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A new genus of Stenetriidae Hansen, 1905 (Asellota: Isopoda: Crustacea) from the Great Barrier Reef, Australia and the southwestern Pacific

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Abstract

Onychatrium **gen. nov.** is described, with five included species: *Onychatrium forceps* **sp. nov.**, the type species and *Onychatrium torosus* **sp. nov.**, both from the Great Barrier Reef; *Onychatrium entale* (Nordenstam, 1946) **comb. nov.**, from Tapateuen (= Tabiteue Island), Gilbert Islands; *Onychatrium thomasi* (Bolstad & Kensley, 1999) **comb. nov.**, from Madang, Papua New Guinea; and *Onychatrium echiurum* (Nobili, 1906) **comb. nov.**, and *species inquirenda* from the Tumaotu Islands, Eastern French Polynesia. The primary distinguishing characters for *Onychatrium* **gen. nov.** are a trapezoid pseudosrostrum, the male pereopod 1 with elongate dactylus (4.7–7.3 as long as proximal width), propodus with strongly produced and acute lobe, carpus with a distally acute, flat, ventrally directed process (except *O. torosus* **sp. nov.**, which has a short and truncate process) and the merus with a distally directed inferodistal lobe. The genus is known only from the southern Pacific, from the Tuamotus (eastern French Polynesia) to the Great Barrier Reef and northern Papua New Guinea.

Key words: Asellota, Isopoda, Crustacea

Introduction

The isopod fauna of coral reefs can be considered moderately well known, albeit with significant taxon and regional gaps in knowledge (see Poore & Bruce 2012). In the Australian context the primary regional gaps in documentation are the western and northern coral reefs, and the major taxonomic gap was and remains the Asellota, which in 2010 was represented by merely three species: *Joeropsis sandybrucei* Bruce, 2009; *Ascionana magnetica* Just & Wilson, 2004; and *Prethura hutchingsae* Kensley, 1982. Recent publications (Bruce & Buxton 2013; Bruce 2015; Shimomura & Bruce 2012) have started to redress this imbalance. A focus of attention has been the family Stenetriidae Hansen, 1905, which is both diverse and abundant on coral reefs (see Kensley 1984; Kensley & Schotte 2002; Müller 1990, 1991a, b; Martin *et al.* 2003), being represented in Australia by at least eight genera (Bruce & Buxton 2013). The present work continues documenting the tropical Stenetriidae of Australia.

Bruce & Buxton (2013) reviewed *Hansenium* Serov & Wilson, 1995, redefining the genus on the basis of the type species and excluding all but two species from the genus. In the same work, the genus *Machatrium* Bruce & Buxton, 2013 was established with nine species, the remaining species of *Hansenium* all being regarded as *incertae sedis* or *species inquirenda*. Some of the species excluded from *Machatrium* and *Hansenium* (*sensu strictu*) formed definable groups, one such group being a small number of species similar to *Stenetrium entale* Nordenstam, 1946, characterized by the male pereopod 1 having a greatly elongate dactylus and the propodus inferior margin with a strongly produced process, among other characters. This group of species is here formally recognized as *Onychatrium* **gen. nov.**, with five species, all from shallow-water coral reef environments in the southwestern Pacific. The erection of *Onychatrium* **gen. nov.** does not necessitate any change to the diagnosis for *Hansenium* given by Bruce & Buxton (2013), with only two included species, all other species in the genus at that time being transferred to *Machatrium* or placed into the category of *incertae sedis*, as such not conforming the genus *Hansenium* Bruce & Buxton, 2013 *sensu strictu*.

Methods

See Bruce & Buxton (2013) for a detailed account of field methods; DELTA (Dallwitz 1980; Dallwitz *et al.* 1997, 2006; Coleman *et al.* 2010) was used to prepare descriptions; character sets for both genera and species have been further refined and developed to include the new taxa. Measurements methods and definitions for pereopod 1 are given in Bruce & Buxton (2013).

The word ‘**bommie**’ (noun; popular usage; from bombora, first used in 1871; in turn derived from the Dharuk Aboriginal word bumbora) has been defined as “an outcrop of coral reef, often resembling a column, that is higher than the surrounding platform of reef and which may be partially exposed at low tide” (Anon 2014). These large free-standing coral outcrops, often a massive *Porites* colony, can reach 10 metres in height. Bommie Bay, Lizard Island is named for these structures.

Abbreviations. MTQ—Museum of Tropical Queensland, Townsville; SMNH—Swedish Museum of Natural History Stockholm; RS—robust seta/e.

Taxonomy

Isopoda Latreille, 1817

Asellota Latreille, 1802

Stenetrioidea Hansen, 1905

Stenetriidae Hansen, 1905

Onychatrium gen. nov.

Type species: *Onychatrium forceps* sp. nov., here designated.

Species included. *Onychatrium forceps* sp. nov., type species and *Onychatrium torosus* sp. nov., both from the Great Barrier Reef; *Onychatrium entale* (Nordenstam, 1946) **comb. nov.**, Tapateuen (=Tabiteue Island), Gilbert Islands, Kiribati; and *Onychatrium thomasi* (Bolstad & Kensley, 1999) **comb. nov.** Madang, Papua New Guinea. *Onychatrium echiurum* (Nobili, 1906) **comb. nov.**, Tumaotu Islands, Eastern French Polynesia, belongs to the genus, but as there is no type material for Nobili’s specimens (Nobili 1906; see Bruce & Buxton 2013), and the description and figures are minimal; the species is here regarded as *species inquirenda*.

Diagnosis. Cephalon lateral margins smooth, lateral spines acute, antennal spines sub-equal in length to lateral, acute; antennal spines about as long as pseudorostrum. Pseudorostrum trapezoid, wider than long. Male pereopod 1 merus quadrate with inferodistal process; carpus inferodistal process triangular, projecting at approximately 45° to axis of merus–propodus; propodus elongate (length at least 1.6–2.5 times longer than proximal width), propodal palm transverse or oblique, narrow, 0.4–0.6 as wide as propodus width, with toothed lobe bearing 3–5 teeth, with large terminal RS; palm with large inferior process, curved distally or straight, tapering to rounded apex with terminal RS; dactylus elongate, 4.7–7.3 as long as proximal width, 1.1–1.4 length of propodus; superior margin distal one-third densely setose, inferior margin with 15–18 regularly-spaced robust setulate setae. Male pleopod 2 appendix masculina widest at mid-length, distally narrowed, sub-acuminate, without setae; lateral margin with 0 or 1 proximally directed spines.

Description of male. Eyes large (more than 12 ommatidia), reniform. *Body* dorsal surface smooth or sparsely setose, widest at pereonite 1; *pereonite 1* length 0.8–1.6 times pereonite 2 length; *pereonites 2–4* lateral margins concave to straight, anteriorly acute. *Pleotelson* length subequal to width; lateral margins smooth, sub-parallel, posterolateral spines prominent, margin posterior to spines rounded with weak apical point; dorsal surface smooth, not setose.

Antenna length equal or longer than total body length, article 1 lateral spine absent.

Pereopod 1 basis superior margin with regularly spaced setae along length, superior submarginal ridge with row of setae. *Merus* inferior submargin with a dense patch of long setae, superodistal margin not produced, densely setose, with long setae. *Carpus* inferodistal margin produced. *Propodus* superior side robust, superior margin with submarginal row of long setae; inferior margin with submarginal row of long setae, both laterally and mesially.

Pleopod 1 protopod rectangular, lateral margin setae present; rami lateral margins evenly convex. *Pleopod 2* protopod 3 times longer than wide, proximal lobe extending mesially *c* 1.6–1.7 medial width; distal apex sharply pointed; *endopod* length 0.4–0.5 protopod length. *appendix masculina* lateral margin groove present.

Female. Generally similar to male but for primary sexual characters. *Pereopod 1 basis* submarginal ridge with regularly-spaced short setae, 1 long seta. *Ischium* superodistal margin produced, apex blunt with 1 large, long seta. *Merus* superodistal margin produced, process sub-triangular, with dense long setae mesially, inferodistal margin not produced. *Carpus* inferodistal margin produced. *Propodus* widest distally; superior side robust, with central oblique area of steep narrowing, inferior side a wide, thin blade; inferior margin densely setose, with a row of setulate setae and a row of simple setae. *Propodal palm* straight, slightly oblique; width *c* equal to inferior margin length, 0.6 propodus maximum width; with 5–8 teeth increasing in size towards inferior end; inferior end of palm with single robust flagellated seta and single robust serrate seta adjacent to first tooth.

Pleopod 2 lateral margins parallel or becoming closer together distally, with 3 setae; apex with 1–2 setae, inferior surface sparsely setose.

Remarks. *Onychatrium* **gen. nov.** is characterised by the putative apomorphies of the male pereopod 1 propodus having a prominent, elongate and distally acute process arising from the proximal inferior margin together with an elongate dactylus, the tip of which extends well beyond the propodal process; the palm is narrow, with a weakly to strongly toothed lobe; three of the four species have a prominent, triangular and distally acute inferior carpal process that projects strongly away from the axis of the propodus at an angle of approximately 45°; the merus of all species has a slender inferodistal process that is variable in size between species; pleopod 2 appendix masculina is widest at mid-length, with a narrowly rounded sub-acuminate apex that lacks a setose fringe.

The female pereopod 1 of *Onychatrium* has a single serrate robust seta on the palm, positioned adjacent to the large robust seta at the inferodistal angle of the palm (Fig 4F). All species of *Hansenium* Serov & Wilson, 1995 and *Machatrium* Bruce & Buxton, 2013 (where illustrated) have a series of submarginal serrate setae on the female palm, with the exception of *Machatrium thungku* Bruce & Buxton, 2013, which has none.

Onychatrium **gen. nov.** belongs to a group of stenetriid genera that is characterised by having a trapezoid pseudorostrum. The principle differentiating and diagnostic characters that separate *Onychatrium* from *Hansenium* Serov & Wilson, 1995, *Machatrium* Bruce & Buxton, 2013 and *Stenetrium* Haswell 1881 are presented in Table 1. *Onychatrium*, *Hansenium* and *Machatrium* typically have a prominent carpal process on pereopod 1. In *Onychatrium* the process is triangular in profile and projects at an approximate angle of 45° to the meral–propodal axis, whereas in *Machatrium* the carpal process extends at a weak angle (approximately 10° to axis) along the propodus; in *Hansenium* the process is serrate and is not triangular.

Liocoryphe Serov & Wilson, 1995 has a prominent spoon-like carpal process on the male pereopod 1. This genus is clearly distinguished from *Onychatrium* **gen. nov.** as well as *Hansenium* and *Machatrium*, in having small eyes (4–6 vs 12 or more ommatidea), the head lacking antennal and lateral spines, the dorsum lacking chromatophores and the pseudorostrum is anteriorly rounded, not trapezoid.

Onychatrium torosus **sp. nov.** has a weak carpal process, a relatively long meral process and also has an elongate merus. In the context of the stenetriid genera these are significant differences from the other congeneric species but the diagnostic propodal process, elongate dactylus and appendix masculina morphology permits the species to be held in this combination.

Species of *Onychatrium* **gen. nov.** are largely and most readily separated by differences in the morphology of the male pereopod 1. There are also subtle difference in the proportions of the cephalic spines, and the shape of the space between the antennal and lateral spine. The shape and size of the various processes and lobes on the male pereopod 1 develop with maturity, and this is illustrated in Figure 10 for the three species for which there are multiple specimens.

Distribution. The genus is known from the southwestern Pacific, and has been recorded only from coral-reef habitats: Great Barrier Reef, Queensland; Madang, Papua New Guinea (Bolstad & Kensley 1999); Tuamotu Islands, French Polynesia (Nobili 1906, 1907) and Kiribati (Nordenstam 1946).

Etymology. Derived from the Greek ‘onychos’ (onyx) meaning talon or claw, combined with ‘-trium’ indicating family affinity; gender neuter.

TABLE 1. Principle differentiating characters for *Hansenium*, *Stenetrium* and *Machatrium* and *Onychatrium* **gen. nov.** Putative apomorphic characters (bold) are identified for *Onychatrium*. Principal published sources are Serov and Wilson (1995, 1999) for *Stenetrium* and Bruce and Buxton (2013) for *Hansenium* and *Machatrium*.

Character	<i>Onychatrium</i> gen. nov.	<i>Hansenium</i>	<i>Machatrium</i>	<i>Stenetrium</i>
1. Antenna (A2), article 1	without lateral spine	without lateral spine	without lateral spine	with lateral spine
2. Pseudorostrum/rostrum	pseudorostrum trapezoid, wider than long	pseudorostrum trapezoid, wider than long	pseudorostrum trapezoid, wider than long	Rostrum; sub-triangular
3. Pereopod 1 propodus	inferior margin thick, not blade-like	inferior margin thick, not blade-like	inferior margin blade-like	inferior margin blade-like
4. Pereopod 1 propodus	moderate (1.3–1.6 L/W)	moderate (1.6–2.0 L/W)	elongate (1.5–2.4 L/W)	short (1.0–1.3) (from Serov and Wilson 1995)
5. Pereopod 1 propodus palm	transversely truncate	oblique with mid-margin inflection	transversely truncate or distally inflected	transversely truncate
6. Pereopod 1 propodus palm	narrow (0.4–0.6 propodal width)	wide (0.8 propodal width)	wide (0.7–0.8 propodal width)	wide (0.8 propodal width; type species)
7. Pereopod 1 palm proximal inferior margin	with long, acute distal process	without distal process	without distal process	without distal process
8. Pereopod 1 carpus inferior margin	with ventrally projecting blade	long serrated blade; anteriorly projecting	long spatulate blade; anteriorly projecting	without carpal blade
9. Pereopod 1 merus	quadrate (except <i>O. torosus</i> sp. nov.)	quadrate	angular	angular (from Serov and Wilson 1995)
10. Pereopod 1 merus	with anteriorly projecting blade	without blade	without blade	without blade
11. Appendix masculina	without apical setae	without apical setae	with apical setae	with apical setae
12. Appendix masculina	narrowly rounded apically; margins sub-parallel	bluntly rounded apically; margins sub-parallel	distally wide, excavate rounded apically; margins diverging	styliform (in type species)

Key to the species of *Onychatrium* gen. nov.

1. Male pereonite 1 length approx. 1.5 pereonite 2 length; pereopod 1 carpal process short, weakly produced, length 0.2 carpal width; propodus without free proximal inferior margin *O. torosus* **sp. nov.**
- Male pereonite 1 length approx. 0.9–1.2 pereonite 2 length; carpal process long, length 1.0–2.0 carpal width; propodus with free proximal inferior margin 2
2. Male pereopod 1 meral process long, acute, length 1.6 merus length *O. entale*
- Male pereopod 1 meral process short, blunt, shorter than merus length 3
3. Male pereopod 1 meral process length 0.3 merus length; propodus free proximal inferior margin 0.5 propodus length; dactylus evenly curved *O. forceps* **sp. nov.**
- Male pereopod 1 meral process length 0.5 merus length; propodus free proximal inferior margin <0.1 propodus length; dactylus mid-section straight *O. thomasi*

***Onychatrium entale* (Nordenstam, 1946) comb. nov.**

(Figure 1)

Stenetrium entale Nordenstam, 1946: 26, figs 25–27.—Wolff 1962: 249.

Hansenium entale.—Serov & Wilson, 1995: 81.

Material examined. *Holotype*: ♂ (3.8 mm), Tapateuen (=Tabiteue Island), Kiribati (SMNH 798).

Description. *Cephalon* length 0.6 width; antennal spines acute; lateral spines subequal in length to antennal spines; lateral spines acute, short, not extending distally as far as antennal spines; space between lateral and antennal spines mesially oblique; lateral margins straight or weakly convex. *Eyes* pale brown (faded in specimen), arranged in two parallel rows. *Pleotelson* length 1.0 width.

Antennula article 1 length 1.7 width; *article 2* length 1.2 width; *article 3* length 2 width; *article 4* length 0.5 width.

Maxilliped basis length 2.1 maximum width; *endite* distal margin with 5 fan setae, distomesial corner with 1 triangular RS; *epipod* length 3.1 width, width 1.1 basis width, distomesial margin with 5 regularly-spaced setae, lateral margin sinuate.

Pereopod 1 ischium length 1.3 width; inferodistal margin with 1 seta, mesial distal margin with submarginal row of long setae; superodistal margin produced, with 4 long setae, apex narrowly rounded.

Pereopod 1 merus length 0.7 width, 0.9 carpus length, 0.8 ischium length; inferior margin without setae; inferior submargin with a dense patch of long setae; superodistal margin not produced, densely setose with long setae; *inferodistal meral process* moderately long, extending distally approx. half way along carpal blade, length 1.6 merus length, inferior margin length 0.9 merus length, narrowly lanceolate, apex acute.

Pereopod 1 carpus sub-triangular; length 1.3 width, 0.9 ischium length; inferior margin not clearly defined, co-linear with inferior process margin. *Carpal process* length 1.4 width, 1.1 carpal width; sub-triangular, extending distally more than half length of propodus; apex acute, not setose; inferior margin straight, densely setose along distal two-thirds, distal to meral process, with 1 row of straight setae, 1–2 rows of long distally angled setae; distal margin slightly concave, sparsely setose.

Pereopod 1 propodus robust superiorly; length 1.3 maximum width, 2.1 proximal width, 1.6 ischium length; inferior margin clearly defined, long, 0.5 propodus length, 0.3 superior margin length, with submarginal row of long setae; superior margin with mesial row of evenly-spaced setae, and submarginal lateral row of long setae. *Propodal palm* width 0.4 maximum propodus width; transverse; toothed lobe with 5 teeth, largest tooth 7.6 length of smallest tooth. *Palm process* length 3.1 width, RS at apex; inferior margin convex, setose, along distal half only; superior margin weakly convex. *Dactylus* weakly curved; length 6.8 basal width, 3.8 propodal palm width, 1.4 propodus length; superior margin distal third densely setose; inferior margin with 18 regularly-spaced robust setulated setae; mesial surface not setose.

Pleopod 3 endopod apex with 4 plumose setae. *Pleopod 4* exopod apex with 8 plumose setae.

Remarks. The holotype of *O. entale* was examined and available appendages drawn. This species is similar to *Onychatrium forceps* **sp. nov.**, but there are several points of distinction. These differences are (state in *O. forceps* **sp. nov.** in parentheses): lateral head spine short, not extending anteriorly to level of antennal spine (long, extending anteriorly to level of antennal spine); space between lateral and antennal spine mesially oblique (evenly rounded); lateral margin of head straight or very weakly convex (manifestly convex); maxilliped exopod with evenly convex lateral margin (lateral margin distally concave); pereopod 1 carpal blade acute, with a broad base (carpal blade more slender); meral lobe long, acute (meral lobe short, blunt).

The lateral and antennal head spines present a consistent appearance in *O. forceps* **sp. nov.**, as well as for other congeneric species for which there are multiple specimens, and these differences are considered to be of species-level significance.

Distribution. Known only from the type locality, Tapateuen, Kiribati, central Pacific.

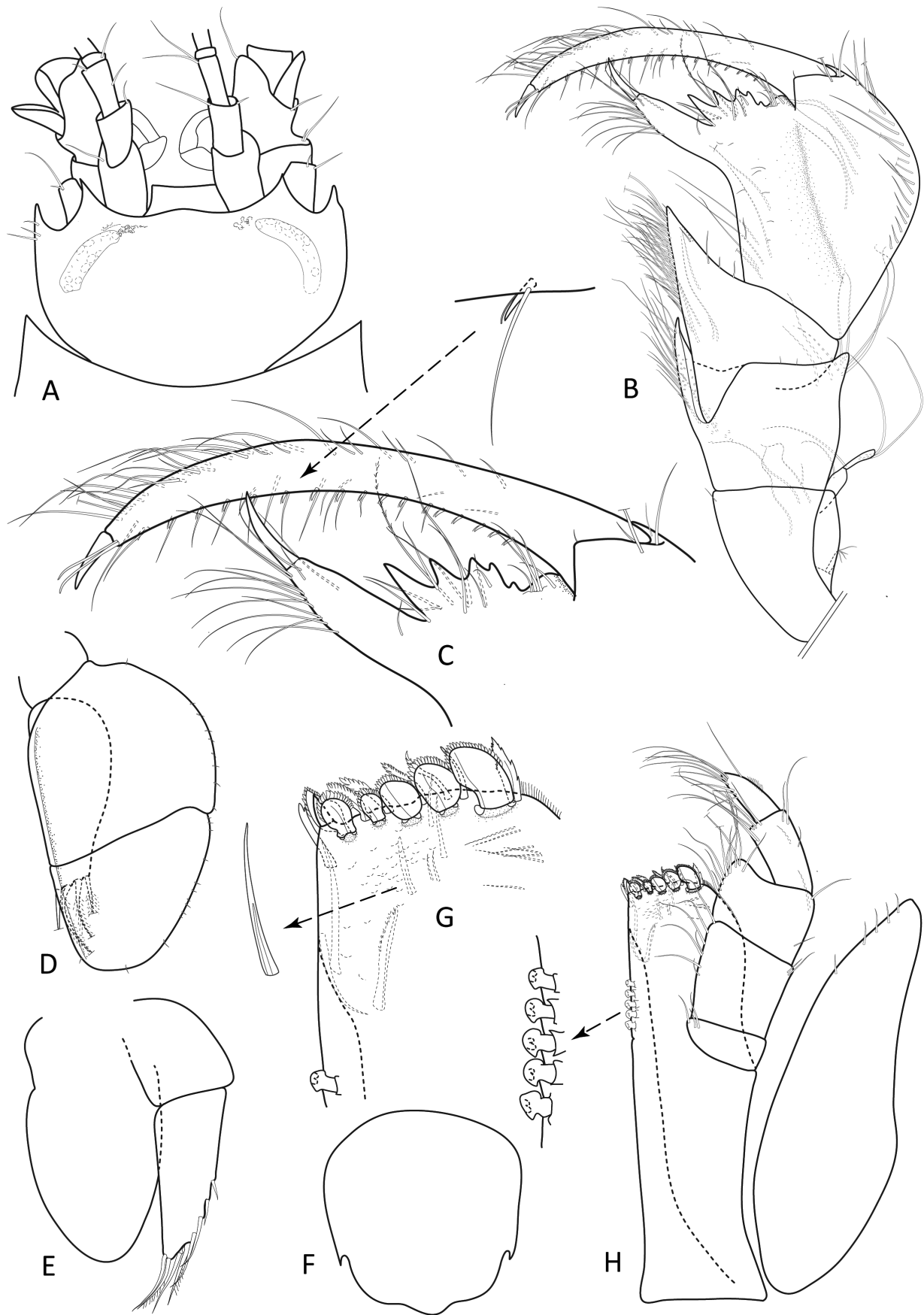


FIGURE 1. *Onychatrium entale* (Nordenstam, 1946) **comb. nov.** male holotype (SMNH 798), **A**, dorsal view of cephalon, **B**, pereopod 1, **C**, enlargement of pereopod 1 dactylus, **D**, pleopod 3, **E**, pleopod 4, **F**, pleotelson, **G**, enlargement of left maxilliped endite, **H**, left maxilliped.

***Onychatrium forceps* sp. nov.**

(Figures 2–5, 10)

Material examined. *Holotype*: ♂ (3.8 mm), Broomfield Reef, back reef, 23.2623°S, 151.9256°E, 18 November 2010, reef flat, coral rubble on sand, 7 m, coll. M. Błażewicz-Paszkowycz (MTQ W34194).

Paratypes: ♂ (4.0 mm [dissected]), ♀ (ovig., 3.5 mm), same data as holotype (MTQ W33826). ♂ (4.1 mm), ♀ (ovig., 4.0 mm [P1 dissected]), Mast Head Reef, 23.53188°S, 151.71889°E, 19 November 2010, coll. M. Capa (MTQ W33835). ♂ (3.7 mm [pleopod 2 dissected]), northern Wistari Reef, reef flat, 23.45053°S, 151.8843°E, 21 November 2010, 17.1 m, coll. V. Ivanenko (MTQ W34195). 3 ♂ (3.9, 2.9 [P1 dissected], 3.0 mm), 6 ♀ (ovig., 4.2, 3.5, 3.0 mm, non-ovig., 4.1, 3.0, 2.2 mm), 10 juv. (1.0–2.4 mm), northern Wistari Reef, 23°27.257'S, 151°52.840'E, 23 November 2009, rubble on bommie, 3 m, coll. N. Bruce & K. Schnabel (MTQ 31601). ♂ (3.8 mm), Heron Island reef flat, 23.46053°S, 151.9293°E, 13 November 2010, “Harry’s Bommie”, dead coral on sandy bottom, 10 m, coll. C. Buxton (MTQ W33643). ♂ (3.3 mm), Broomfield Reef, back reef, 23.2623°S, 151.9256°E, 18 November 2010, coral rubble in bommie crevasse, 6.5 m, coll. C. Buxton (MTQ W33822). 2 ♂ (3.9, 2.9 [P1 dissected] mm), ♀ (ovig., 3.8 mm [P1, P2, P7 dissected]), 3 juv. (1.4–2.0 mm), northern Wistari Reef, reef flat, 23.45053°S, 151.8843°E, 21 November 2010, on hydrozoan, 16 m, coll. C. Buxton (MTQ W34196). ♂ (3.6 mm), southern Heron Island, 23.47437°S, 151.95047°E, 21 November 2009, Autonomous Reef Monitoring Structure (ARMS), coarse rubble, 10–16 m, coll. S. Smith (MTQ W31671). 2 ♀ (ovig., 3.9 mm, non-ovig. 2.7 mm), Heron Island lagoon, reef flat, 23.46671°S, 151.98102°E, 22 November 2010, coral rubble, 1–2 m, coll. C. Buxton (MTQ W34197). 4 ♀ (ovig., 3.3, 3.3 mm, non-ovig., 2.2, 1.8 mm), Heron Island, 23.46053°S, 151.9293°E, 13 November 2010, “Harry’s Bommie”, coarse sand, 10 m, coll. C. Buxton (MTQ W33641). 3 ♂ (3.8, 3.5, 3.3 mm), 6 ♀ (ovig. 4.0, 3.5 mm, non-ovig. 3.5, 3.1, 3.1, 2.8 mm), juv. (1.9 mm), Mast Head Reef, 23.53192°S, 151.7152°E, 19 November 2010, rubble on sand, 10 m, coll. C. Buxton (MTQ W33840). ♂ (3.1 mm [pleopod 2 dissected]), ♀ (3.1 mm), Sykes Reef, front reef slope, 23.4316°S, 152.0493°E, 14 November 2010, sand at base of wall, 27 m, coll. J. Reimer (MTQ W33684). ♂ (3.6 mm), Sykes Reef fore-reef, 23.43238°S, 152.03375°E, 14 November 2009, live coral, 30 m, coll. K. Schnabel (MTQ W31581). 2 ♂ (4.0 [pleopods 1, 2 dissected], 3.7 mm), Heron Island fore-reef, 23.47222°S, 151.95047°E, 13 November 2009, “Twin Peaks, Pinnacles”, coarse coral rubble, 12 m, coll. K. Schnabel (MTQ W31579). 2 ♂ (2.7, 1.4 [P1 dissected] mm), north Heron Island, reef edge, 23.43309°S, 151.92705°E, 20 November 2010, “Tenements 1”, coral rubble with *Halimeda*, 5 m, coll. C. Buxton (MTQ W34198). ♂ (4.2 mm [P1 and pleopod 2 dissected]), ♀ (3.6 mm [pleopods and uropod dissected]), Heron Island, north-eastern side, 23.42996°S, 151.95050°E, 20 November 2009, dead coral heads, 4–5 m, coll. N. Bruce & K. Schnabel (MTQ W34199). 2 ♂ (3.6, 3.3 mm), ♀ (3.5 mm), Heron-Wistari channel, 23°27.248'S, 151°55.005'E, 25 November 2009, small rubble, 29–30 m, coll. K. Schnabel & S. Smith (MTQ W34200). ♂ (4.3 mm [pleopods dissected]), 4 ♀ (ovig. 4.3 mm, non-ovig. 3.7, 2.8, 2.2 mm), Heron Island, north eastern side, 23°25.990'S, 151°55.601'E, 22 November 2009, dead *Acropora*, 12 m, coll. N. Bruce & K. Schnabel (MTQ W31597). ♂ (3.8 mm), ♀ (ovig., 3.6 mm), juv. (2.5 mm), Lamont Reef, southern side, 23°36.125'S, 152°03.152'E, 19 November 2009, coral rubble, 10.5 m, coll. K. Schnabel & N. Bruce (MTQ W31589). 3 ♂ (3.6, 3.5, 3.4 mm), Heron Island, 23.44736°S, 151.91197°E, 26 November 2010, “Canyons”, rubble with sand, 15 m, coll. M. Błażewicz-Paszkowycz (MTQ W34201).

Lizard Island and surroundings: 3 ♂ (3.7 [P1 dissected], 3.3, 3.0 mm), 3 ♀ (ovig., 2.9, non-ovig., 3.7, 3.0), Day Reef, outer reef, 14.47045°S, 145.5284°E, 5 September 2010, dead coral heads, 17 m, coll. C. Buxton (MTQ W32851). ♂ (3.9 mm), Lizard Island, Bommie Bay, reef flat, 14.66157°S, 145.4716°E, 8 September 2010, dead coral heads, 10 m, coll. C. Buxton (MTQ W32558). 3 ♂ (4.1, 3.8, 3.2 mm), ♀ (ovig., 3.7 mm), Yonge Reef, north-west side, reef slope, 14.57735°S, 145.6105°E, 10 September 2010, coarse coral rubble, 10 m, coll. C. Buxton (MTQ W32988). ♂ (3.7 mm), Yonge Reef, outer fore-reef, 14.61575°S, 145.6196°E, 7 April 2008, bommie crest, *Halimeda* and rubble, 3 m, coll. M. Błażewicz-Paszkowycz (MTQ W14086). ♂ (2.8 mm), Yonge Reef, back reef, 14.58028°S, 145.60840°E, 21 April 2008, 9 m, coll. K. Mills (MTQ W34202). 10 juv. (2.1, 2.0, 1.5, 1.5, 1.5, 1.5, 1.4, 1.4, 1.3, 1.0 mm), Lizard Island, North Point, reef crest, 14.64553°S, 145.45335°E, 11 April 2008, compact dead *Acropora*, 0.5 m, coll. N. Bruce (MTQ W14070). 2 ♂ (2.6, 1.8 mm), Lizard Island, April 2008, 4–8 m (MTQ W14077). ♂ (4.0 mm), Yonge Reef, outer reef slope, 14.57735°S, 145.6105°E, 10 September 2010, coarse coral

1. See ‘Methods’ for explanation of the term word ‘bommie’.

rubble, 25 m, coll. C. Buxton (MTQ W34203). ♂ (2.6 mm), ♀ (ovig., 3.2, 2.9 mm, non-ovig., 3.0 mm), same data as previous (MTQ W33013).

Other material. *Broomfield Reef and surrounds:* Broomfield Reef, reef flat, 17–18 November 2010 (MTQ W33779, MTQ W33780, MTQ W33799, MTQ W33827, MTQ W33830). Wistari Reef, outer fore-reef, 11 November 2009 (MTQ W31578). Heron Island, outer fore-reef, 13 November 2009 (MTQ W31580). Sykes Reef, outer fore-reef, 14–18 November 2009 (MTQ W31582, MTQ W31588). Sykes Reef, back reef, 14 November 2009 (MTQ W31583). Lamont Reef, back reef, 16 November 2009 (MTQ W31584). Lamont Reef, southern side, 19 November 2009 (MTQ W31590, MTQ W31592, MTQ W34219). Heron Island, Harry's Canyon, 18 November 2009 (MTQ W31585, MTQ W31586, W31587). Heron Island reef, north-eastern side, 20–22 November 2009 (MTQ W31594, MTQ W31596, MTQ W31598, MTQ W31599). Wistari Reef, northern side, 23 November 2009 (MTQ W31600). Heron Island–Wistari Reef channel, 25 November 2009 (MTQ W31602, MTQ W31603). Heron Island, The Patches (Mystery Bommie), 28 November 2009 (MTQ W31605). Heron Island reef, southern side (Twin Peaks), 28 November 2009 (MTQ W31607). Heron Island reef, Autonomous Reef Monitoring Structure (ARMS) #9, 28 November 2009 (MTQ W31608). Heron Island outer fore-reef, ARMS #41, 12 November 2009 (MTQ W31609). Lamont Reef, south-east, reef wall, 16 November 2010 (MTQ W33755). Mast Head Reef, reef flat, 19 November 2010 (MTQ W33849). Heron Island, northern reef edge, Tenement 1, 20 November 2010 (MTQ W34223). Wistari Reef, edge, Heron Island–Wistari Reef channel, 30 November 1979 (MTQ W34224).

Lizard Island and surrounds: Patch reef near Seabird Islet, 8–11 April 2008 (MTQ W14071, MTQ W14072). Lagoon patch reef off Casuarina Beach, 17 April 2008 (MTQ W14078). Day Reef, outer reef, 5 September 2010 (MTQ W32827, MTQ W32828, MTQ W32839). Yonge Reef, reef flat, 10 September 2010 (MTQ W32997). Lizard Island, Big Vicky Reef, lagoon patch reef, 13 April 2008 (MTQ W34220). Lizard Island, North Point, reef crest, 12 April 2008 (MTQ W34221). Lizard Island, 14 April 2008 (MTQ W34222). Hicks Reef, outer reef front, 21 February 2009 (MTQ W34225). Day Reef, outer reef slope, 13 February 2009 (MTQ W34226).

Description. *Body* length 2.9 maximum width. *Cephalon* length 0.5 width, 1.4 pereonite 1 length; lateral margins convex, sparsely setose; lateral spines equal in length to antennal spines; space between lateral and antennal spines evenly rounded; lateral margins convex. *Eyes* with 20 ommatidia, pale brown. *Pereonite 1* length 0.4 width, 1.2 pereonite 2 length, width 1.1 cephalon width. *Pleotelson* length 0.9 width.

Antennula length 1.6 cephalon length; *article 1* length 1.4 width, mesial margin with 7 short penicillate setae, distolateral margin with 1 large penicillate seta, lateral margin with 1 long seta; *article 2* length 1.7 width, distomesial margin with 1 cluster of setae, including 1 penicillate seta, distolateral margin with 1 cluster of setae, including 1 penicillate seta, proximolateral margin with 1 penicillate seta, centre of inferior side with 1 cluster of setae, including 1 penicillate seta; *article 3* length 1.9 width, distomesial margin with 1 cluster of setae, distolateral margin with 1 cluster of setae, mesial margin with 1 seta, inferodistal margin with 1 cluster of setae; *article 4* length 0.4 width, inferior distal margin with 2 penicillate setae; *flagellum* with 9 articles, flagellar article 1 length 2.5 article 2 length, 1 aesthetasc per article on distal 7 articles.

Antenna length approximately 1.1 body length; *peduncle article 1* length 0.6 width, distolateral margin with 1 cluster of setae; *article 2* length 0.8 width, distolateral margin with 1 long seta; *article 3* length 1.2 width, distomesial margin with 1 cluster of setae, mesial margin with 1 cluster of setae, lateral margin with 3 setae surrounding squama; *article 4* length 0.7 width, distomesial margin with 2 setae; *article 5* length 5.0 width, *article 6* length 6.0 width; *flagellum* articles each with a cluster of 4 distally projecting setae, the cluster position serially repeating every 4 articles.

Mandible left spine row with 4 spines, right spine row with 10 spines; *palp article 2* length 3.3 width, with row of 8 short serrate setae; *article 3* length 2.6 width. *Maxillula* lateral lobe apex with 13 serrate RS; mesial lobe apex with 2 large plumose setae, distomesial margin with 1 setulate RS, 1 large seta. *Maxilla mesial lobe* mesial margin with 5 large plumose setae, 2 setulate RS, apex with 3 large setulate setae, 2 setae with spatulate tips; *middle lobe* apex with 4 large setulate setae, distal end with a row of 8 setae, decreasing in size proximally; *lateral lobe* apex with 4 large setulate setae, distal end with a row of 7 setae, decreasing in size proximally. *Maxilliped basis* length 2.2 maximum width; *endite* distal margin with 5 fan setae (4 only on right maxilliped of some individuals), distomesial margin with 4 serrate setae, distomesial corner with 1 triangular RS; *epipod* length 3.2 width, width 1.1 basis width, distomesial margin with 4 regularly-spaced setae, lateral margin sinuate.

Pereopod 1 basis length 3.2 width; superior margin with regularly-spaced short setae, 2 long proximally; submarginal row of short setae.

Pereopod 1 ischium length 1.3 width; inferior margin with 1 short seta, inferodistal margin without setae, distal margin without short setae, mesial distal margin with submarginal row of 4 long setae, 1 short seta; superodistal margin not produced, with 4 long setae.

Pereopod 1 merus sub-quadrate; length 0.8 width, 1.1 carpus length, 0.8 ischium length; inferior margin without setae; inferior submargin with a row of 4 long setulate setae; distal margin without setae; superodistal margin not produced; densely setose with 6 long setae; *inferodistal meral process* short, not extending distally to carpal blade, length 0.5 merus inferior margin length, 0.3 merus length, oblong, apex rounded, mesial surface setose, with long setulate setae and shorter simple setae.

Pereopod 1 carpus sub-triangular; length 1.1 width, 0.7 ischium length; distal margin with 5 short setae; inferior margin clearly defined, length 0.25 carpus length. *Carpal process* length 2.0 width, 1.6 carpal width; long, curved and tapering, extending distally more than half length of propodus; apex densely setose, rounded; inferior margin slightly convex, densely setose, along full length, 1 row of straight setae, 1–2 rows of long setae angled distally; superior margin concave, setose along full length.

Pereopod 1 propodus robust superiorly with pronounced narrowing obliquely, proximal to the palm; length 1.6 maximum width, 2.6 proximal width, 1.6 ischium length; inferior margin clearly defined, long, length 0.5 propodus length, 0.5 superior margin length, with submarginal row of long setulate setae; superior margin with 2 long setae, a submarginal mesial row of long setulate setae, a submarginal lateral row of long setae. *Propodal palm* width 0.4 maximum propodus width; slightly oblique; toothed lobe with 5 teeth. *Palm process* length 3.4 width, RS at apex; inferior margin weakly convex, densely setose, at apex and distal quarter only; superior margin straight to weakly concave. *Dactylus* curved; length 6.6 basal width, 4.2 propodal palm width, 1.3 propodus length; superior margin distal third setose, with regularly-spaced setae; inferior margin with 16 regularly-spaced robust flagellated setae; mesial surface densely setose on distal half.

Pereopod 2 basis superior margin with 3 penicillate setae; *ischium* superior margin with 1 large seta; *merus* superodistal margin with 1 RS, 1 large seta; *carpus* superodistal margin with 4 setae (including 1 penicillate seta), inferior margin with 5 flagellated RS (most distal paired with 1 RS); *propodus* superior margin sparsely setose; superodistal margin with 5 setae (including 1 penicillate seta); inferior margin with 5 flagellated RS (and 1 flagellated serrate RS at inferodistal corner).

Pereopod 7 basis superior margin with 2–3 penicillate setae; *carpus* inferior margin with 4 flagellated RS (most distal paired with 1 RS); *propodus* inferior margin with 4 flagellated RS (and 1 flagellated serrate RS at inferodistal corner).

Pleopod 1 protopod length 0.5 width; lateral margin with 2 simple setae; distal margin with pair of acute RS; surface setae absent; *rami* lateral margins with regularly-spaced simple setae along distal half (becoming closer together distally); inferior surface with few setae. *Pleopod 2* protopod length 3.1 medial width; basal lobe width 1.7 medial width; distal lobe sub-triangular; lateral margin with 2 setae; endopod without setae, medial length 0.5 protopod length. *Appendix masculina* length 1.8 endopod medial length, 0.9 protopod length; with lateral, proximally-directed robust spine; lateral margin with distal groove. *Pleopod 3* endopod apex with 6 plumose setae. *Pleopod 4* exopod apex with 8 plumose setae. *Pleopod 5* apex with 7 plumose setae.

Uropod length 0.2 body length, 0.7 pleotelson length; protopod length 2.3 width; *endopod* length 1.1 protopod length, distal and sub-distal margins with 10 penicillate setae, distal tip with cluster of elongate setae, maximum length 1.9 endopod length; *exopod* length 0.8 protopod length, 0.7 endopod length, distal tip with cluster of elongate setae, maximum length 2.1 exopod length.

Female. *Female pereopod 1 basis* length 2.5 width, superior margin with 2 short setae, submarginal ridge with irregularly-spaced short setae. *Ischium* superodistal margin strongly produced, apex with large, long seta. *Merus* superodistal margin produced, triangular, apex blunt. *Carpus* inferodistal margin produced, process bluntly triangular, apex rounded. *Propodus* length 1.1 distal (maximum) width, 2.5 proximal width, length 2.9 ischium length; distal width 2.4 proximal width; inferior margin length 0.6 propodus length, densely setose, with a row of setulate setae and a row of simple setae, setae restricted to distal half of margin. *Propodal palm* width 0.6 distal propodus width, 1.1 inferior margin length; straight, slightly oblique, with 8 teeth, setose, without a cluster of setae at articulation; terminal end with single robust flagellated seta, and single robust serrate seta adjacent to first tooth. *Dactylus* length 7.2 width, 1.6 palm width; inferior margin with 14 regularly-spaced robust flagellated setae.

Female pleopod 2 length 1.3 width; lateral margins with 3 setae; distal margins slightly concave; apex acute, with 2 setae; inferior surface with 3 setae.

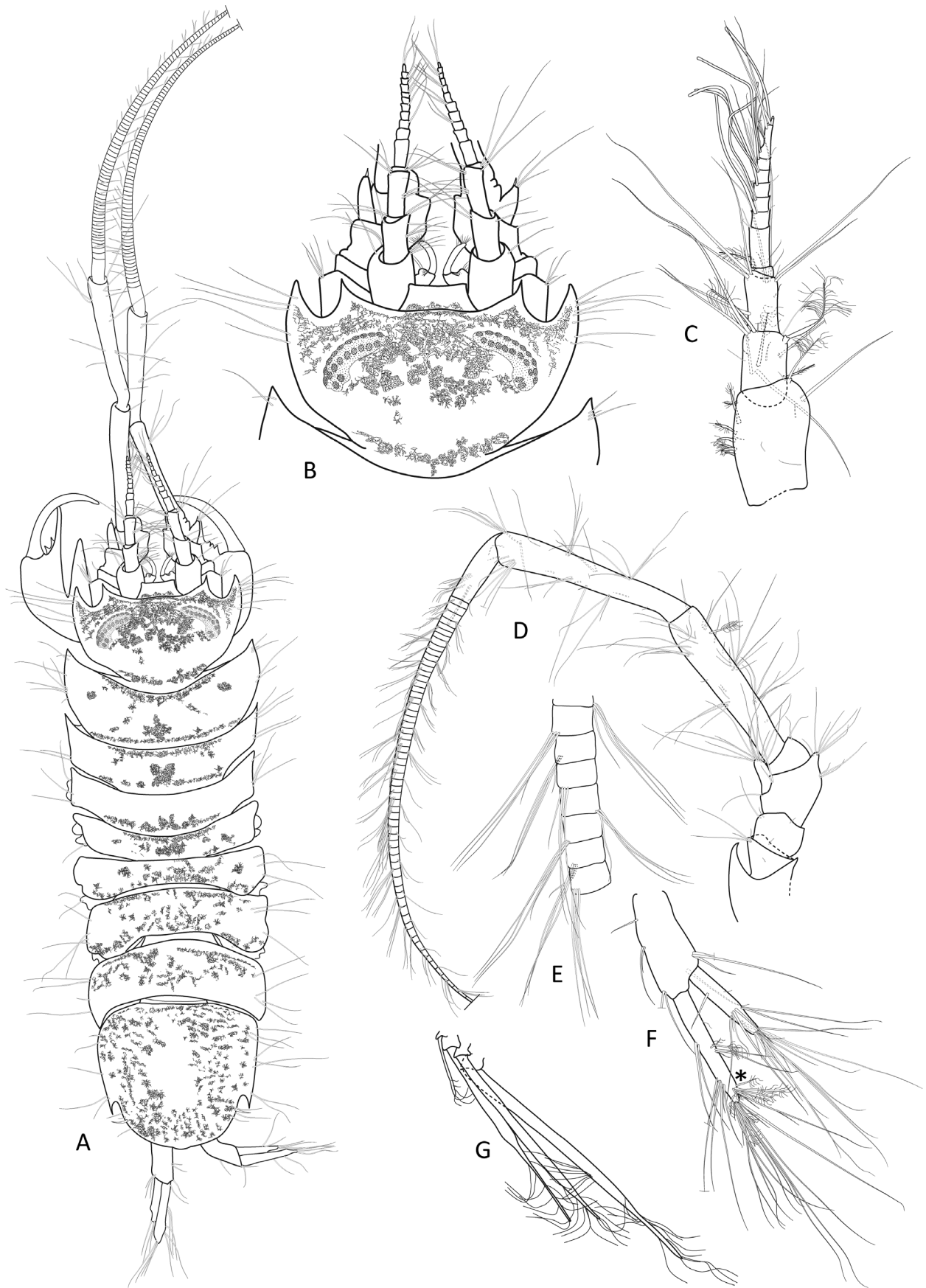


FIGURE 2. *Onychatrium forceps* sp. nov. **A, B**, male holotype (MTQ W34194), **A**, dorsal view, **B**, dorsal view of cephalon; **C–G**, male paratype (MTQ W33826), **C**, antennula, **D**, antenna, **E**, enlargement of antennal flagellum articles 23–29, **F**, uropod, **G**, cluster of penicillate setae on distolateral border of endopod (marked by asterisk).

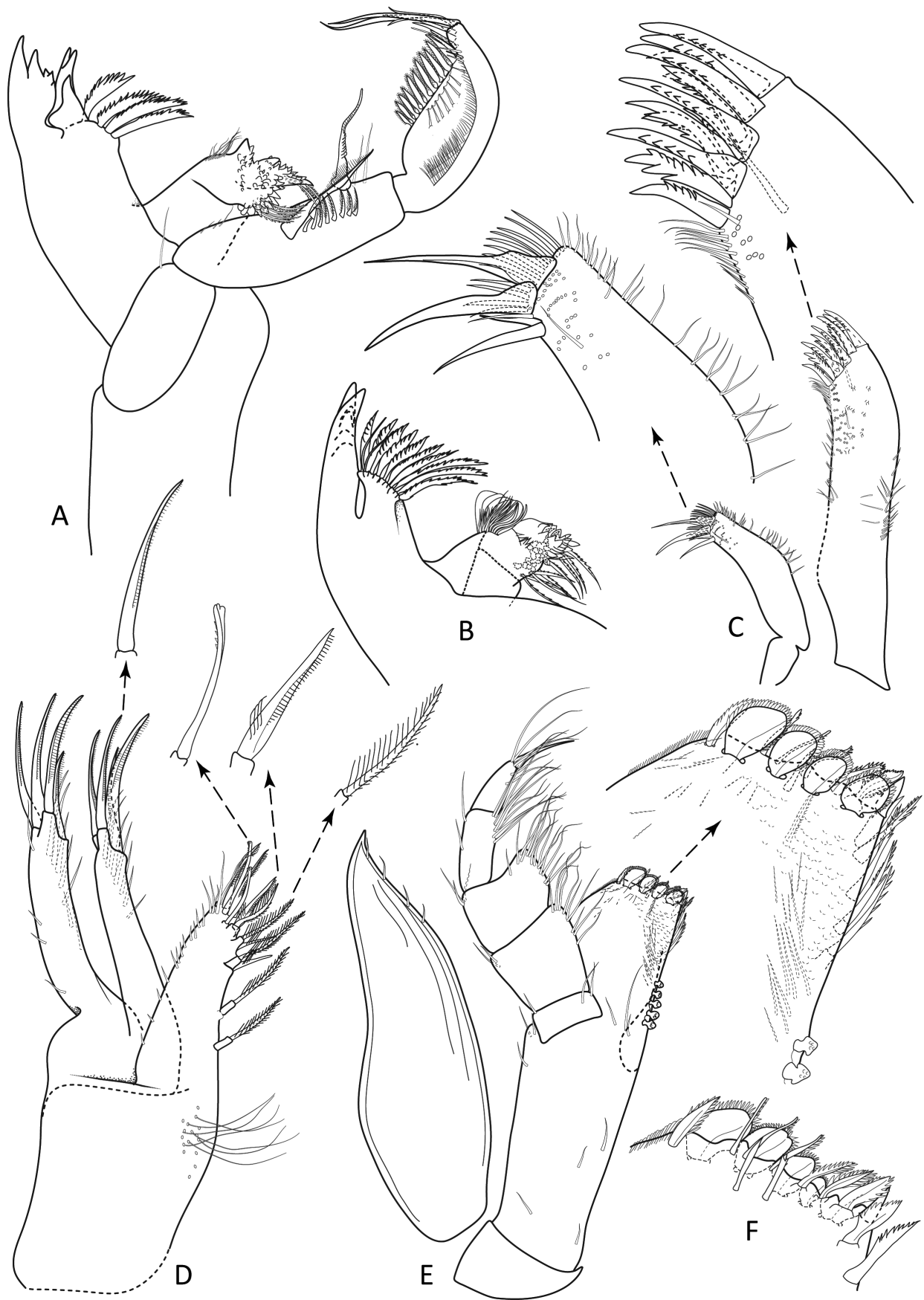


FIGURE 3. *Onychatrium forceps* sp. nov. male paratype (MTQ W33826), **A**, left mandible with palp; **B**, right mandible; **C**, maxillula, with details of mesial and lateral lobes; **D**, left maxilla, with enlargements of setal types; **E**, right maxilliped, with enlargement of endite; **F**, left maxilliped endite setae.

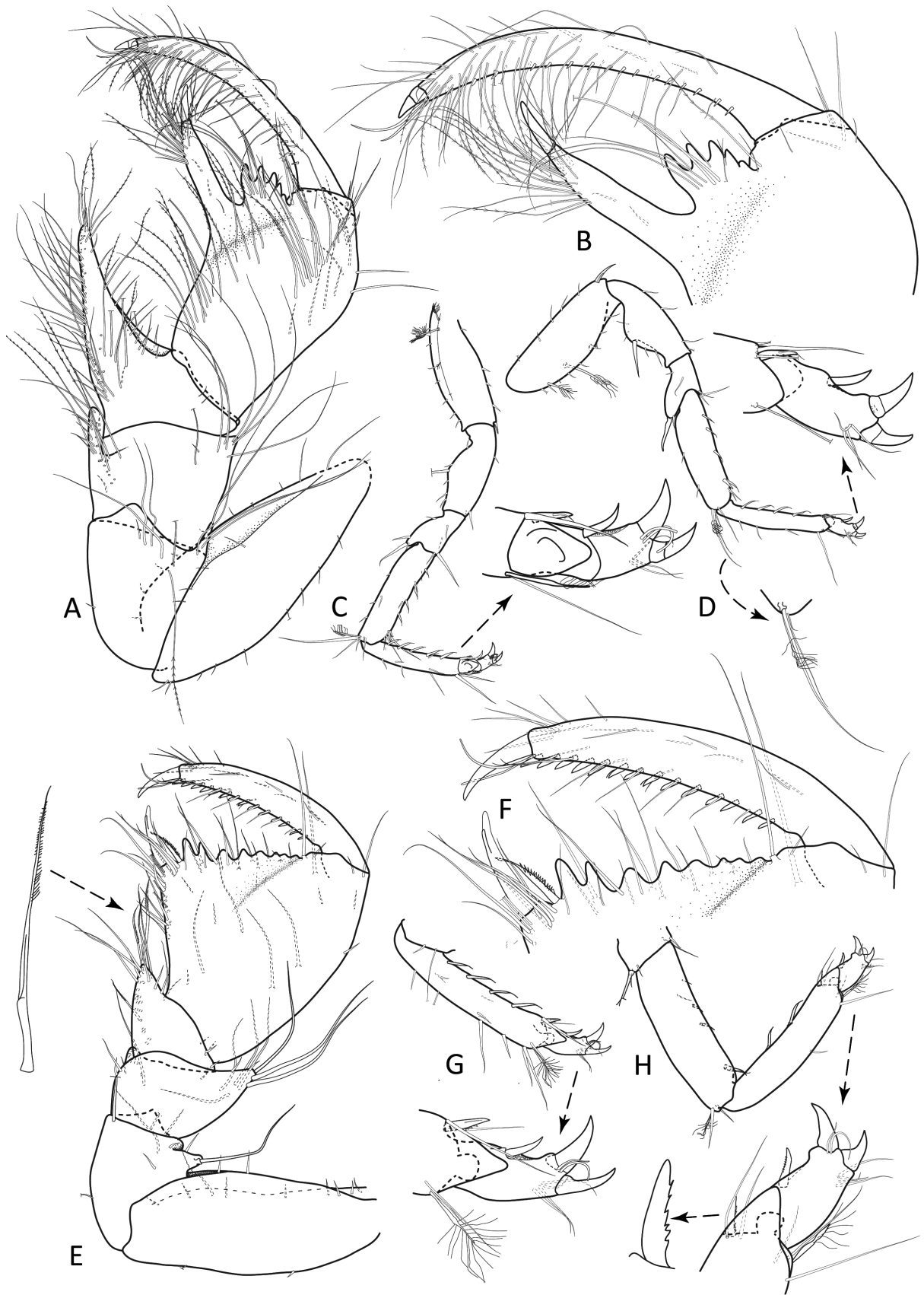


FIGURE 4. *Onychatrium forceps* sp. nov. **A, B**, male holotype (MTQ W34194), **A**, pereopod 1, **B**, enlargement of pereopod 1 dactylus; **C, D**, male paratype (MTQ W33826), **C**, pereopod 2, **D**, pereopod 7; **E–H**, female paratype (MTQ W34196), **E**, pereopod 1, **F**, enlargement of pereopod 1 dactylus, **G**, pereopod 2 carpus and dactylus, **H**, pereopod 7 merus, carpus and dactylus.

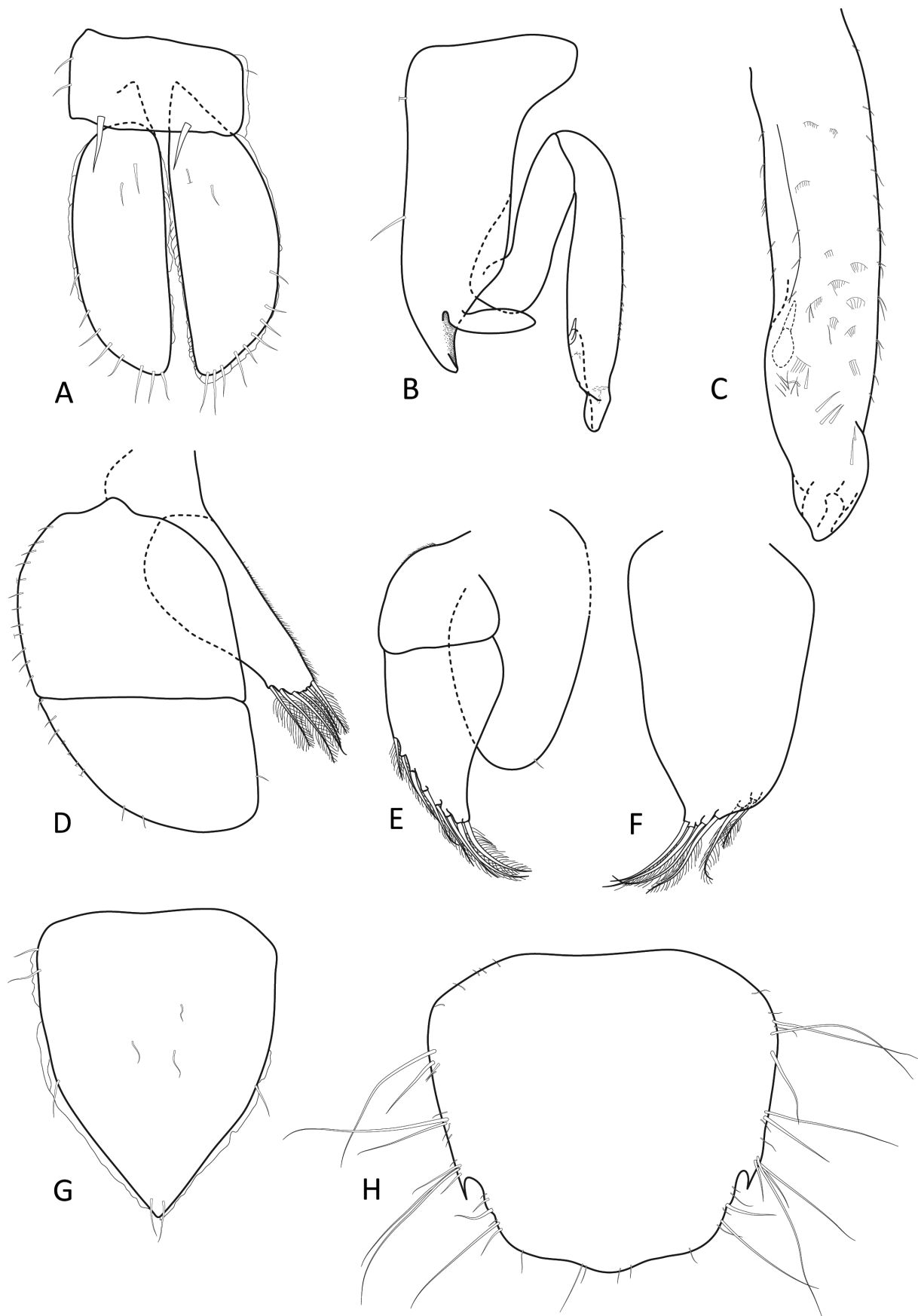


FIGURE 5. *Onychatrium forceps* sp. nov. **A**, male paratype (MTQ W33826) pleopod 1; **B–C**, male paratype (MTQ W31579), **B**, pleopod 2, **C**, enlargement of appendix masculina apex; **D–F**, male paratype (MTQ W33826), **D**, pleopod 3, **E**, pleopod 4, **F**, pleopod 5; **G**, female paratype (MTQ W34199) pleopod 2; **H**, male paratype (MTQ W33826) pleotelson.

Remarks. *Onychatrium forceps* **sp. nov.** may be identified by the adult male pereopod 1 having a long acute carpal process, a short, blunt meral process, and the propodus with a long free inferior margin proximal to the propodal process. The most similar species is *O. entale*, and the differences between the two species are discussed under the remarks for *O. entale*. The principal pereopodal differences are: *O. forceps* has a short and blunt meral lobe and a basally narrow carpal lobe while *O. entale* has a long and acute meral lobe and a basally broad carpal lobe.

On the Great Barrier Reef the sympatric *Onychatrium torosus* **sp. nov.** can be distinguished from *O. forceps* by several characters of the male pereopod 1, including a more elongate merus with a large process, a small blunt carpal process and a relatively short pereopod 1 dactylus. In adult male *O. forceps* pereonite 1 is slightly longer than pereonite 2 (as for many stenetriids), but in *O. torosus* pereonite 1 appears massive, being 1.6 as long as pereonite 2.

Distribution. Great Barrier Reef, from Capricorn Group in the south and Lizard Island and adjacent reefs in the north; intertidal to 30 m.

Etymology. The epithet is the Latin word *forceps*, alluding to the forcep-like opposition of the elongate dactylus to the propodal process.

***Onychatrium torosus* sp. nov.**

(Figures 6–8, 10)

Material examined. *Holotype*: ♂ (4.3 mm), Lizard Island lagoon, off Palfrey Island, 14.68687°S, 145.43764°E, 16 April 2008, hard, current swept bottom, 7 m, coll. M. Błażewicz-Paszkowycz (MTQ W34204).

Paratypes: 6 ♂ (3.9, 3.2, 3.0, 2.8, 2.8, 2.5 mm), 11 ♀ (ovig., 3.5, 3.2 mm, non-ovig., 4.0, 3.9, 3.8, 3.5, 3.0, 2.9, 2.7, 2.6, 2.2 mm), 2 juv. (2.1, 1.8 mm), same data as holotype (MTQ W14059). 9 ♂ (4.6 mm, 3.7–4.0 mm, 3.7 mm [dissected]), 8 ♀ (7 ovig., 3.4–4.0 mm, non-ovig., 4.1 mm), entrance to Lizard Island lagoon, near Seabird Islet, patch reef, 14.68900°S, 145.46710°E, 11 April 2008, small rubble on sand, 1–2 m, coll. N. Bruce & M. Błażewicz-Paszkowycz (MTQ W14076). 2 ♂ (3.1, 2.5 mm), 2 ♀ (3.8, 2.8 mm), same data as previous, dead coral heads, 1–2 m (MTQ W34209). 3 ♂ (4.3 mm [dissected], 4.2 mm, 4.0 mm [P7 dissected]), 3 ♀ (ovig., 3.8 mm [dissected], non-ovig., 3.7 mm [P1 dissected], 3.7 mm), same data as previous (MTQ W34205). ♀ (4.3 mm), Lizard Island lagoon, “Big Vicky Reef”, north-west of Palfrey Island, patch reef, 13 April 2008, coarse coral rubble, 3 m, coll. K. Mills (MTQ W14081). 5 ♂ (3.0–3.7 mm), 2 ♂ (2.6 mm [P1 dissected], 2.3 mm), ♀ (4.2 mm), juv. (1.7 mm), Lizard Island lagoon, patch reef off Palfrey Island, 14.68345°S, 145.44147°E, 16 April 2008, large dead *Acropora* head, 1.5 m, coll. N.L. Bruce (MTQ W34206). 4 ♂ (2.5–2.8 mm), 4 ♀ (ovig., 4.1, 2.8 mm, non-ovig., 3.1, 2.6 mm), North Point, 14.64553°S, 145.45335°E, 12 April 2008, compacted dead *Acropora*, 0.5 m, coll. N.L. Bruce (MTQ W34207). ♂ (3.2 mm), “Washing Machine”, North Point, reef edge, 14.65383°S, 145.4634°E, 27 August 2010, dead coral rubble, 5 m, coll. C. Buxton (MTQ W32624). 3 ♂ (2.9, 1.6 [P1 dissected], 1.5 mm), ♀ (2.5 mm), Lizard Island lagoon between Palfrey and South Islands, reef flat, 14.69893°S, 145.4487°E, 3 September 2010, coarse rubble, 3 m, coll. C. Buxton (MTQ W32760). 4 ♂ (4.0, 4.0, 3.8 [dissected], 3.3, 3.0 mm), 3 ♀ (ovig., 4.1 mm, non-ovig., 3.9, 3.3 mm), Lizard Island, Casuarina Beach, patch reef, 14.68039°S, 145.44453°E, 15 April 2008, coral heads, 1 m, coll. N. Bruce (MTQ W34208).

Other material. Lizard Island. Patch reef off Casuarina Beach, 15 April 2008 (MTQ W14063); “Bommie Bay”, 2 September 2010 (MTQ W32741); North Point, 12 April 2008 (MTQ W34210, MTQ W34211, MTQ W14073); “Big Vicky Reef”, lagoon patch reef, 13 April 2008 (MTQ W34212); patch reef off Palfrey Island, 16 April 2008 (MTQ W34229); patch reef near Seabird Islet, 11 April 2008 (MTQ W34231).

Description. *Body* length 3.3 maximum width. *Cephalon* length 0.5 width, 0.9 pereonite 1 length; lateral spines subequal in length to antennal spines; space between lateral and antennal spines mesially oblique; lateral margins convex. *Eyes* with 17 ommatidia, pale brown. *Pereonite 1* length 0.5 width, 1.6 pereonite 2 length, width 1.3 cephalon width; *Pleotelson* length 1.0 width.

Antennula length 1.6 cephalon length; *article 1* length 1.6 width, mesial margin with 4 short penicillate setae, distolateral margin with 1 large penicillate seta, lateral margin with 1 long seta; *article 2* length 1.6 width, distomesial margin with 1 cluster of setae, distolateral margin with 1 cluster of setae, including 1 penicillate seta, centre of inferior side with 1 cluster of setae; *article 3* length 2.1 width, distomesial margin with 1 cluster of setae,

mesial margin with 1 cluster of setae, including 2 penicillate setae, inferodistal margin with 1 cluster of setae; *article 4* length 0.3 width, inferior distal margin without penicillate setae; *flagellum* with 11 articles, 1 aesthetasc per article on distal 9 articles.

Antenna length *c* 1.0 body length; *peduncle article 1* length 0.9 width, distolateral margin with 1 cluster of setae; *article 2* length 0.7 width, distolateral margin with 2 long setae; *article 3* length 1.3 width, distomesial margin with 1 cluster of setae, mesial margin with 1 cluster of setae, lateral margin with 4 setae surrounding squama; *article 4* length 0.6 width, distomesial margin with 1 seta; *article 5* length 5.1 width, *article 6* length 6.8 width, *flagellum* articles each with a cluster of 4 distally projecting setae, the cluster position serially repeating every 4 articles.

Mandible left spine row with 4 spines, right spine row with 10 spines; *palp article 2* length 3.4 width, with row of 7 short serrate setae; *article 3* length 2.5 width. *Maxillula* lateral lobe apex with 13 serrate RS; mesial lobe apex with 2 large plumose setae, distomesial margin with 1 setulate RS, 1 large seta. *Maxilla mesial lobe* mesial margin with 5 large plumose setae, 3 setulate RS, apex with 3 large setulate setae, 2 setae with spatulate tips; *middle lobe* apex with 4 large setulate setae, distal end with a row of 8 setae, decreasing in size proximally; *lateral lobe* apex with 4 large setulate setae, distal end with a row of 10 setae, decreasing in size proximally. *Maxilliped basis* length 2.2 maximum width; *endite* distal margin with 5 fan setae (4 only on right maxilliped of some individuals), distomesial margin with 4 serrate setae, distomesial corner with 1 triangular RS; *epipod* length 3 width, width 1.1 basis width, distomesial margin with 4 regularly-spaced setae, lateral margin sinuate.

Pereopod 1 basis length 2.8 width; superior margin with regularly-spaced short setae, 4 long proximally; submarginal row of short and long setae.

Pereopod 1 ischium length 1.4 width; inferior margin with 2 short setae, 1 long seta, inferodistal margin with 2 setae, distal margin with 7 short setae, mesial distal margin with submarginal row of 7 long setae; superodistal margin not produced, with 10 long seta.

Pereopod 1 merus length 1.0 width, 1.3 carpus length, 0.9 ischium length; inferior margin with 1 short seta, 3 long setae, inferior submargin with a dense patch of long setae, distal margin with 4 short setae; *meral process* long, extending distally past carpus–propodus border, length 1.2 merus inferior margin length, 0.8 merus length, lanceolate, apex rounded, mesial surface densely setose on proximal third only, lateral surface densely setose along full length of inferior margin.

Pereopod 1 carpus sub-quadrate; length 0.8 width, 0.7 ischium length; distal margin with 2 short setae; inferior margin clearly defined, length 0.8 carpus length. *Carpal process* short, a sub-triangular lobe, length 0.9 width, 0.2 carpal width; apex rounded, not setose; inferior margin convex, setose, with long setae.

Pereopod 1 propodus robust superiorly with pronounced narrowing medially and obliquely, proximal to the palm; length 1.4 maximum width, 1.6 proximal width, 1.2 ischium length; inferior margin not clearly defined, short, 0.07 propodus length, 0.07 superior margin length; superior margin with 2 short setae, a submarginal mesial patch of long setae. *Propodal palm* width 0.5 maximum propodus width; oblique; toothed lobe with 4 teeth, largest tooth length 5.0 smallest tooth length; distance from toothed lobe to propodal process 0.2 palm width, 0.2 propodal process width. *Propodal process* length 1.6 width, RS at apex; inferior margin weakly convex, setose along full length; superior margin straight. *Dactylus* curved; length 4.7 basal width, 2.5 propodal palm width, 1.5 propodus distal width (not including process), 1.0 propodus length; inferior margin with 15 regularly-spaced robust flagellated setae.

Pereopod 2 basis superior margin with 2–3 penicillate setae; *ischium* superior margin with 1 large seta; *merus* superodistal margin with 1 RS, 1 large seta; *carpus* superodistal margin with 5 setae (including 1 penicillate seta), inferior margin with 6 flagellated RS (most distal paired with 1 RS); *propodus* superior margin sparsely setose; superodistal margin with 5 setae (including 1 penicillate seta); inferior margin with 5 flagellated RS (and 1 flagellated serrate RS at inferodistal corner).

Pereopod 7 basis superior margin with 2 penicillate setae; *carpus* inferior margin with 5 flagellated RS (most distal paired with 1 RS); *propodus* inferior margin with 4 flagellated RS (and 1 flagellated serrate RS at inferodistal corner).

Pleopod 1 protopod length 0.4 width; lateral margins with 1 seta; distal margin without pair of RSe; surface setae absent; rami lateral margins with regularly-spaced setae along distal half (becoming closer together distally); inferior surface with a few setae. *Pleopod 2* protopod length 2.9 medial width; basal lobe width 1.6 medial width; distal lobe slightly shorter than exopod, triangular; lateral margin with 2 setae; endopod without setae, medial

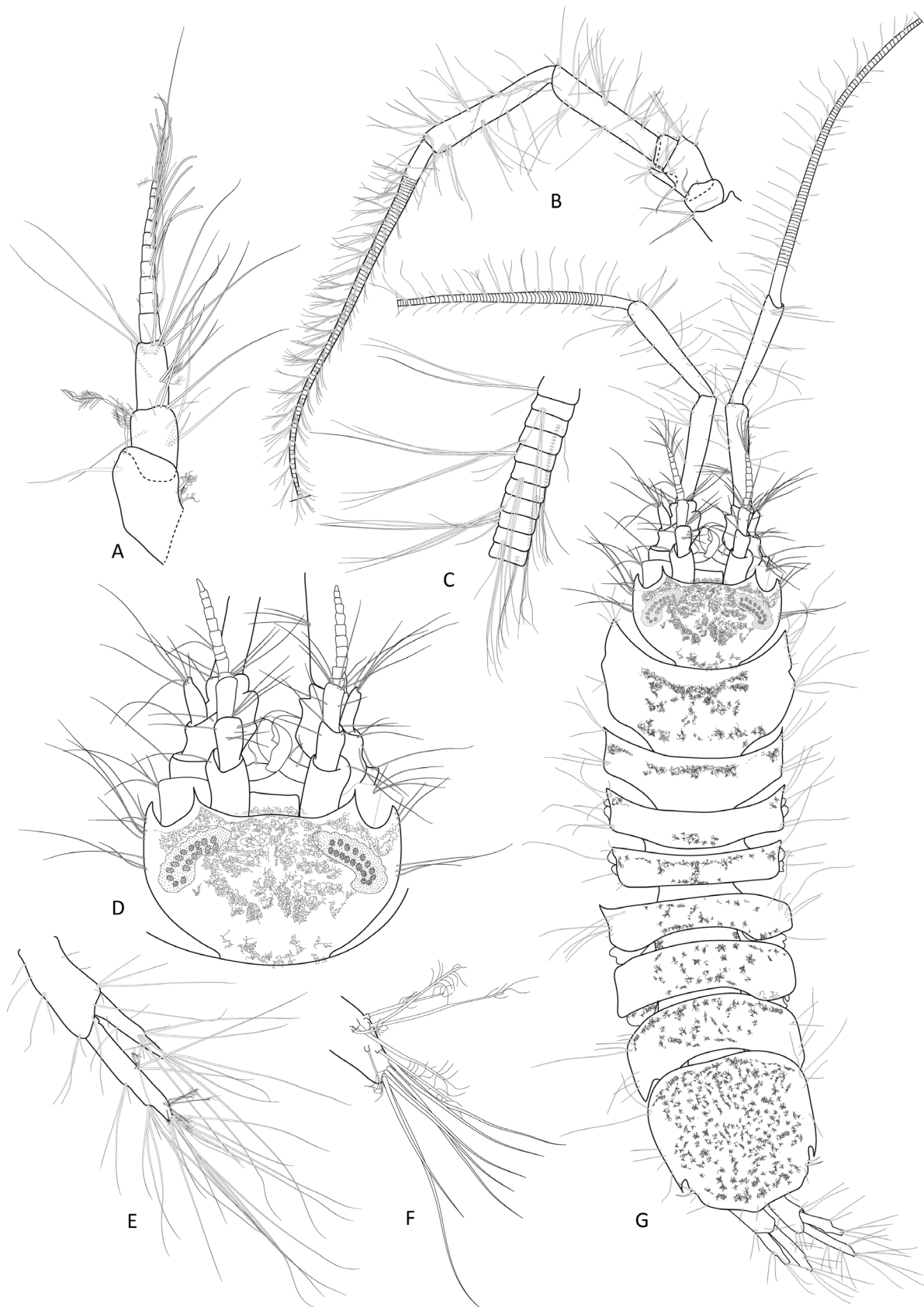


FIGURE 6. *Onychatrium torosus* sp. nov. **A–C**, male paratype (MTQ W14076), **A**, antennula, **B**, antenna, **C**, enlargement of antennal flagellum articles 24–34; **D**, male holotype (MTQ W34194) dorsal view of cephalon; **E**, **F**, male paratype (MTQ W14076), **E**, uropod, **F**, enlargement of setae on disto-lateral border of endopod; **G**, male holotype (MTQ W34194) dorsal view.

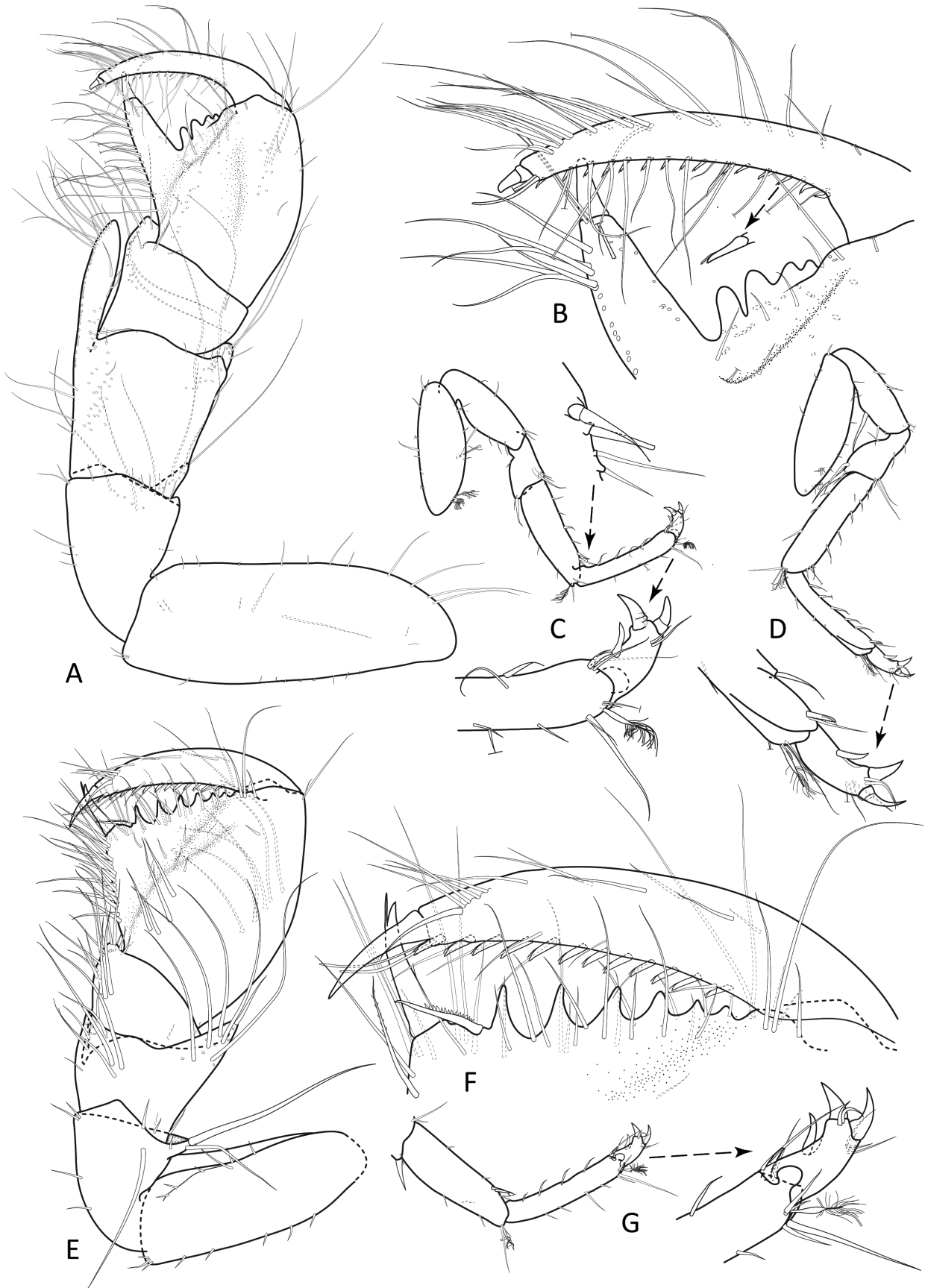


FIGURE 7. *Onychatrium torosus* sp. nov. **A, B**, male holotype (MTQ W34202), **A**, pereopod 1, **B**, enlargement of pereopod 1 dactylus; **C, D**, male paratype (MTQ W14076), **C**, pereopod 7, **D**, pereopod 2; **E–G**, female paratype (MTQ W34205), **E**, pereopod 1, **F**, enlargement of pereopod 1 dactylus, **G**, pereopod 7.

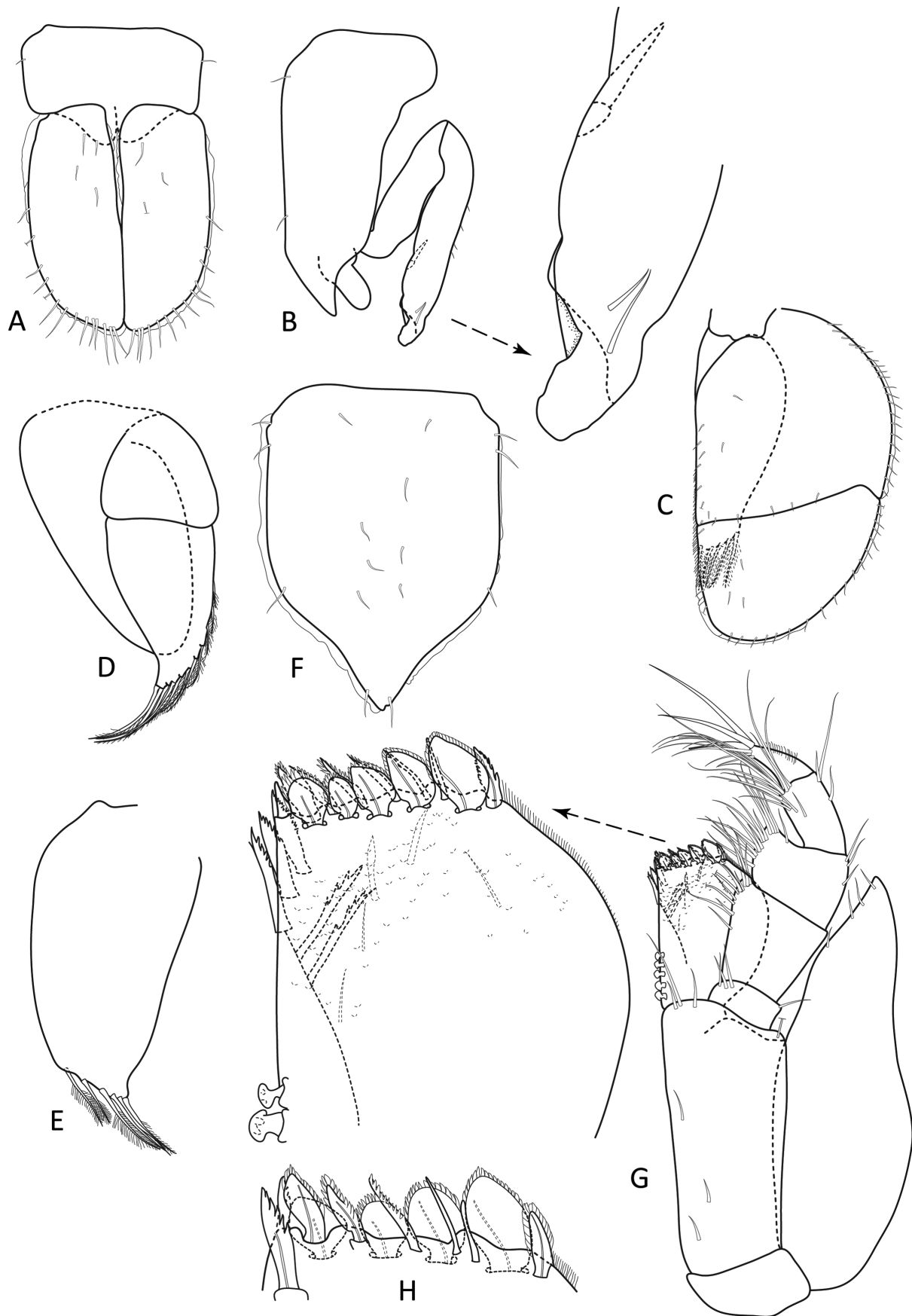


FIGURE 8. *Onychatrium torosus* sp. nov. **A–E**, male paratype (MTQ W14076), **A**, pleopod 1, **B**, pleopod 2, with enlargement of appendix masculina apex, **C**, pleopod 3, **D**, pleopod 4, **E**, pleopod 5; **F**, female paratype (MTQ W34205) pleopod 2; **G**, **H**, male paratype (MTQ W14076), **G**, left maxilliped, with enlargement of endite, **H**, right maxilliped endite setae.

length 0.4 protopod length. *Appendix masculina* length 1.8 endopod medial length, 0.8 protopod length; with lateral, proximally-directed robust spine; lateral margin with distal groove; mesial margin with small, evenly spaced setae; apex with narrowly rounded, laterally concave lobe, without interior pocket of scale setae; 1 proximally projecting distolateral spine. *Pleopod 3* endopod apex with 5 plumose setae. *Pleopod 4* exopod apex with 11 plumose setae. *Pleopod 5* apex with 6 plumose setae.

Uropod length 0.2 body length, 0.6 pleotelson length; protopod length 2 width; *endopod* length 1.1 protopod length, distal and sub-distal margins with 9 penicillate setae, distal tip with cluster of elongate setae, maximum length 2.2 endopod length; *exopod* length 0.8 protopod length, 0.7 endopod length, distal tip with cluster of elongate setae, maximum length 2.9 exopod length.

Female. *Pereopod 1 basis* length 2.4 width, inferior margin with 5 short setae, inferodistal margin with 3 setae. *Carpus* inferodistal margin slightly produced, process rounded. *Propodus* length 1.1 distal (maximum) width, 1.9 proximal width, 2.4 ischium length; inferior margin length 0.5 propodus length, setae restricted to distal three-quarters of margin; *palm* width 1.0 inferior margin length, with 6 teeth, articulation with 4 long setae. *Dactylus* length 5.6 width, 1.7 palm width, inferior margin with 12 regularly-spaced robust flagellated setae.

Pleopod 2 length 1.4 maximum width; lateral margins parallel; posterolateral margins concave; apex slightly notched, asymmetric.

Remarks. Male *Onychatrium torosus* **sp. nov.** can be identified by the large pereonite 1 (1.6 pereonite 2 length) and the characters of pereopod 1: elongate meral process, carpal process a small blunt lobe, propodus inferior margin with no clear margin proximal to the propodal process, and a relatively short and stout propodal process. Pereopod 1 dactylus is relatively shorter than in the other congeneric species. *Onychatrium thomasi* differs in having a very short meral process, a robust, broad-based meral process and long curved propodal process.

Distribution. Lizard Island and adjacent reefs, northern Great Barrier Reef; generally shallow from depths of 0.5 to 7 m.

Etymology. The epithet is the Latin word *torosus* (brawny, muscular), referring to the large pereonite 1 and pereopod 1; noun in apposition.

***Onychatrium thomasi* (Bolstad & Kensley, 1999) comb. nov.**

(Figure 9, 10)

Hansenium thomasi Bolstad & Kensley, 1999: 169, figs 3–5.—Bruce & Buxton, 2013: 450.

Material examined. Topotypes (Madang, Papua New Guinea): ♂ (3.6 mm), ♀ (2.3 mm), Masamoz Reef, 5.1350°S, 145.83833°E, 18 April 1989, rubble at base of reef slope, 18 m, coll. N.L. Bruce & M. Jebb (MTQ W19774). 2 ♂ (3.4, 2.7 mm), barrier reef south of Wongat Island, 5.14333°S, 145.850°E, 29 April 1989, coral rock from hard crest, 4 m, coll. N.L. Bruce & M. Jebb (MTQ W34213). 6 ♂ (3.9 [pereopod 1, pleopod 2 dissected], 3.2 [pereopod 1, pleopod 2 dissected], 3.1, 3.0, 2.8 [P1 dissected], 2.5 mm), 7 ♀ (ovig., 3.5, 2.8 mm, non-ovig. 3.3, 3.2 [pereopod 1, pleopod 2 dissected], 3.1, 2.9, 2.7 mm), Masamoz Reef, 5.1333°S, 145.8333°E, 24 April 1989, *Halimeda* and coarse sand, 5 m, coll. N.L. Bruce & M. Jebb (MTQ W19749). ♂ (3.0 mm), 2 ♀ (3.1, 2.1 mm), Masamoz Reef, 5.1350°S, 145.8333°E, 24 April 1989, coral rubble, reef top, 5 m, coll. N.L. Bruce & M. Jebb (MTQ W34214). 2 ♂ (3.6, 3.0 mm), 2 ♀ (3.8, 3.5 mm), Wongat Island, 5.1350°S, 145.8334°E, 25 April 1989, small rubble on sand, 10 m, coll. N.L. Bruce & M. Jebb (MTQ W34215). 4 ♂ (2.7, 2.5, 2.4, 2.2 mm), 10 ♀ (ovig., 2.6 mm, non-ovig., 3.5, 3.3, 3.2, 3.1, 3.1, 3.1, 2.8, 2.7, 2.1 mm), south of Wongat Island, outer reef, reef slope, 5.140°S, 145.85°E, 19 April 1989, dead coral, 16 m, coll. N.L. Bruce & M. Jebb (MTQ W34216). 2 ♂ (3.1, 2.0 [P1 dissected] mm), 8 ♀ (ovig. 3.5, 3.4, 3.2, 3.0, 3.0 mm, non-ovig. 2.8, 2.7, 2.2 mm), barrier reef south of Wongat Island, reef crest and back reef, 5.1400°S, 145.84833°E, 25 April 1989, dead coral in gully, 6 m, coll. N.L. Bruce & J. Mizeu (MTQ W19762). 5 ♂ (2.9, 2.7, 2.6, 2.6, 1.4 mm), 8 ♀ (ovig. 3.8, 3.7, 2.8, 2.4 mm, non-ovig. 2.8, 2.8, 2.3, 2.1 mm), 3 juv. (1.5, 1.6, 2.0 mm), Wongat Island, north-west corner, 5.1350°S, 145.8433°E, 23 April 1989, semi-exposed rubble among alcyonarians, 0.5 m, coll. N.L. Bruce (MTQ W34217). 3 ♂ (3.8, 3.6, 2.3 mm), 3 ♀ (2.9, 2.9, 2.5 mm), barrier reef south of Wongat Island, back reef, 5.1400°S, 145.84833°E, 28 April 1989, coarse rubble, *Halimeda* covered, 7 m, coll. N.L. Bruce & R. Ueba (MTQ W34218).

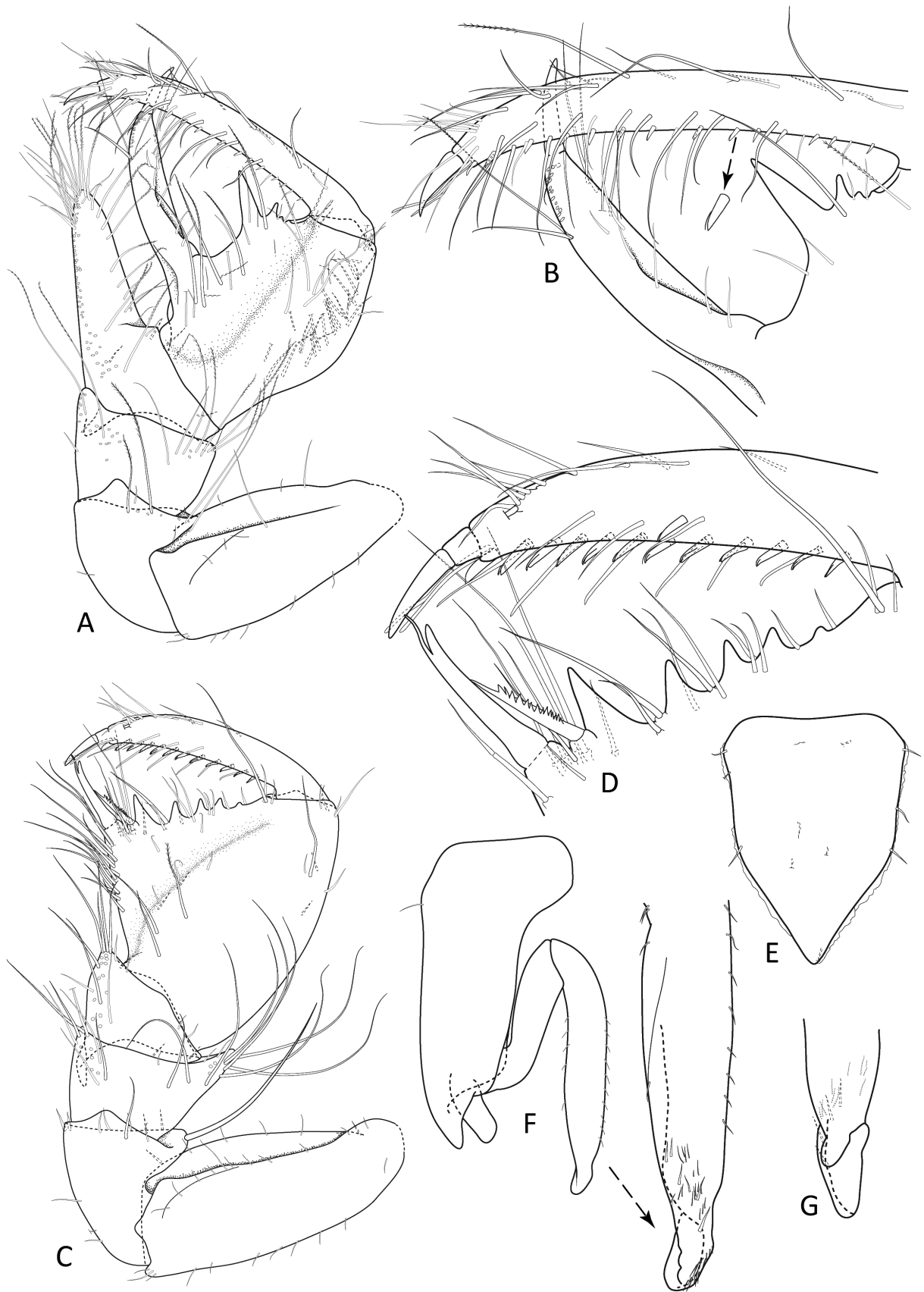
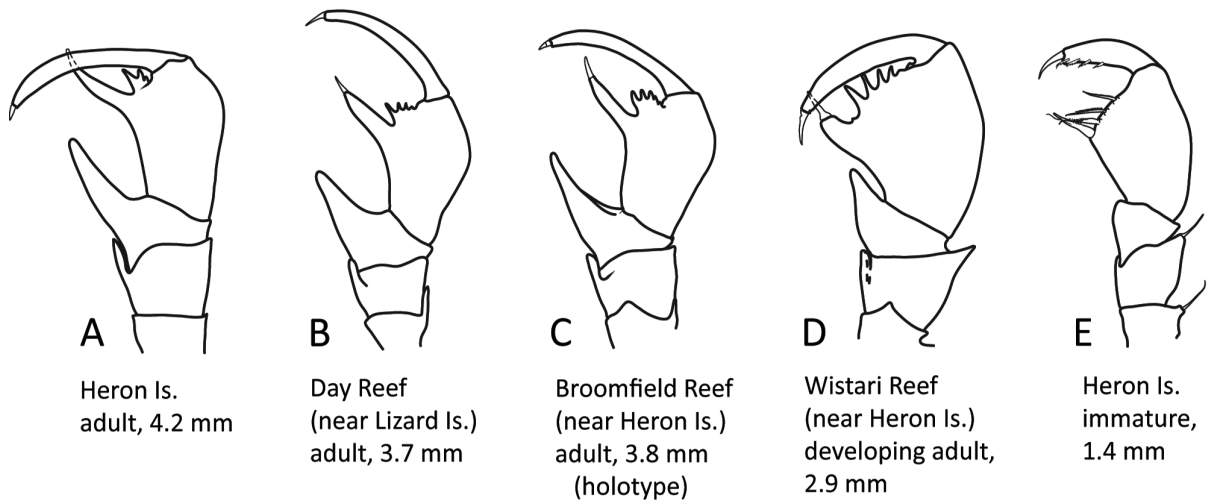
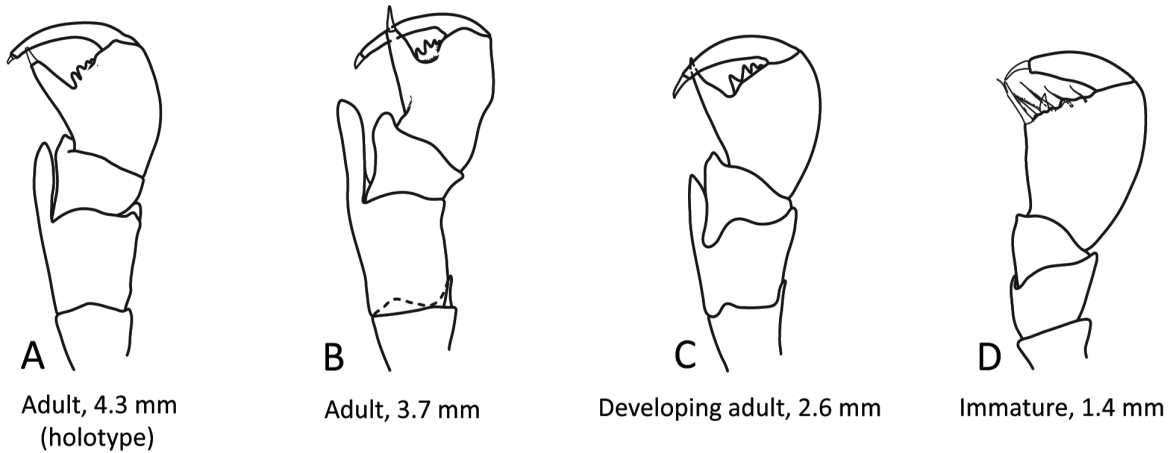


FIGURE 9. *Onychatrium thomasi* (Bolstad and Kensley, 1999) **comb. nov.** **A, B,** male 3.2 mm (MTQ W19749), **A,** pereopod 1, **B,** enlargement of pereopod 1 dactylus; **C–E,** female (MTQ W19749), **C,** pereopod 1, **D,** enlargement of pereopod 1 dactylus, **E,** pleopod 2; **F,** male 3.9 mm (MTQ W19749) pleopod 2, with enlargement of appendix masculina; **G,** male 3.2 mm (MTQ W19749) apex of appendix masculina.

Onychatrium forceps n. sp.



Onychatrium torosus n. sp. (Lizard Island)



Onychatrium thomasi (Bolstad and Kensley, 1999) comb. nov. (Madang)

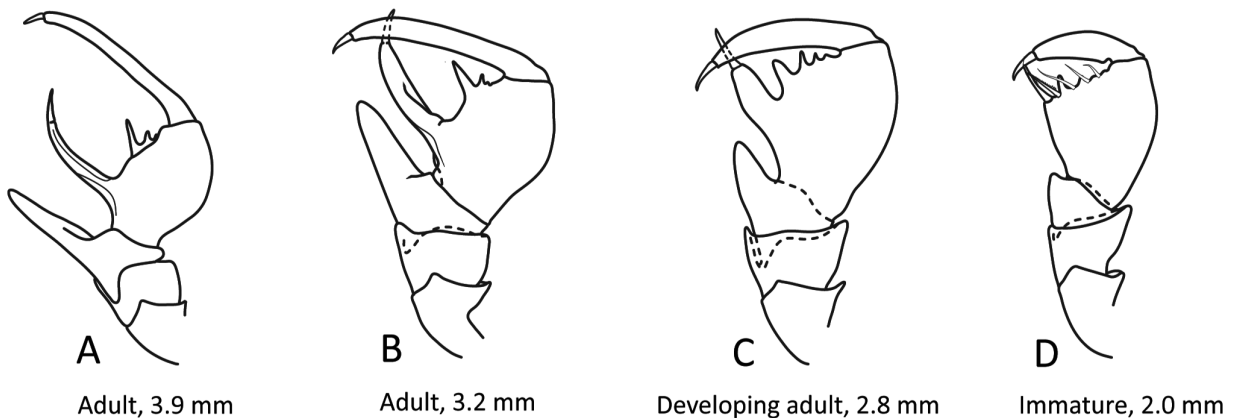


FIGURE 10. *Onychatrium* male pereopod 1 variation—comparison between species, developmental stages and locations. *Onychatrium entale* (Nordenstam, 1946) comb. nov. holotype (SMNH 798). *Onychatrium forceps* sp. nov., **A**, paratype (MTQ W31594), **B**, paratype (MTQ W32851), **C**, holotype (MTQ W34194), **D**, paratype (MTQ W34196), **E**, paratype (MTQ W34198). *Onychatrium torosus* sp. nov., **A**, holotype (MTQ W34204), **B**, paratype (MTQ W14076), **C**, paratype (MTQ W34206), **D**, paratype (MTQ W32760). *Onychatrium thomasi* (Bolstad and Kensley, 1999) comb. nov., **A**–**C**, topotypes (MTQ W19749), **D**, topotype (MTQ W19762).

Supplementary description. *Pereopod 1* basis length 2.1 width; superior margin with 2 short setae, 1 long seta proximally; submarginal row of short and long setae.

Ischium length 1.2 width; inferior margin with 1 short seta, inferodistal margin without setae, distal margin with 1 short seta, mesial distal margin with submarginal row of 5 long setae; superodistal margin not produced, with 3 long setae.

Merus length 0.7 width, 1.0 carpus length, 0.7 ischium length; inferior margin with 1 short seta, inferior submargin with a dense patch of long setulate setae, distal margin without setae. *Inferodistal meral process* short, oblong, length 0.7 merus inferior margin length, 0.5 merus length, mesial surface with numerous long setulate setae, lateral surface with 1 seta.

Carpus sub-triangular; length 0.7 width, 0.6 ischium length; distal margin with 3 short setae; inferior margin not clearly defined. *Carpal process* long, tapering, straight; length 1.9 width, 1.4 carpal width; extending distally adjacent to propodal palm, oriented *c* 63 degrees to propodal longitudinal axis, parallel with propodal process; apex rounded, densely setose; inferior margin straight, densely setose, setae becoming submarginal on proximal third, 1 row of straight setae, 1–2 rows of long setae angled distally; superior margin straight, setose along full length.

Propodus robust superiorly with pronounced narrowing medially; length 1.5 maximum width, 1.7 proximal width, 1.7 ischium length; inferior margin clearly defined, short, 0.07 propodus length, 0.07 superior margin length, submarginal setae setulate; superior margin with a marginal row of evenly-spaced setae, a submarginal lateral row of long setae. *Palm* width 0.6 maximum propodus width, oblique; toothed lobe with 4 teeth, largest tooth length 15.5 smallest tooth length; distance from toothed lobe to propodal process 0.7 palm width, 0.9 propodal process width. *Propodal process* length 4.7 width, including RS at apex; inferior margin convex, setose along distal quarter only; superior margin straight. *Dactylus* straight in mid-section, slightly curved at ends; length 7.3 proximal width, 3.5 propodal palm width, 2.2 propodus distal width (not including process), 1.5 propodus length; inferior margin with 15 regularly-spaced robust flagellated setae.

Pleopod 2 protopod length 3.3 maximum width, basal lobe width 1.6 medial width, distal lobe sub-triangular, lateral margin with 1 seta; *endopod* length 0.4 protopod length. *Appendix masculina* length 1.9 endopod length, 0.8 protopod length; without lateral spine.

Female. *Pereopod 1* basis length 2.3 width, superior margin with 5 short setae, inferior margin with 7 short setae, inferodistal margin with 3 setae. *Carpus* inferodistal margin slightly produced, process triangular. *Propodus* length 1.0 distal (maximum) width, 2.1 proximal width, 3.0 ischium length; inferior margin length 0.6 propodus length, setae restricted to distal two-thirds of margin; *palm* width 1.1 inferior margin length, with 5 teeth, articulation with 1 long seta. *Dactylus* length 5.6 width, 1.7 palm width, inferior margin with 12 regularly-spaced robust flagellated setae.

Pleopod 2 length 1.4 maximum width; lateral margins not parallel, narrowing posteriorly; posterolateral margins straight to slightly concave; apex rounded.

Remarks. *Onychatrium thomasi* may be identified and distinguished from its congeners by the male pereopod 1 having an elongate and distinctly curved propodal process (approximately 4.7x basal width; as long as propodus), the propodal inferior margin with a very short free margin proximal to the propodal process, a robust, large and straight-sided (“triangular”) carpal process and a short and blunt carpal process.

Distribution. Known only from the Madang region, Papua New Guinea; at depths of 0.5 to 18 m.

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