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Periclimenes jackhintoni sp. nov. (Crustacea: Decapoda: Palaemonidae), a new pontoniine shrimp and crinoid associate from Tonga

A.J. BRUCE

Research Associate, Museum and Art Gallery of the Northern Territory
GPO Box 4646, Darwin, NT 0801, AUSTRALIA
abruce@broad.net.au

ABSTRACT

A new species of pontoniine shrimp, *Periclimenes jackhintoni* sp. nov., from Tonga is described and illustrated. The new species is most closely related to *P. ceratophthalmus* Borradaile (Palaemonidae). It is readily distinguished from *P. ceratophthalmus,* and all other species of *Periclimenes,* by its unusual sickle-shaped rostrum. The unique specimen was found in association with an unidentified crinoid host.

KEYWORDS: *Periclimenes,* new species, systematics, commensal, Crustacea, Decapoda, Pontoniinae, Tonga, south-west Pacific.

INTRODUCTION

During the course of the Project Raleigh 1986 trans-Pacific cruise, samples of commensal shrimps were collected from a variety of coral reefs between San Francisco and Darwin by Dr Matt Richmond. These were presented to the Museum and Art Gallery of the Northern Territory. Amongst the specimens collected, a single specimen of a new species of pontoniine shrimp was identified from Tonga. This specimen is here described and illustrated.

Some of the earliest pontoniine shrimps to be described from the Indo-west Pacific region were reported from the islands of the Tongan archipelago. Dana (1852) reported *Harpilius lutescens* and *Coralliocaris graminea* (as *Oedipus gramineus*). Since that time the shallow water pontoniine fauna has received little attention and only three species have been added the Tongan fauna list: *Periclimenes ceratophthalmus* Borradaile, from the Vava'u Islands (Borradaile 1915); *Periclimenes tonga* Bruce, from Nuapapu Island, Vava'u Islands (Bruce 1989); and most recently *Odontonia katoi* (Kubo) from Tonga (Fransen 2006). Of the five, *P. tonga* is known only from the holotype from Tonga. The discovery of a further new pontoniine shrimp is therefore of interest and suggests that the Tongan reefs would be worthy of more detailed study. Of the six pontoniine species now known from Tonga, two have not been reported from elsewhere and Tonga is now the type locality for four species.

The holotype specimen is deposited in the collections of the Museum and Art Gallery of the Northern Territory, Darwin.

Abbreviation used, NTM, Museum and Art Gallery of the Northern Territory; CL, postorbital carapace length.

SYSTEMATICS

Family Palaemonidae Rafinesque
Subfamily Pontoniinae Kingsley
Genus *Periclimenes* Costa
***Periclimenes jackhintoni* sp. nov.**
(Figs 1–5)

Material examined. HOLOTYPE – male, Project Raleigh, stn 65a, Nukualofa, Tongatapu , Tonga, 1.5 m, 17 August 1986, coll. M. Richmond, NTM Cr. 004258.

Diagnosis. A *Periclimenes* with a slender decurved sickle-shaped rostrum, feebly dentate distally, without ventral teeth, well-developed supraorbital teeth, inferior orbital angle without ventromedial flange, small marginal antennal spine, small fixed hepatic spine, proximal segment of antennule distolaterally bidentate, cornea with long terminal papilla, small acute epistomal horns present, fourth thoracic sternite without median process, incisor process distally expanded, multidentate, first pereiopod with slender chela with simple fingers with entire cutting edges, second pereiopods unknown, ambulatory dactyls biunguiculate, abdominal pleura rounded, male first pleopod without medial accessory lobe, telson with 2 pairs of small dorsal spines.

Description. A small slenderly built pontoniine shrimp, body subcylindrical, smooth, glabrous (Fig. 1).

Rostrum (Fig. 2B) well developed, about 0.68 of CL, reaching to middle of intermediate segment of antennular peduncle, slender, compressed, decurved, dorsal carina distinct, extending on to anterior carapace, dorsal margin convex, mainly unarmed, with 2 very small denticles on terminal tenth (Fig. 5A), tip slightly up-turned, ventral

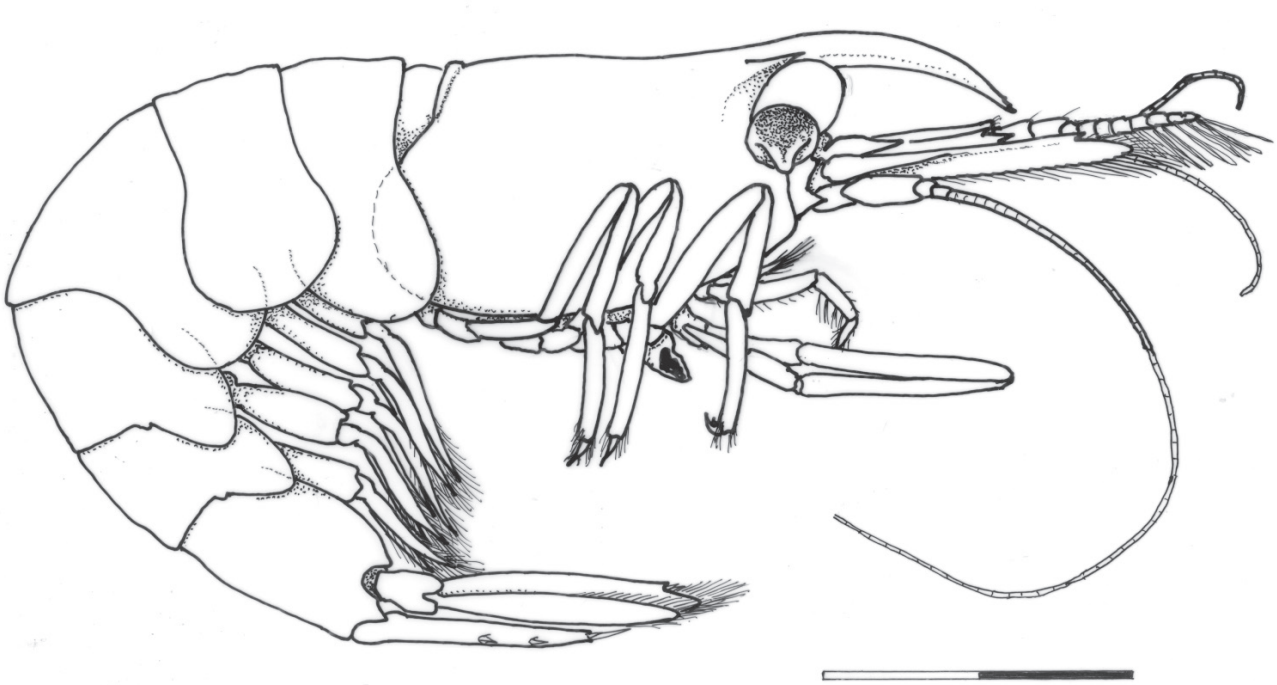

Fig. 1. *Periclimenes jackhintoni* sp. nov., holotype, Tonga, NTM Cr.004258. Scale bar in millimetres.

margin concave, non-setose, unarmed, lateral carinae obsolescent on rostrum proper, expanded laterally over orbit, with small acute lateral tooth.

Carapace with orbit feebly developed (Fig. 2A), inferior orbital angle produced (Fig. 2C) rounded, incurved, without ventral flange, antennal spine slender, marginal, close below inferior orbital angle, hepatic spine similar to antennal, fixed, slightly lower than antennal spine, slightly posterior, anterolateral branchiostegite bluntly rounded.

Abdomen without special features, sixth segment about 0.6 of CL, 1.5 times longer than deep, 1.7 times longer than fifth segment, posterolateral angle acute, posteroventral angle blunt, pleura broadly rounded, margins non-setose.

Telson (Fig. 2I) about 1.3 times sixth segment length, 0.7 of CL, 2.2 times longer than proximal width, expanded proximally, tapering distally, with 2 pairs of small submarginal dorsal spines, about 0.05 of telson length, at 0.5 and 0.75 of telson length, posterior margin about 0.27 of proximal width, angular, slightly produced centrally with small acute median process, lateral spines small, slightly longer than dorsal spines, intermediate spines long, slender, about 0.25 of telson length, 3.0 times lateral spine length, submedial spines slender setulose, about 2.0 times lateral spine length (Fig. 2J).

Antennule (Fig. 2D) with proximal segment of peduncle about 1.8 times longer than wide, medial margin straight, non-setose, with ventromedial tooth at about half length, lateral margin strongly produced distally, with acute inner lobe reaching to distal margin of intermediate segment, with smaller acute distolateral tooth laterally (Fig. 5B); intermediate and distal segments short, subequal, combined length about half of proximal segment length, upper flagellum biramous, short, proximal 3 segments fused, short free ramus with 3 segments, longer ramus filiform, with 3 segments, with about 12 groups of aesthetascs, each darkly pigmented near base, lower flagellum filiform, with 18 segments.

Antenna (Fig. 2E) with basicerite with well-developed acute lateral tooth, distomedial angle with small blunt subcylindrical process, carpocerite short, robust, about twice as long as broad, reaching to about 0.33 of scaphocerite length, flagellum short, scaphocerite well developed, about 3.0 times longer than broad, wider proximally, tapering slightly distally, distal margin bluntly angular, lateral margin straight, with short acute distolateral tooth at about 0.8 of scaphocerite length.

Ophthalmic somite with small accessory pigment spot, without *béc ocellaire*.

Eye (Fig. 2F, G) well developed, cornea oblique, well pigmented, globular, with small dorsal accessory pigment spot, with large distal papilla, proximally broad and compressed, becoming cylindrical and tapering strongly distally, maximal length of cornea subequal to stalk length, stalk sub-cylindrical, tapering slightly distally, about 1.8 times longer than proximal width.

Epistome (Fig. 2H) with small acute horns laterally.

Mandible (Fig. 3A) corpus robust, without palp; incisor process (Fig. 5D) distally moderately expanded, obliquely truncate, with 8 small acute teeth, lateral tooth enlarged, medial tooth reduced, intermediate teeth subequal, molar process stout, obliquely excavate, with blunt marginal teeth and setose tubercles (Fig. 5C).

Maxillula (Fig. 3B) with feebly bilobed palp (Fig. 5E), lower lobe with ventral tubercle with minute simple seta;

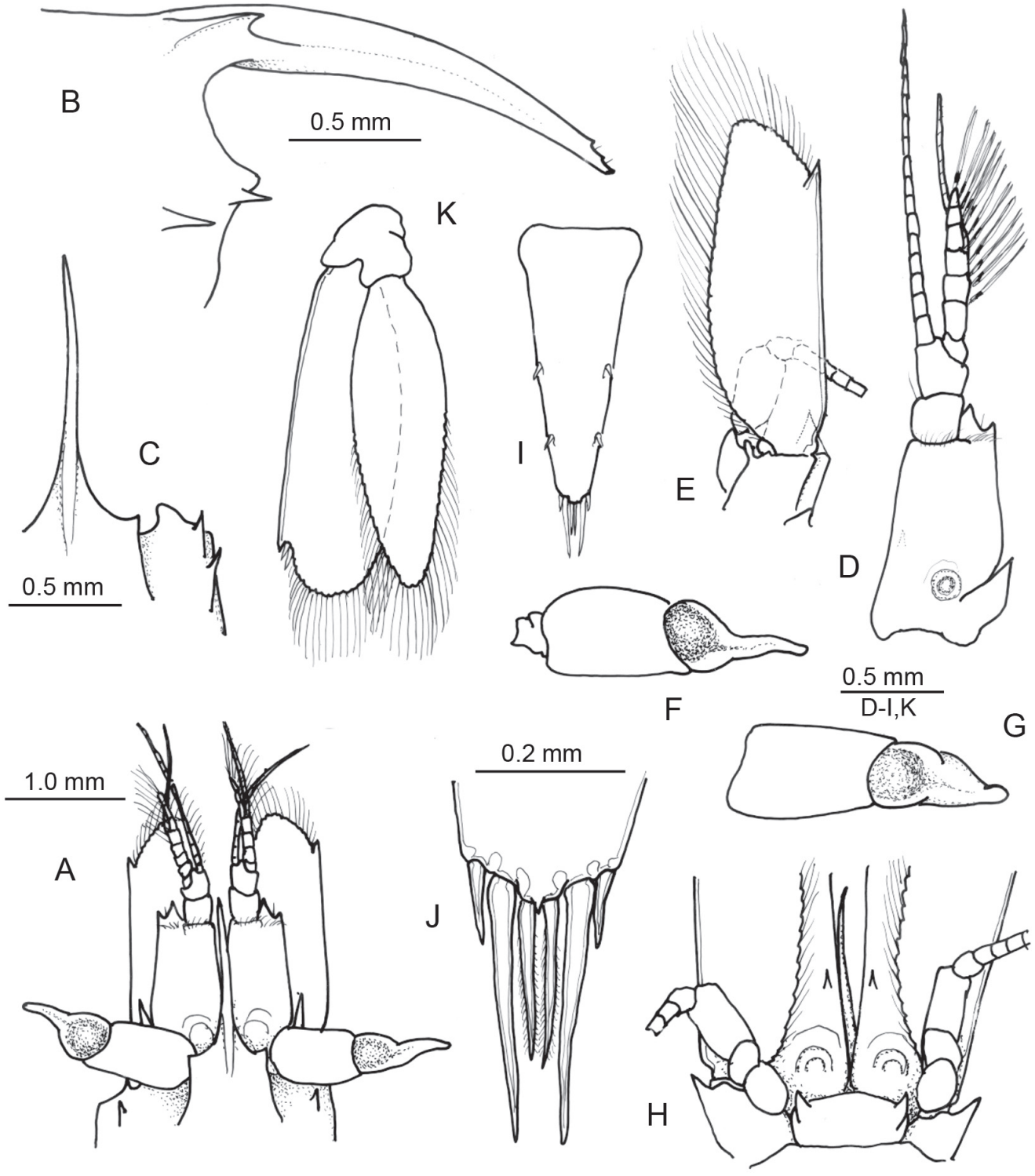

Fig. 2. *Periclimenes jackhintoni* sp. nov., holotype, Tonga, NTM Cr.004258. **A**, anterior carapace and appendages, dorsal; **B**, rostrum and orbital region lateral; **C**, rostrum and right orbital, dorsal; **D**, antennule. **E**, antenna; **F**, eye, lateral; **G**, same, dorsal; **H**, epistomal region, ventral; **I**, telson; **J**, same, posterior spines, (dorsal spine inset); **K**, uropod.

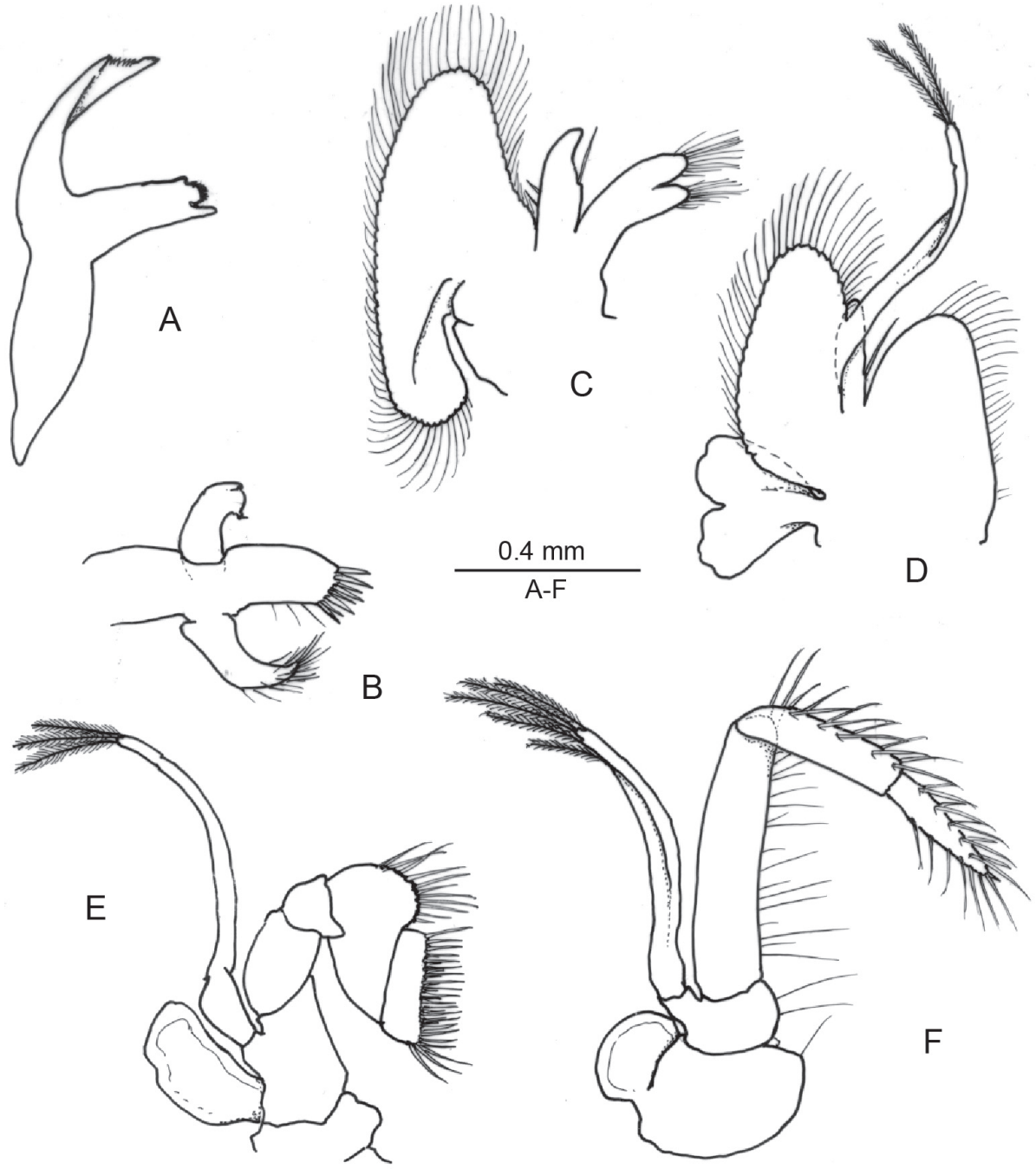

Fig. 3. *Periclimenes jackhintoni* sp. nov., holotype, Tonga, NTM Cr.004258. Mouthparts, left side. **A**, mandible; **B**, maxillula; **C**, maxilla; **D**, first maxilliped; **E**, second maxilliped; **F**, third maxilliped.

upper lacinia bluntly truncate distally with 8 stout simple spines (Fig. 5F), with sparse simple setae, lower lacinia tapering distally with numerous spiniform setae.

Maxilla (Fig. 3C) with simple tapering palp, with slender simple seta at half medial margin length, 2 small plumose setae proximolaterally, basal endite bilobed, lobes short, stout, distally rounded with 10–11 slender simple setae distally, coxal endite obsolete, margin rounded, scaphognathite broad, 2.2 times longer than wide, posterior lobe about 1.5 times longer than basal width, 0.8 of anterior lobe length, anterior lobe about as wide as long, medial margin slightly emarginate.

First maxilliped (Fig. 3D) with short subcylindrical endopod with single simple seta at 0.3 of medial margin, basal endite broad, distally rounded, medial margin straight, sparsely setose, with simple setae, coxal endite obsolete, exopod with well developed flagellum with 2 plumose terminal setae, caridean lobe large, broad, epipod smaller, triangular, bilobed.

Second maxilliped (Fig. 3E) of normal form, dactylar segment about 3.0 times longer than broad,

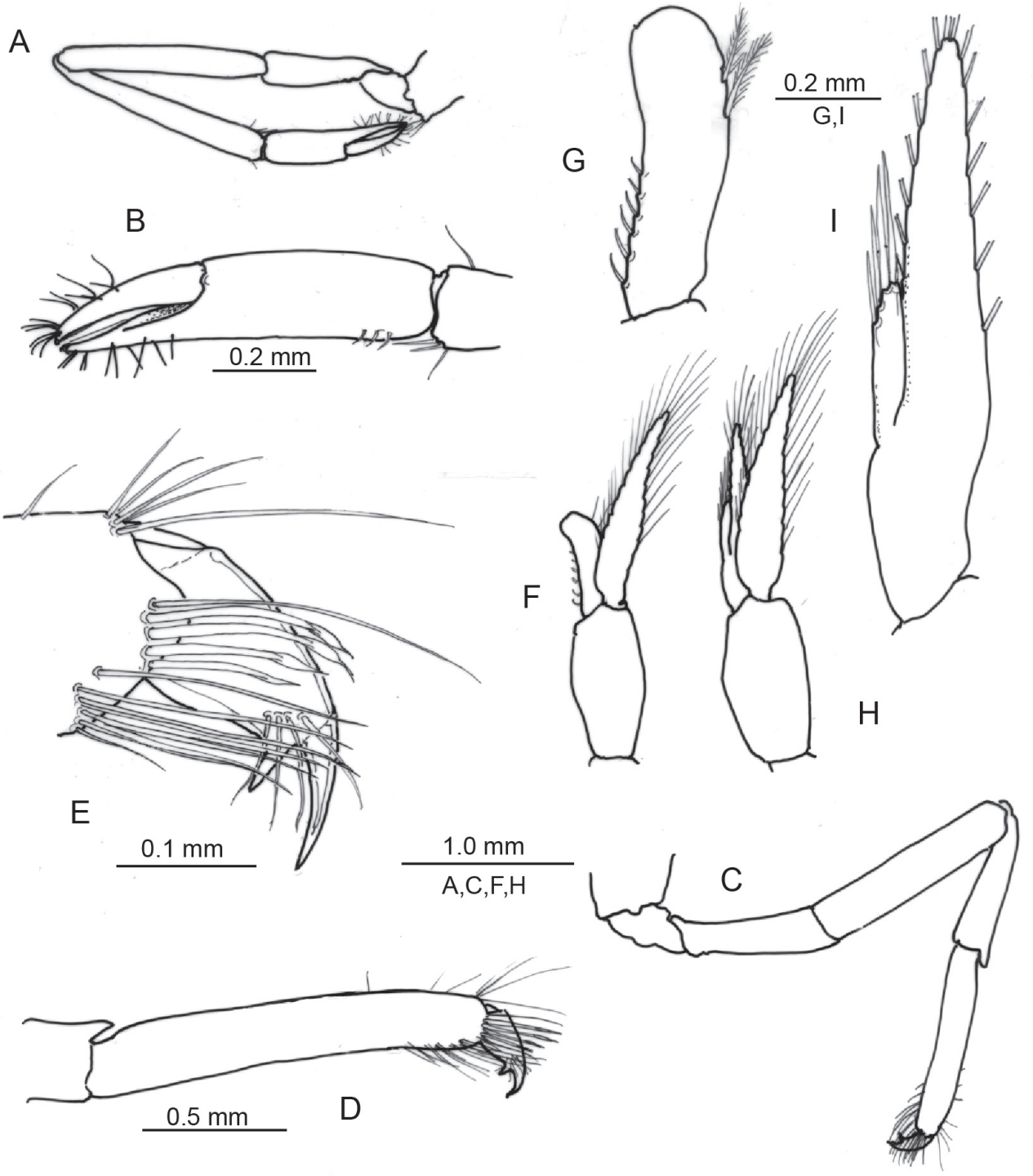

Fig. 4. *Periclimenes jackhintoni* sp. nov., holotype, Tonga, NTM Cr.004258. **A**, first pereiopod; **B**, same, chela; **C**, third pereiopod; **D**, same, propod and dactyl; **E**, same, distal propod and dactyl; **F**, first pleopod; **G**, same, endopod; **H**, second pleopod; **I**, same, endopod.

with numerous denticulate spines along medial margin, propodal segment anteromedially rounded with about 9 long marginal spines, merus and ischiobasis without special features, exopod with well developed flagellum with 3 plumose terminal setae, coxa with medial margin angular, non-setose, with subrectangular epipod laterally, without podobranch.

Third maxilliped (Fig. 3F) with endopod reaching to proximal carpocerite**,** ischiomerus distinct from basis, about 4.5 times longer than wide, tapering slightly distally, sparsely provided with simple setae along medial margin, penultimate segment about 0.6 of proximal segment length, 3.7 times longer than width, with sparse spiniform setae, terminal segment about 0.8 of penultimate segment length, 3.6 times longer than proximal width, with sparse groups of spiniform setae, with small short terminal spine, basis medially rounded with 2 simple setae, exopod with well developed flagellum with 5 plumose terminal setae,

coxa medially angular, with rounded lateral plate, without arthrobranch.

Thoracic sternites with fourth sternite without median process, posterior sternites unarmed.

First pereiopod (Fig. 4A) slender, exceeding carpocerite by carpus and chela; chela (Fig. 4B) slender, palm subcylindrical, oval in section, about 2.5 times longer than width, with sparse cleaning setae proximoventrally, fingers slender, about 0.75 of palm length, dactyl about 4.0 times longer than proximal width, tapering distally, with small robust hooked terminal spine and smaller accessory tooth, with sparse tufts of setae distally, cutting edge entire over distal third only, fixed finger similar; carpus sub-cylindrical, about 1.6 times chela length, 7.0 times longer than width, tapering slightly proximally; merus about 0.95 of carpus length, ischium 0.55 of carpus length; basis and coxa short, without special features, coxa with small setose distoventral process.

Second pereiopods missing, bases and coxae similar, robust.

Ambulatory pereiopods moderately robust. Third pereiopod (Fig. 4C) reaching almost to end of antennular peduncle, dactyl (Fig. 5G) short, compressed, about 0.22 of propod length, unguis well developed, distinctly demarkated from corpus, curved, about 0.75 of corpus length, 4.0 times longer than basal width, corpus about 1.4 times longer than maximal width, dorsal margin convex, without spinules, ventral margin strongly convex, with strong slightly recurved accessory tooth distally, about 0.5 of unguis length, with 4 well-developed sensory setae

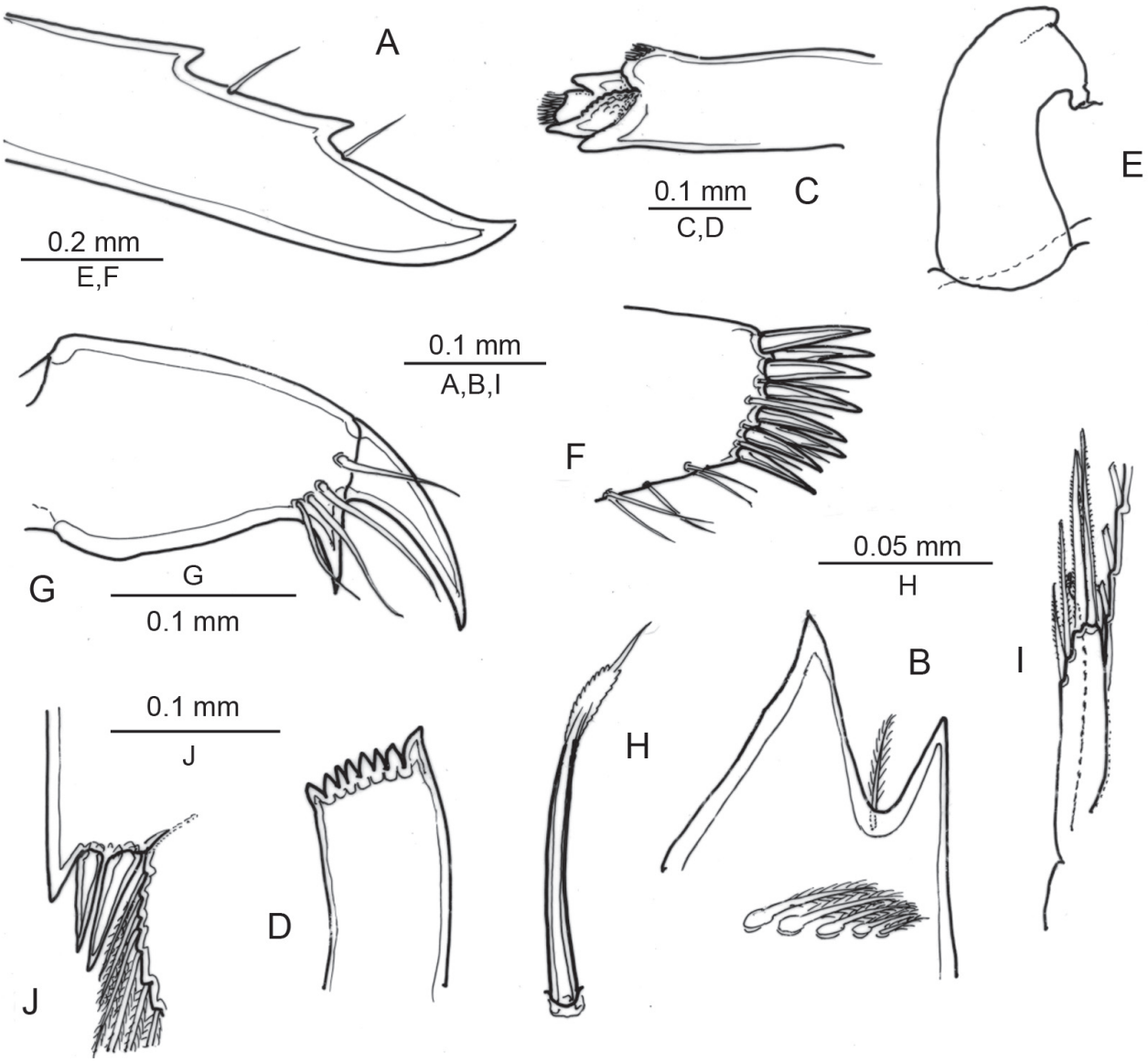

Fig. 5. *Periclimenes jackhintoni* sp. nov., holotype, Tonga, NTM Cr.004258. **A**, tip of rostrum; **B**, right antennule, distolateral angle of proximal segment; **C**, mandible, molar process; **D**, same, incisor process; **E**, maxillula, palp; **F**, same, distal end of dorsal lacinia; **G**, third pereiopod, dactyl; **H**, same, seta from distolateral propod; **I**, second pleopod, appendices masculina and interna; **J**, uropod, distolateral exopod.

distolaterally; propod (Fig. 4D) about 0.4 of CL, about 6.4 times longer than wide, without spines, with numerous long slender simple setae distoventrally, with 4 stout long stout setae distolaterally (Fig. 4E), with preterminal portion expanded, finely denticulate (Fig. 5H); carpus about 0.75 of propod length, 4.0 times longer than distal width, tapering slightly proximally, with well developed distodorsal lobe, unarmed, merus 1.2 times propod length, 4.6 times longer than wide, uniform, unarmed; ischium 0.9 of propod length, 3.0 times longer than distal width, unarmed, basis and coxa without special features, unarmed. Fourth and fifth pereiopods similar to third; fourth propod 1.1 times, fifth subequal to length of third propod.

Male first pereiopod (Fig. 4F), basipodite about twice as long as broad, exopod 1.3 times basipodite length, endopod (Fig. 4G), 0.5 of exopod length, 4.0 times longer than central width, distal third slightly expanded, rounded, lateral margin with 2 short plumose setae, medial margin without accessory lobe, proximal half straight, with 6 short curved simple spines.

Male second pleopod (Fig. 4H) basipodite similar to first pleopod, slightly longer, exopod 1.3 times basipodite length, endopod (Fig. 4I) about 0.8 of exopod length, about 6.5 times longer than central width, with numerous plumose marginal setae, with appendices (Fig. 5I) at 0.3 of medial margin length, appendix masculina about 0.28 of endopod length, subcylindrical, 5.5 times longer than wide, with long stout finely spinulate terminal spine, almost equal to appendix length, with three similar spines of decreasing length proximally along distomedial border, appendix interna exceeding appendix masculina corpus, with few cincinnuli.

Uropod (Fig. 2K) with protopodite bluntly rounded posterolaterally; exopod about 0.8 of CL, 3.0 times longer than broad, lateral margin straight, unarmed, non-setose, with small acute tooth posterolaterally with 2 mobile spines medially on left (Fig. 5J), one on right, diaeresis obsolete; endopod about 0.95 of exopod length, 3.0 times longer than broad.

Host. Unidentified orange crinoid, not preserved.

Colouration. Not recorded.

Etymology. The species is named to honour Dr Colin Jack-Hinton (1933-2006), Foundation Director of the Northern Territory Museum (now Museum and Art Gallery of the Northern Territory), Darwin, in appreciation of his help and encouragement.

Systematic position. *Periclimenes jackhintoni* is most closely related to *P. ceratophthalmus* Borradaile, another crinoid-associated species. *Periclimenes jackhintoni* is readily distinguished from *P. ceratophthalmus* by the long slender decurved sickle-shaped rostrum with two small distal teeth, contrasting with the straight deeper rostrum, slightly up-turned distally, with three to six relatively larger teeth distributed usually over the distal two-thirds of the dorsal border in *P. ceratophthalmus*, as illustrated by Borradaile (1917: pl. XVII, fig. 9a). The corneal papilla is usually short and stout in *P. ceratophthalmus*, about equal to the corneal diameter in length (Bruce 1978: fig. 2A), contrasting with a long slender acutely tapering papilla, about 1.5 times the corneal diameter, in *P. jackhintoni.*

Remarks. *Periclimenes ceratophthalmus* of authors appears to comprise two similar species, both of which are similarly separable from *P. jackhintoni,* lacking its characteristic rostrum. These taxa differ particularly in rostral dentition and telson spinulation. These, together with other closely related species, also found on crinoid hosts, whose systematic status is being revised by J. Okuno and Y. Fujita, are all likely to be removed from the genus *Periclimenes*.

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