lacinia damaged in dissection.

Maxilla. (Fig. 3C) With flattened tapering, non-setiferous palp, about 3.0 times longer than

basal width, basal endite bilobed, lobes short, subequal, with 9 and 11 slender simple terminal setae, coxal endite obsolescent, margin convex, scaphognathite well developed, about 2.75 times

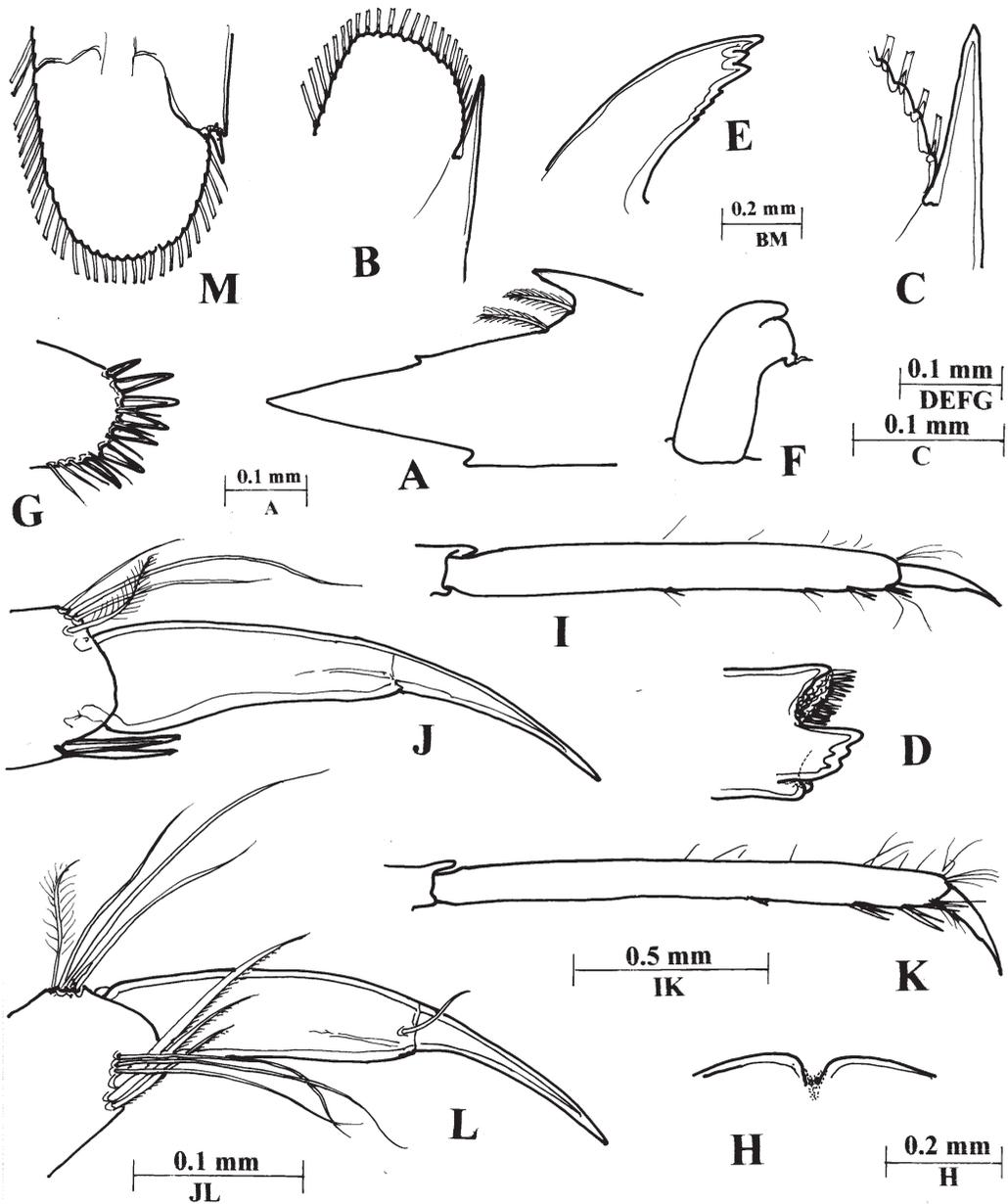


FIG. 6. *Periclimenes kallisto* sp. nov., paratypes, QMW28069, Swain Reefs. A, tip of rostrum; B, distal scaphocerite; C, distolateral tooth scaphocerite; D, mandible, molar process; E, same, incisor process; F, maxillula, palp; G, same, distal upper lacinia; H, fourth thoracic sternite; I, third pereiopod, propod and dactyl; J, same, distal propod and dactyl; K, fifth pereiopod, propod and dactyl; L, same, distal propodus and dactylus; M, uropod, distal end of exopod.

longer than wide, posterior lobe about 2.3 times longer than basal width, anterior lobe about 1.3 times, distally narrow, medial margin concave.

First maxilliped. (Fig. 3D) With simple non-setiferous palp, about 3.5 times longer than wide, basal endite well developed, broadly

rounded, medial margin straight, with sparse, slender simple marginal setae, coxal endite obsolescent, feebly concave, sparsely setose, exopod with well developed flagellum, distal setae lost in dissection, caridean lobe large, epipod small, triangular, feebly bilobed.

Second maxilliped. (Fig. 3E) Normal form, dactylar segment about 4.0 times longer than wide, medial margin straight, densely provided with serrulate spines, propodal segment with anterior margin broadly rounded, feebly medially produced, with sparse spiniform setae, carpus, ischiomerus and basis without special features, exopod with well developed flagellum, lateral margin proximally lamellar, with three plumose terminal setae, coxa with medial margin convex, non-setose, with suboval epipod laterally, without podobranch.

Third maxilliped. (Fig. 3F) With endopod reaching to about 0.5 of carpocerite length; ischiomerus completely fused with basis, combined segment bowed, about 6.0 times longer than central width, margins sub-parallel, slightly tapering distally, sparsely setose medially, basal region medially convex, penultimate segment about 0.55 of antepenultimate segment length, 4.5 times longer than central width, sparsely setose, with two long spiniform setae distolaterally, about 0.3 of antepenultimate segment length, 4.5 times longer than proximal width, tapering distally, with three small groups of serrulate spines, several longer simple spines terminally, exopod well developed, flagellum not exceeding antepenultimate segment of endopod, with four terminal plumose setae, coxa with small rounded medial margin, with semicircular lateral plate, without arthrobranch.

Thoracic sternites. Fourth without median process, with low transverse ridges (Fig. 6H) separated by small U-shaped median notch, fifth to eighth unarmed.

First pereopod. Slender (Fig. 4B), exceeding carpocerite by 0.5 of carpus and chela; chela (Fig. 4C) with palm oval in section, tapering slightly distally, about 2.3 times longer than depth, with three transverse rows of short serrulate spinules proximally, fingers slender, subequal to palm length, about 5.0 times longer than proximal depth, sparsely setose, with stout hooked terminal spines, cutting edges laminar over distal half, entire; carpus subequal to palm length in female, 4.3 times longer than distal width, tapering proximally, with few slender serrulate spines distoventrally, shorter than chela in male (Fig. 5B); merus about 1.25 times chela length, subcylindrical, 7.0 times

longer than width; ischium about 0.5 of merus length, basis short, without special features; coxa with setose distoventral process. Male first pereopod generally similar to female, carpus shorter than chela, about 0.75 of chela length.

Major second pereopod, female. Well developed (Fig. 4D), chela slender, about 1.1 of CL, palm subcylindrical, smooth, 4.0 times longer than depth, fingers (Fig. 4E) slender, slightly more than half palm length, dactylus slender about 5.6 times longer than proximal depth, tapering distally to stout terminal unguis, cutting edge with shallow entire lamina over distal third, proximal half thickened, unarmed, fixed finger similar, with single small acute tooth at 0.4 of length; carpus about 0.8 of palm length, 4.5 times longer than distal width, tapering proximally, unarmed; merus 1.1 times palm length 7.0 times longer than width, uniform, unarmed; ischium slender, about 1.25 times palm length, 9.5 times longer than distal width, tapering slightly proximally, unarmed; basis and coxa without special features.

Male. (Fig. 5C) chela slender, about 0.78 of CL, palm subcylindrical, smooth, 4.8 times longer than depth, fingers (Fig. 5D) slender, about 0.65 of palm length, dactylus slender about 5.0 times longer than proximal depth, tapering distally to stout terminal unguis, cutting edge with shallow entire lamina over distal third, proximal half thickened, unarmed, fixed finger similar, with single small acute tooth at 0.4 of length; carpus about 0.65 of palm length, 3.3 times longer than distal width, tapering proximally, unarmed; merus 1.3 times palm length, 7.0 times longer than width, uniform, unarmed; ischium slender, subequal to palm length, 8.5 times longer than distal width, tapering slightly proximally.

Minor second pereopod. Smaller (Fig. 4F), less well developed than major pereopod; chela about 0.6 of CL, 0.85 of major chela length, palm 4.0 times longer than depth, fingers 0.8 of palm length, slender, unarmed, carpus subequal to length of major carpus, about 0.75 of palm length, 6.0 times longer than distal width, tapering proximally, unarmed; merus 1.5 times palm length, 8.5 times longer than distal width, tapering slightly proximally, unarmed; ischium slender, 1.3 times palm length, 1.1 times merus length, basis and coxa without special features. *Male.* (Fig. 5E) smaller, less well developed than major pereopod; chela about 0.68 of CL, 0.83 of major chela length, palm 4.6 times longer than depth, fingers (Fig. 5F) 0.5 of palm length, slender, unarmed, carpus longer than major carpus, subequal to palm length, 4.7 times longer

than distal width, tapering proximally, unarmed; merus 1.1 times palm length, 8.0 times longer than distal width, tapering slightly proximally, unarmed; ischium slender, 1.2 times palm length, 1.1 times merus length.

Third pereopod. Slender, exceeding carapocrite by carpus, propod and dactyl; dactyl (Fig. 6J) slender, about 0.25 of propod length, corpus and unguis clearly demarkated, unguis simple, slender, curved, about 6.0 times longer than basal width, 0.77 of corpus length, corpus compressed, about 2.75 times longer than proximal depth, dorsal margin feebly convex, ventral margin feebly biconvex, unarmed, with single distolateral sensory seta; propod (Fig. 6I) 10.0 times longer than wide, uniform, sparsely setose, with pair of short simple distoventral spines, about half unguis length, 0.75 of distal propod width, with pair and single similar distal ventral spines, smaller simple spine at half propod length; carpus about 0.5 of propod length, 5.5 times longer than wide, unarmed, merus subequal to propod length, 11.0 times longer than wide, unarmed, ischium subequal to carpal length, half meral length, unarmed, basis and coxa without special features.

Fourth pereopod. Similar to third, propod about 1.1 times length of third propod, 11.5 times longer than deep, spinulation and dactylus as in third pereopod.

Fifth pereopod. Similar to third, propod (Fig. 6K) about 1.15 times length of third propod, 14.0 times longer than deep, with three long slender serrulate distolateral spines, two pairs of slender distal ventral spines, about twice length of third and fourth pereopod spines, small ventral spine at 0.65 of ventral length; dactyl (Fig. 6L) 0.2 of propod length, corpus less tapering than in third pereopod.

Male pleopods. First pleopod (Fig. 5G) normal, basipodite about 2.2 times longer than width, margins non-setose, lateral straight, medial strongly convex, exopod 1.2 times longer than basipodite, 4.5 times longer than wide, endopod (Fig. 5H) 0.5 of exopod length, about 2.8 times longer than width, distally pointed, with five short plumose setae distolaterally, medial margin with blunt accessory lobe distally, proximal margin with three short curved simple spinules, with single short plumose seta proximally. Second pleopod (Fig. 5I) similar to first, with basipodite about 1.2 times first basipodite length, 2.25 times longer than central width, exopod 1.2 times basipodite length, 4.0 times longer than width, endopod

(Fig. 5J) 0.9 of exopod length, 4.7 times longer than width, appendices (Fig. 5K) at about 0.3 of medial length, corpus of appendix masculina subcylindrical, 5.0 times longer than wide, 0.22 of endopod length, with three simple terminal spines, two subequal, about 1.2 times corpus length, one shorter, 0.75 of corpus length.

Uropod. (Fig. 2I) with protopodite posterolaterally rounded; exopod reaching to end of telson, 3.0 times longer than broad, lateral margin straight, sparsely setose, with small acute distolateral tooth, with larger mobile spine medially, diaeresis well developed (Fig. 6M); endopod about 0.8 of exopod length, 3.5 times longer than broad.

Ova. Numerous, small.

MEASUREMENTS. Holotype. postorbital carapace 2.0mm, carapace and rostrum 4.75mm, total body length (approx.) 13.7mm, major second pereopod chela 2.2mm, minor second pereopod chela 1.3mm; ova length 0.5mm. Allotype. postorbital carapace 1.7mm, carapace and rostrum 2.7mm, total body length (approx.) 8.5mm, major second pereopod chela 1.2mm, minor second pereopod chela 0.95mm.

COLOUR PATTERN. Unknown.

HOST. Unidentified bushy black corals [Antipatharia].

DISTRIBUTION. Type locality. Swain Reefs. Known only from Swain Reefs and Keeper Reef, Queensland, Australia. Bathymetric Range. 10–30m.

ETYMOLOGY. The species is named after the R.V. Kallisto, of the Russian Academy of Sciences Far East Science Center, Vladivostok.

SYSTEMATIC POSITION. *Periclimenes kallisto* is most closely related to a small group of species that includes *P. affinis* (Zehntner, 1894), *P. brocketti* Borradaile, 1915, *P. canalinsulae* Bruce & Coombes, 1997, and *P. jugalis* Holthuis, 1952. Of these, *P. kallisto* appears most closely related to *P. jugalis*, from which it is most readily distinguished by the slender ambulatory dactyls and the lack of teeth on the second pereopod dactyls. *Periclimenes jugalis* is known from the holotype specimen from the Aru Islands, Indonesia, and four specimens from Zanzibar (Bruce, 1976).

Periclimenes brocketti Borradaile, 1915, is known from the holotype specimen only (Borradaile, 1915), which was re-described by Bruce (1978), who noted its poor condition. The close resemblance to *P. affinis*, re-described by Holthuis (1958), and possible synonymy of these species has been pointed out (Bruce, 1978, 1982; Chace & Bruce, 1993). No fresh information on

P. brocketti has since become available and, as no distinguishing characters have been discerned, *P. brocketti* Borradaile, 1915, is now formally designated as a junior synonym of *Periclimenes affinis* (Zehntner, 1894). Both species were originally reported in association with crinoid hosts.

These species may be distinguished by the following key.

1. Rostral dentition 5/0, ambulatory propods with short blunt spines *P. canalinsulae* Bruce & Coombes
Rostral dentition greater than 5/0, ambulatory propods with long acute spines 2
2. First pereopod with carpus 1.4 times or more than length of chela; ambulatory propods with transverse rows of long setae disto-laterally; rostral dentition 6-7/1-2 *P. affinis* (Zehntner)
First pereopod with carpus 1.2 times or less than length of chela; ambulatory propods without transverse rows of long setae distolaterally 3
3. Teeth on fingers of second pereopod well developed, acute; ambulatory dactyls robust, rostral dentition 7/2 *P. jugalis* Holthuis
Teeth on fingers of second pereopod obsolete; ambulatory dactyls slender, rostral dentition generally 7-9/1 (rarely /0,2) *P. kallisto* sp. nov

REMARKS. Although associated with a wide variety of coelenterate hosts, few of the Indo-West Pacific species of *Periclimenes* appear to have been previously recorded in association with antipatharian hosts. Species associated with antipatharians that were earlier included in the genus *Periclimenes*, have since been transferred to other genera, such as *Kemponia nilandensis* (Borradaile, 1915) and *Manipontonia psamathe* (De Man, 1902). Two species of the restricted genus *Periclimenes* have been reported from *Antipathes* by Duris (1990), *P. brucei* and *P. zeviniae*, both from about 50m in the Maldive Islands. *Periclimenes brucei* shows a close resemblance in its bodily parts to *P. kallisto* but is markedly different in the presence of one extremely elongated slender second pereopod and distinctly biunguiculate ambulatory dactyls. *Periclimenes zeviniae* also has stoutly biunguiculate ambulatory dactyls. It also has characteristic finger tips on the first pereopod chela, which are broadly rounded and minutely multidentate, quite unlike the slender simple fingers of *P. kallisto*, or any other *Periclimenes* species.

One female specimen of *P. kallisto* was examined in which the dactyl of the third ambulatory (Fig. 4H) was as in the holotype female but the fourth had a minute distal accessory denticle (Fig. 4G). The fifth pereopod dactyl (Fig. 4I) has a small acute distal accessory tooth.

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