

The Coastal Talitroid Amphipods of New Caledonia (Amphipoda: Talitroidea)

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ABSTRACT. One new genus and three species of talitrid amphipods are described from New Caledonia: *Chroestia amoa* sp. nov., *Talorchestia spinipalma* (Dana, 1852), *Thiorchestia caledoniana* gen. et sp. nov. Descriptions are accompanied by basic ecological information on beaches where the specimens were collected.

Introduction

Five species of terrestrial talitroid amphipods are currently known from New Caledonia: *Chiltonorchestia pusilla* (Chevreux, 1915); *C. starmuhlneri* (Ruffo & Vesentini Paiotta, 1972); *Ignamborchestia sarasini* (Chevreux, 1915); *Chevreuxiana antennulata* (Chevreux, 1915); and one beach-hopper, *Talorchestia spinipalma* (Dana, 1852). Most are well described and all but one species appear to be associated with fresh water at altitudes of 300–1000 m. In this paper, based on a collection from around the coastline, we describe two beach-hoppers, i.e., mainly coastal supralittoral / intertidal leaf-litter / wrack, non-substrate modifying talitroids: *Chroestia amoa* sp. nov. and *Thiorchestia caledoniana* gen. et sp. nov., and report new records of *Talorchestia spinipalma* (Dana, 1852) bringing the total talitroidean taxa from New Caledonia to eight.

We also report the sites along the coastline where talitroids were found, and those where no talitroids were found, after applying the same sampling effort. In fact, through a meta-analysis of data from 201 beaches worldwide, McLachlan

& Defeo (2017) concluded that, in terms of resident macrofauna, beaches “behave” like ecological islands, so the single beach unit dimension becomes extremely relevant to describe the distribution of organisms. From this perspective we consider it important to report also those sites where no talitroids were found, as informative zeros. On the assumption that the integration of disciplines requires both clear protocols and matching units (Obergh, 2011), we here present the organism along with standard information related to the “beach unit” where it was collected (unit dimensions summarized in Fanini *et al.*, 2021). Information remains quantitative, though it supports the depiction of patterns and baselines. We encourage further studies based on collections of coastal talitroids to utilize this approach.

Material and methods

From 24 December 2014 to 6 January 2015 J. K. Lowry and L. Fanini circumnavigated Grand Terre, New Caledonia collecting coastal talitroids at a number of sites (Table 1). Beach units (hereafter “sites”) around the coastline of Grand

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Table 1. Sampling sites ordered from North to South. **Bold text** indicates sites where talitroids were found.

sites	verbatim coordinates	collectors' notes
Poum	20°13.894'S 164°01.413'E	Shingle beach
Malabou	20°17.530'S 164°06.426'E	Sand beach close to touristic infrastructure
Pouebo	20°22.777'S 164°34.993'E	Estuarine beach
Yambe	20°26.018'S 164°39.283'E	Sand beach
Tao	20°30.967'S 164°46.094'E	Estuarine beach
Koumac	20°33.718'S 164°17.219'E	Shingle beach
Kalaa gomein	20°41.293'S 164°21.848'E	Estuarine beach
Hiengene	20°41.473'S 164°56.552'E	Shingle beach
Amoa	20°45.713'S 165°11.541'E	Estuarine beach
Poindimie	20°55.635'S 165°19.093'E	Sand beach
Voh	20°57.976'S 164°39.384'E	Sand beach
Oundjo	21°02.560'S 164°41.884'E	Mangrove
Mou	21°06.105'S 165°26.924'E	Sand beach
Poe	21°36.802'S 165°24.214'E	Sand beach
Thio mission	21°37.261'S 166°15.598'E	Sand beach
Bourake	22°18.076'S 166°27.443'E	Sand beach close to small port and village

Terre, New Caledonia were searched by J. K. Lowry & L. Fanini, by removing substrate along transects perpendicular to the shoreline, from the detritus strand line to the base of the dune. The process was repeated for parallel lines, spaced five metres apart. Talitroids moving out of the substrate were hand collected with an entomological aspirator. Talitroids were recorded as absent if none were found after 30 minutes of searching the supralittoral zone as described above.

Standard variables for beach ecology are: beach width, beach slope and substrate grain size, recorded at low tide (after Schlacher *et al.*, 2008). Beach width and beach face slope were assessed after McLachlan & Defeo (2017); sand classification based on mean grain size follows Blott & Pye (2001). Given the striking difference among substrates where species were found, the substrate was analysed in detail and a sand colour analysis was added (but see Mestanza-Ramón *et al.* (2020) for integrating substrate parameters

into target-oriented beaches characterization). Sand colour determination follows CIE-L*a*b methodology, returning variables of lightness (L*) on a scale of 0–100, yellow-blue and red-green (a* and b*) ranging from -200 to +200. Values are inter-convertible with the Munsell scale (Vodyanitskii & Kirillova, 2016) (Table 2).

Specimens were preserved in 70% ethanol immediately after collection time, then prepared for SEM analyses following steps 1–9: 1) soaked in Tween 10 for a few minutes to remove any dirt/grime on the body; 2) washed several times in water to remove the Tween 10; 3) Sonicated in water to shake off the dirt/grime; 4) dissection of one half of the animal, with all parts placed in individual vials and identified; 5) specimen and bits taken through an ethanol grade series: 70, 80, 90, 95, 100, 100, 100; 6) critical point drying all parts and specimens; 7) legs and mouthparts were mounted on carbon tabs and aluminium stubs, with mouthparts usually

Table 2. Beach and substrate metrics recorded for the sites where talitroids were found.

site	beach width (m)	beach face slope (°)	substrate (mean grain size in mm)	sand colour (CIE-L*a*b)	coarse substrate fraction (% of sample weight)	beach unit	wrack presence
Thio mission	10.5	7.86	fine-medium sand (0.23)	dark a*3.97 b*9.85	0	extended	yes
Mou	7.0	6.15	coarse sand (0.70)	fair L*66.41 a*4.19 b*17.66	83.18	pocket	yes, also leaf litter
Amoa	7.0	4.50	very coarse sand (1.37)	dark L*38.93 a*5.73 b*13.56	2.95	estuarine	yes
Malabou	5.0	7.00	medium sand (0.38)	white L*71.33 a*3.16 b*13.77	0	embayment	yes

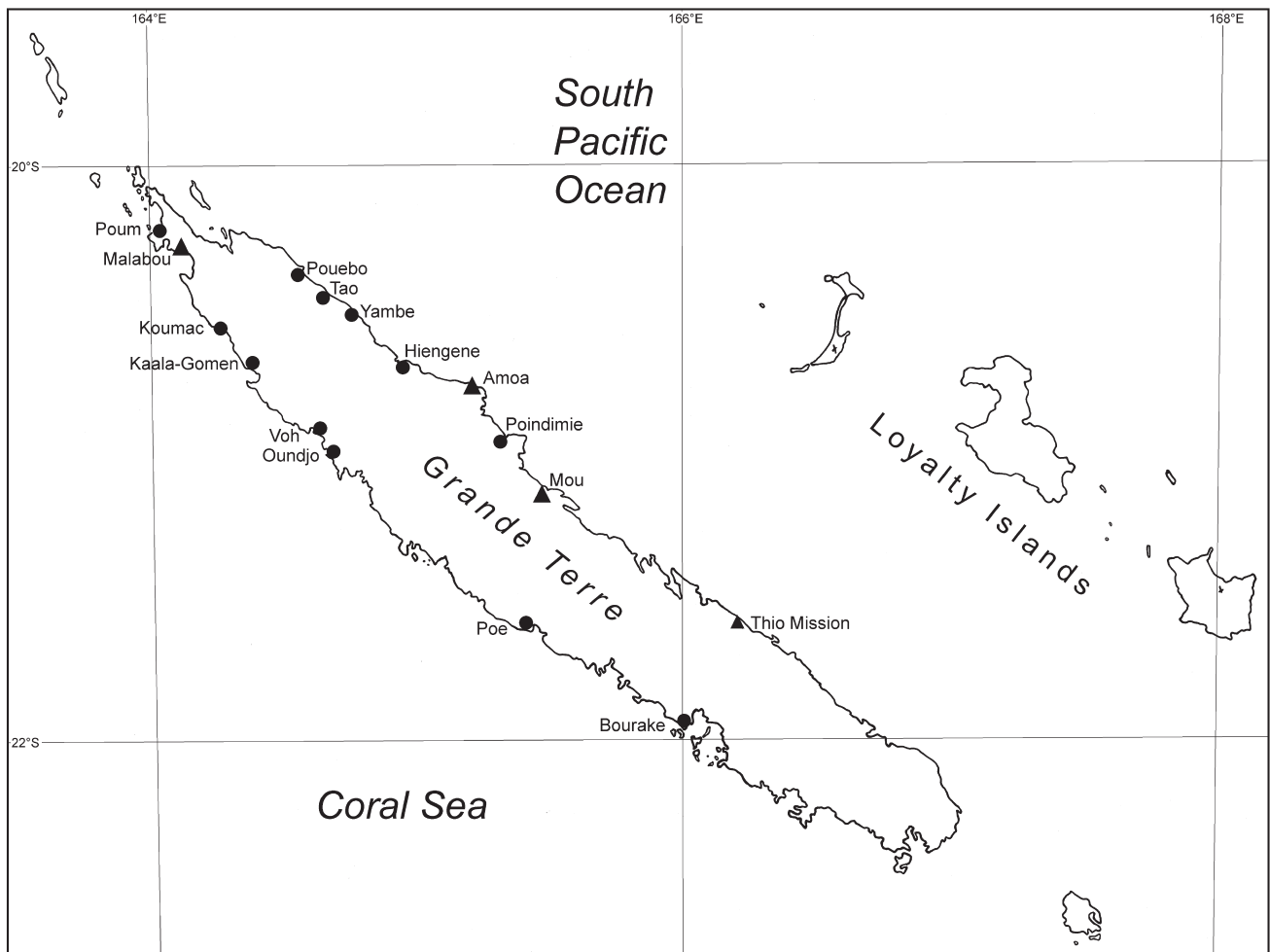


Figure 1. Map of Grand Terre, New Caledonia showing collecting sites in this study. Triangles indicate stations positive for talitroids. Circles indicate stations negative for talitroids.

Table 3. Occurrence of species of talitroids at each site.

sites: toponym and collection date	specimens collected and registration number	collection notes
Thio mission 27 December 2014	<i>Talorchestia spinipalma</i> , 5 males (adults and juveniles), 4 females (adults and juveniles) AM P.97475, and <i>Thiorchestia caledoniana</i> , 2 males, 5 females, AM P.105706	Supralittoral of an extended black sand beach with pumice.
Mou 2 January 2015	<i>Thiorchestia caledoniana</i> , 4 males, 1 juvenile female, AM P.97476	Supralittoral of a pocket beach, with leaves, coarse sand and pumice, amphipods burrowed in the sand, lots of crickets on the supralittoral.
Amoa 2 January 2015	<i>Chroestia amoa</i> , 3 males, 24 females, AM P.97477	Supralittoral of an estuarine sandy beach.
Malabou 31 December 2014	<i>Chroestia amoa</i> : 1 male, AM P.100369, 1 female, AM P.100370; 19 males, 22 females, AM P.97473; 6 males, 3 females, AM P.97474	Supralittoral of a sandy beach within a bay, covered in wrack, mainly <i>Zostera</i> .

mounted on one stub in a row, so it was possible to image each part at 90° and move to the next, and then rotate the stub to image the other side; 8) the whole mount was made using a pin; and 9) all parts and the whole mount were then gold sputter coated.

Taxonomic descriptions were generated from a DELTA database (Dallwitz, 2018) to the talitroid genera and species of the world. **Bolded text** indicates diagnostic characters. Material collected in this study is lodged in the Australian Museum, Sydney (AM). The following abbreviations are used for museum collections: Museo Civico di Storia Naturale di Verona, Italy (MVR), Museum national d'Histoire naturelle, Paris, France (MNHN) and the Osaka Museum of Natural History, Japan (OMNH). Standard abbreviations on the figures are: A, antenna; D, dactylus; EP, epimeron; G, gnathopod; H, head; LL, lower lip; lm, lacinia mobilis; MD, mandible; MP, maxilliped; MX, maxilla; Oost, oostegite; P, pereopod; sp, setal patch; T, telson; U, uropod; UL, upper lip; UR, urosome; L, left, R, right.

The list of known material, including types of known New Caledonian talitroids, is reported for completeness in the Systematics section, even not all specimens were examined or designated in this paper.

Results

Circumnavigation of Grand Terre, New Caledonia, revealed an uneven presence of talitroids on beaches. Out of 16 sites sampled (Fig. 1, Table 1), ranging from estuarine to mangrove environments, with different exposure ("extended" to "pocket" beach), and on different coastlines of the island, talitroid amphipods were collected from only four sites. There is essentially no common environmental feature among the collection sites, except for the absence from the western shore of the island.

Different species were found in different and non-contiguous environments (in terms of beach morphology, exposure, and substrate characteristic), on the eastward coastline of Grand Terre (Table 3). Stranded wrack was observed on beaches both with and without talitroids, hence the availability of organic inputs was excluded as a limiting factor. Indeed, while continuous coastlines host macro-scale gradients of populations of the same species such as *Vallorchestia dispar* (Dana, 1852) along the New South Wales coast of Australia (Lowry, 2012), *Platorchestia platensis* (Krøyer, 1845) along the Uruguayan and Brazilian coasts (Serejo, 2004), the pattern here reported is puzzling and raises novel questions regarding the distribution of talitroid amphipods on islands.

Systematics

Talitroidea Rafinesque, 1815

Makawidae Myers & Lowry, 2020

Chiltonorchestia pusilla (Chevreux, 1915)

Parorchestia pusilla Chevreux, 1915: 11, pl. 3.—Ruffo & Vesentini Paiotta, 1972: 253, figs 4, 8(2).

Chiltonorchestia pusilla.—Bousfield, 1984: 203, tab. 5.—Ruffo & Krapp-Schickel, 2005: 36.—Iannilli & Ruffo, 2007: 23.—Lowry, 2007: 286.

Lectotype: Female, ovigerous (labelled as female B by Chevreux; ethanol and 1 slide of gnathopods plus last two segments of the urosome), MNHN-IU-2013-19685, Lac en Huit, New Caledonia, along margin, coll. F. Sarasin & J. Roux. **Paralectotypes:** 4 specimens (undissected, ethanol), MNHN-IU-2013-19686, Lac en Huit, New Caledonia, along margin, coll. F. Sarasin & J. Roux; 1 female (dissected, ethanol), MNHN-IU-2013-19687, New Caledonia; 1 male (labelled as male B by Chevreux; 1 slide, gnathopods), MNHN-IU-2013-19688, Lac en Huit, New Caledonia, along edge of lake.

Type locality. Lac en Huit, on gorse near the river (altitude 244 m), New Caledonia.

Ecological type. Riparian-hopper.

Habitat. Freshwater. Among gorse, near the shore (Chevreux, 1915). Seems to be an aquatic form, having always been collected in shallow water (Ruffo & Vesentini Paiotta, 1972).

Distribution. New Caledonia (Chevreux, 1915).

Chiltonorchestia starmuhlneri (Ruffo & Vesentini Paiotta, 1972)

Orchestia starmuhlneri Ruffo & Vesentini Paiotta, 1972: 258, figs 5–8(1).

Chiltonorchestia starmuhlneri.—Bousfield, 1984: 203, tab. 5.—Ruffo & Krapp-Schickel, 2005: 36, 69, 78, 86.—Iannilli & Ruffo, 2007: 23.—Lowry, 2007: 286.

Holotype: Male, 9 mm, MVRCr 255, tributary of White River, near forest road to ranger station at Blockhouse Ouénarou on west slope of Mount Pouèdihhi (altitude 300 m), New Caledonia.

Type locality. Tributary of the White River, near the forest road to the ranger station at Blockhouse Ouénarou on the west slope of Mount Pouèdihhi (altitude 300 m), New Caledonia.

Ecological type. Riparian-hopper.

Habitat. Living in or near freshwater.

Distribution. New Caledonia (Ruffo & Vesentini Paiotta, 1972).

***Ignamborchestia sarasini* (Chevreux, 1915)**

Parorchestia sarasini Chevreux, 1915: 8, pl. 2.
Chiltonorchestia sarasini.—Bousfield, 1984: 203, tab. 5.—
 Iannilli & Ruffo, 2007: 23.
Ignamborchestia sarasini.—Lowry & Myers, 2019: 42,
 fig. 18.

Lectotype: Female (undissected, ethanol), MNHN-IU-2013-19689, summit of Mount Ignambi, 1300 m, coll. F. Sarasin & J. Roux, 15 April 1911. **Paralectotypes:** 2 specimens (undissected, ethanol), MNHN-IU-2013-19690, summit of Mount Ignambi, 1300 m; 1 female (labelled as female A by Chevreux; head in ethanol and 11 slides of maxillae 1–2 left and right, gnathopods, pereopods 3–7, pleopods 1–3, uropods, and telson), MNHN-IU-2013-19691; 1 female (labelled as female B by Chevreux; ethanol and 2 slides of mouthparts, gnathopods 1, 2 and branchiae), MNHN-IU-2013-19692; 1 male (2 slides, antennae 1–2, maxilla 1, maxillipeds and gnathopods), MNHN-IU-2013-19693, Ignambi Forest.

Type locality. Mt Ignambi, forest, 700–1300 m altitude, north-eastern New Caledonia.

Ecological type. Forest-hopper.

Habitat. Forest floors at 700–800 m altitude.

Remarks. Differs from *Chiltonorchestia* in its short antenna 1.

Distribution. New Caledonia: Mt Ignambi (Chevreux, 1915); Farino; Pouembout (Iannilli & Ruffo, 2007).

Talitridae Rafinesque, 1815

Talitrinae Rafinesque, 1815

***Chevreuxiana antennulata*
(Chevreux, 1915)**

Talorchestia antennulata Chevreux, 1915: 5, pl. 1.
Chevreuxiana antennulata.—Lowry & Myers, 2019: 22,
 fig. 7.

Lectotype: Female (23 mm; ethanol and 10 slides of antenna 1–2 / mouthparts / gnathopods / pereopods 1, 3 and 5 (broken) / pleopods 1–3 / pleopod 2 / pleopod 3 / pereopods 2–4 / uropods 1–2 / uropod 3, telson), MNHN-IU-2013-19694, New Caledonia, Mount Canala, 800–1000 m. **Paralectotypes** (all New Caledonia): 2 specimens, juvenile (undissected ethanol), west coast of New Caledonia, G. Dupuis coll., 1888, MNHN-IU-2013-19695; 4 specimens (undissected ethanol), Mount Canala, 700 m, MNHN-IU-2013-19696; 6 specimens (males and females) (undissected ethanol), Mount Humboldt, MNHN-IU-2013-19697; 1 female (dissected, ethanol, and 1 slide, gnathopod 1), Mount Canala, 700 m, MNHN-IU-2013-19698; 1 male, 9 mm (4 slides of head / gnathopods / pereopod 5 / pleopod 3, uropod 1–2), Mount Humboldt 1100 m, MNHN-IU-2013-19699.

Type locality. Mt Canala, 800–1000 m, under rotten leaves.

Ecological type. Forest-hopper.

Habitat. Living under rotten leaves at 200–1000 m altitude.

Distribution. New Caledonia: Tchalabel; Oubatche; Mt Ignambi, forest 600 m altitude; Hienghiène; Mt Panié, forest, 500–1600 m altitude; Coné; Vallée de la Tiouaca; Mt Canala, 700–1000 m; Mt Humboldt, 1100–1600 m altitude; Ngoï Valley, forest, 200 m altitude; Yaté. Loyalty Islands: M: area, Kaoua (Chevreux, 1915).

***Chroestia* Marsden & Fenwick, 1985**

Chroestia Marsden & Fenwick, 1985: 843.—Lowry & Stoddart, 2003: 271.

Type species. *Chroestia lota* Marsden & Fenwick, 1984, monotypy.

Included species. *Chroestia amoa* sp. nov., *C. lota* Marsden & Fenwick, 1985.

Category. Mascupod.

Ecological type. Beach-hoppers (mainly coastal supra-littoral/intertidal leaf-litter/wrack, non-substrate modifying talitrids).

Habitat. *Chroestia* is common in thick mats of *Zostera* and mangrove debris on a small sand-gravel beach at the top of an extensive mud flat area.

Diagnostic description. **Male** (based on Marsden & Fenwick, 1985).

Head. *Eye* medium ($\frac{1}{5}$ – $\frac{1}{3}$ head length). *Antenna 1* short, rarely longer than peduncular article 4 of antenna 2. *Antenna 2* peduncular articles slender or slightly incrassate (expanded); article 3 without plate or process ventrally. *Labrum epistome* without robust setae. *Mandible* left lacinia mobilis 4-cuspidate. *Maxilliped* outer margin of precoxa not stepped; palp article 2 with distomedial lobe; article 4 reduced, button shaped.

Pereon. *Gnathopod 1* sexually dimorphic; subchelate; **posterior margin of carpus and propodus each with lobe covered in palmate setae; palm transverse.** *Gnathopod 2* subchelate; propodus palm acute; posterior margin of merus, carpus, and propodus each without lobe covered in palmate setae; **dactylus attenuated distally.** *Pereopods 3–7* bi-cuspidactylate. *Pereopod 4* dactylus thickened proximally with notch midway along posterior margin. *Pereopod 5* dactylus long, slender, not inflated. *Pereopod 6* not sexually dimorphic; shorter than pereopod 7. *Pereopods 6–7* without row of short setae along posterior margin of the dactyli. *Pereopod 7* not sexually dimorphic. Propodus without large distal tuft of setae.

Pleon. *Pleonites 1–3* without dorsal spines. *Oostegites* setae with curled tips. *Pleopods 1–3* all well-developed. *Epimera 1–3* slits absent. *Uropod 1* peduncle distolateral robust seta present (large), with simple tip; rami without apical spear-shaped setae; **outer ramus without marginal robust setae;** inner ramus with marginal robust setae in 1 row. *Uropod 2* rami without apical spear-shaped setae; outer ramus with marginal robust setae in 1 row; **inner ramus with marginal robust setae in 1 row.** *Uropod 3* ramus shorter than peduncle. *Telson* longer than broad, tapering distally, apically incised, with marginal and apical robust setae, **with 7 to 10 or more robust setae per lobe.**

Remarks. *Chroestia* is confined to Australia and New Caledonia which separated from each other about 65 million years ago (Coleman, 1980) and may indicate a possible minimal age for *Chroestia*, but also shows the morphological stability of species within the genus.

Distribution. Australia: Lota, Queensland (Marsden & Fenwick, 1985). New Caledonia: Malabou and Amoa, Grand Terre (this paper).

Chroestia amoa sp. nov.

urn:lsid:zoobank.org:act:D0A16782-C24F-453B-BC44-311A6875D5F0

Figs 2–4

Holotype: Male, 10.8 mm, AM P.100369 (SEM pin and 4 SEM stubs), Malabou, Grand Terre, New Caledonia, 20°17.530'S 164°6.426'E, bay, supralittoral, sandy beach covered in wrack, mainly *Zostera*, coll. J. K. Lowry & L. Fanini, 31 December 2014. **Paratypes:** 1 female, AM P.100370 (SEM pin and 1 SEM stub); 19 males, 22 females (wet specimens), AM P.97473; 6 males, 3 females (wet specimens), AM P.97474, same data as holotype. 3 males, 24 females (wet specimens), AM P.97477, near Amoa, Grand Terre, New Caledonia, 20°45.713'S 165°11.541'E, estuary supralittoral, sandy beach, coll. J. K. Lowry & L. Fanini, 2 January 2015.

Type locality. Malabou, Grand Terre, New Caledonia (20°45.713'S 165°11.541'E), estuary supralittoral, sandy beach.

Ecological type. Beach-hopper.

Habitat. Estuary supralittoral, sandy beach.

Etymology. Named for the town of Amoa, Grande Terre, New Caledonia.

Description. Male (based on holotype, 10.8 mm, AM P.100369).

Head. Eye medium ($\frac{1}{5}$ – $\frac{1}{3}$ head length). *Antenna 1* short, not reaching midpoint of peduncular article 5 of antenna 2. *Antenna 2* peduncular articles slender, with many small robust setae; article 1 enlarged, bulbous. *Mandible* left lacinia mobilis 4-cuspidate. *Maxilla 1* inner plate with 2 apical plumose setae; palp vestigial, 2-articulate, without apical seta. *Maxilla 2* inner plate with one large plumose seta along inner margin. *Maxilliped* palp broad, article 2 with distomedial lobe; article 4 reduced, button shaped.

Pereon. Gnathopod 1 sexually dimorphic; subchelate; coxa much smaller than coxa 2; **posterior margin of carpus and propodus each with lobe covered in palmate setae**; carpus longer than propodus, length more than $2 \times$ width; propodus anterior margin with 3 groups of robust setae, “subtriangular” with well-developed posterodistal lobe, palm transverse; dactylus simplidactylate. **Gnathopod 2** subchelate; with distally rounded anterodistal lobe on medial surface; posterior margin of merus, carpus, and propodus each without lobe covered in palmate setae; **propodus palm acute, evenly rounded, without proximal sinus**, without large distal sinus, without proximal spine or thumb defining palm, without large projection near dactylar hinge; **dactylus attenuated distally, slightly curved**, subequal or slightly longer than palm; posterior margin smooth; shorter than posterior margin of propodus. *Pereopods 3–7*

dactyli cuspidactylate (bicuspidactylate), with anterodistal denticulate patch. *Pereopod 4* significantly shorter than pereopod 3; carpus significantly shorter than carpus of pereopod 3; dactylus amplidactylate, thickened proximally with notch midway along posterior margin. *Pereopod 5* short, less than $\frac{2}{3}$ length of pereopod 6; merus broad, longer than broad, expanded distally. *Pereopod 6* shorter than pereopod 7; not sexually dimorphic; coxa posterior lobe with anteroventral corner rounded, not produced; basis expanded. *Pereopod 7* not sexually dimorphic; posterior margin with broad, small serrations, each with a small seta, posterodistal lobe present, shallow, broadly rounded; merus expanded distally, subtriangular, anterior margin straight; carpus unexpanded; subrectangular; shorter than propodus; propodus broad; length $6.6 \times$ width. *Oostegites* (female) present, setae with curled tips.

Pleon. *Pleopods 1–3* all well-developed. *Epimera 1–3* ventral margin without robust or slender setae. *Uropod 1* peduncle distolateral robust seta present (large), large ($\frac{1}{4}$ length of outer ramus), with simple tip; **exopod without marginal robust setae**; endopod with marginal robust setae in 1 row. *Uropod 2* exopod with marginal robust setae in 1 row; endopod with marginal robust setae in 1 row. *Uropod 3* ramus shorter than peduncle; peduncle with 1 or 2 very long robust setae dorsal margin, linear (narrowing). **Telson** as broad as long, tapering distally, completely cleft, with apical and marginal robust setae, **with at least 10 robust setae per lobe**.

Female (sexually dimorphic characters). Based on paratype female, AM P.100370. **Gnathopod 1** posterior margin of merus, carpus, and propodus each without lobe covered in palmate setae. *Propodus* subrectangular, anterior margin with 2 groups of robust setae, palm acute; dactylus simple, longer than palm. **Gnathopod 2** mitten-shaped; basis slightly expanded; ischium without lobe on anterior margin; posterior margin of merus, carpus, and propodus each with lobe covered in palmate setae. *Carpus* well developed (not enclosed by merus and propodus), posterior lobe present, projecting between merus and propodus. *Palm* obtuse, nearly straight. *Dactylus* curved, posterior margin smooth, shorter than palm. **Oostegites** long (length greater than $2 \times$ width), longer than wide, setose, setae with curled tips.

Remarks. This is the first record of *Chroestia* outside Australia. *Chroestia amoa* is very similar to *C. lota* Marsden & Fenwick, 1985 from Moreton Bay, Queensland, Australia. The main morphological difference between these species is the shape of the palm of male gnathopod 2, which is evenly rounded in *C. amoa*, but has a distinctive proximal sinus in *C. lota*.

Distribution. New Caledonia: Malabou and Amoa, Grand Terre.

Thiorchestia gen. nov.

urn:lsid:zoobank.org:act:8EEBA7EA-0B81-47F2-A9B7-53FC6DF3C8F3

Figs 5–7

Type species. *Thiorchestia caledoniana* sp. nov., monotypy.

Included species. *Thiorchestia caledoniana* sp. nov.

Category. Mascupod.

Ecological type. Beach-hopper.

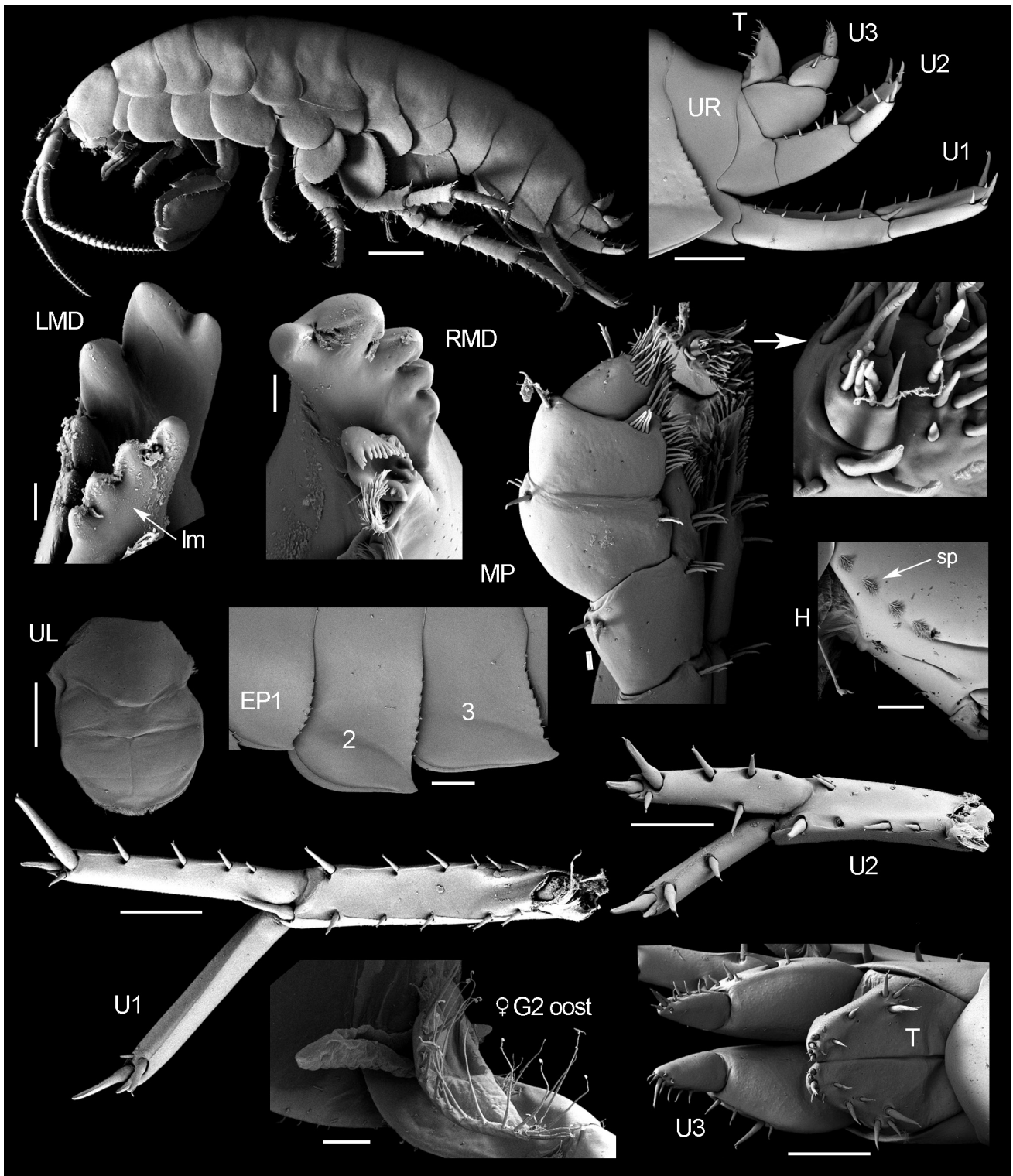


Figure 2. *Choestia amoa* sp. nov., holotype, male, 10.8 mm, AM P.100369; paratype, female, AM P.100370, New Caledonia. Scale: MD 0.02 mm; H, LL, MP, UL, oost, T 0.2 mm; EP1–3, U1–2, UR 0.5 mm.

Habitat. Supralittoral zone of sandy beaches.

Etymology. Named for Thio mission, Grande Terre, New Caledonia, the type locality and very first site visited by the authors, their son, and their hosts Bertrand and Paule. Gender feminine.

Size. 9.8 mm.

Diagnosis of male. Head. *Antenna 1* slender or slightly incrassate. *Gnathopod 1* subchelate; posterior margin of carpus and propodus each with palmate lobe; dactylus cuspidactylate. *Pereopod 4* dactylus thickened proximally with notch along posterior margin. *Epimera 1–3* without slits. *Pleopods* well developed. *Uropod 1* exopod without marginal robust setae. *Uropod 3* subequal in length to peduncle.

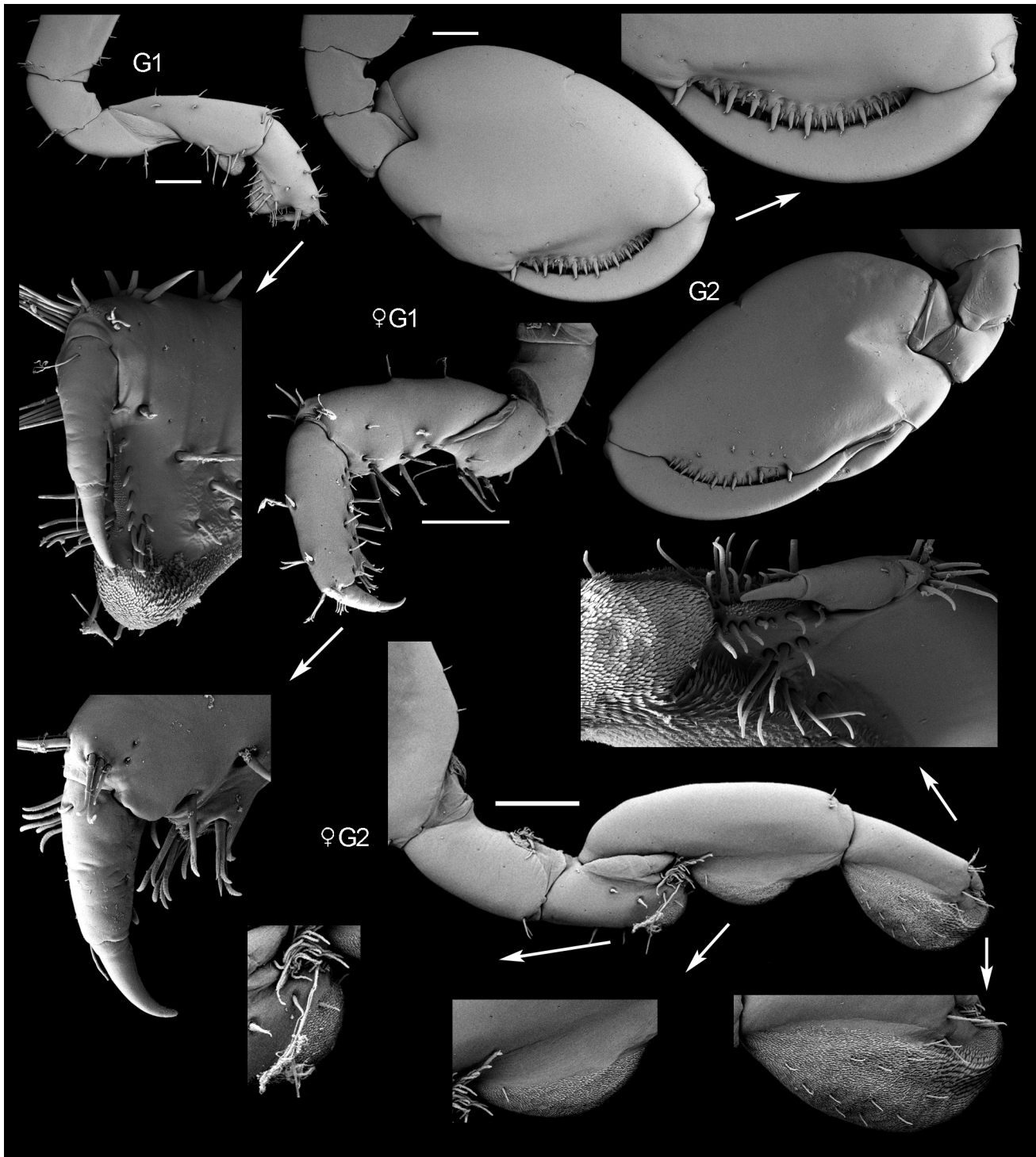


Figure 3. *Chroestia amoa* sp. nov., holotype, male, 10.8 mm, AM P.100369; paratype, female, AM P.100370, New Caledonia. Scale: male G2 0.2 mm; remainder 0.1 mm.

Remarks. *Thiorchestia* is very similar to the Caribbean genus *Tethorchestia* Bousfield, 1984. The ramus of uropod 3 is subequal in length to the peduncle in *Thiorchestia* (shorter in *Tethorchestia*). Other differences are considered at species level and the genera are considered convergent.

Distribution. New Caledonia.

Thiorchestia caledoniana sp. nov.

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Figs 5–7

Holotype: Male, 9.8 mm, AM P.100367 (SEM pin and 3 SEM stubs), Thio mission, Grand Terre, New Caledonia, 21°37.261'S 166°15.598'E, supralittoral, and extended black sand beach with pumice, hand collection with entomological aspirator, J. K. Lowry & L. Fanini, 27 December 2014.

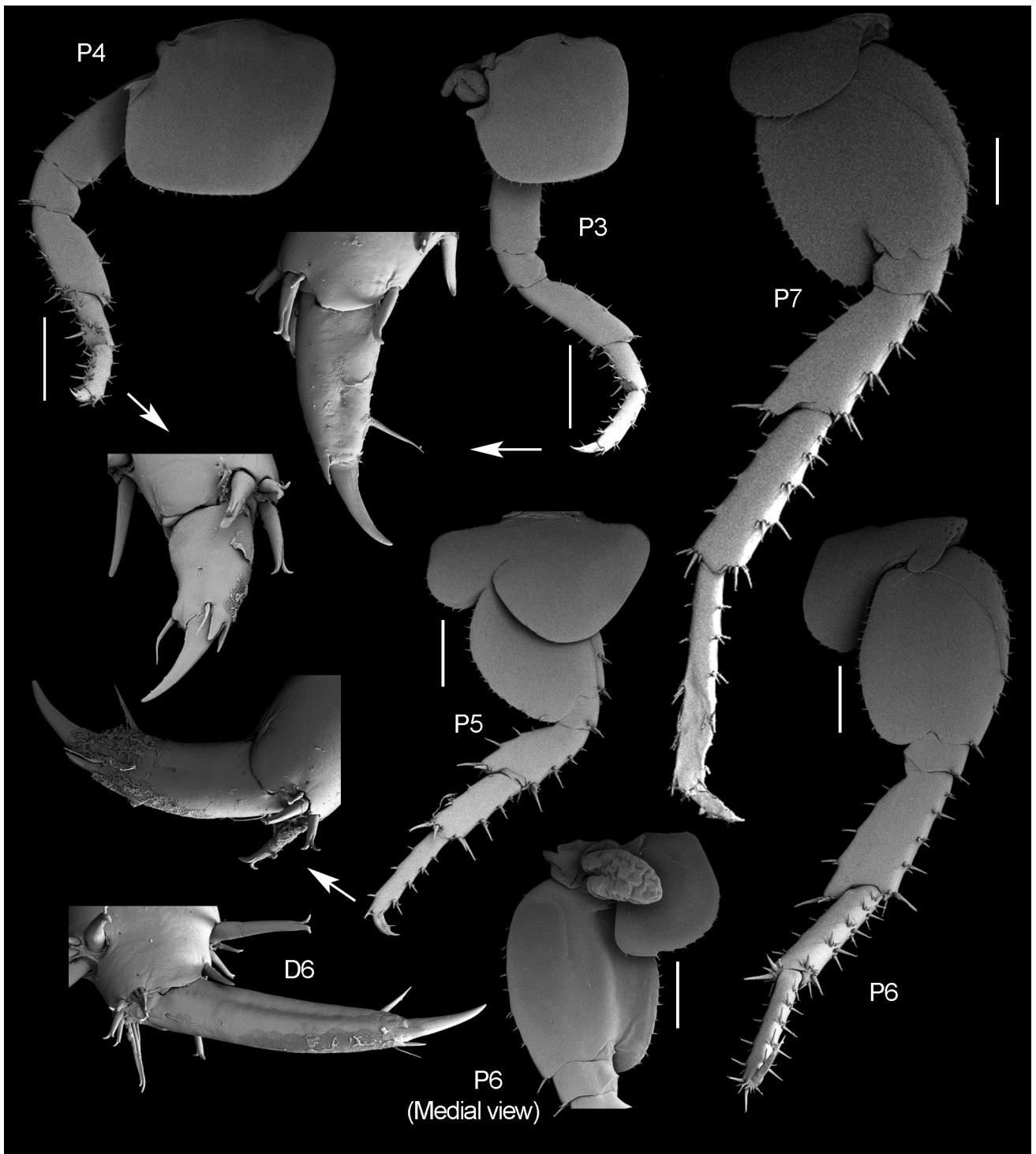


Figure 4. *Chroestia amoa* sp. nov., holotype, male, 10.8 mm, AM P.100369, New Caledonia. Scale: 0.5 mm.

Paratypes: 1 female, AM P.100368 (SEM pin and 1 SEM stub), 1 male, 4 females (wet specimens), AM P.105706, Thio mission, Grand Terre, New Caledonia, 21°37.261'S 166°15.598'E, supralittoral, and extended black sand beach with pumice, hand collection with entomological aspirator, J. K. Lowry & L. Fanini, 27 December 2014.

Additional material examined. 4 males, 1 female, AM P.97476, Mou, Grand Terre, New Caledonia, 21°06.105'S 165°26.924'E, estuary supralittoral, sandy beach, J. K. Lowry & L. Fanini, 2 January 2015.

Type locality. Thio mission, Grand Terre, New Caledonia.

Diagnostic description. Male. Head. *Antenna 1* slender or slightly incrassate. *Mandible* lacinia mobilis 5-cuspidate. Maxilliped palp article 2 with distomedial lobe; article 4 reduced, button shaped. *Gnathopod 1* subchelate; posterior margin of carpus and propodus each with palmate lobe; dactylus cuspidactylate. *Gnathopod 2* dactylus shortened distally, recurved. *Pereopods 3–7* cuspidactylate (bicuspidactylate). *Pereopod 4* dactylus thickened proximally with notch along posterior margin.

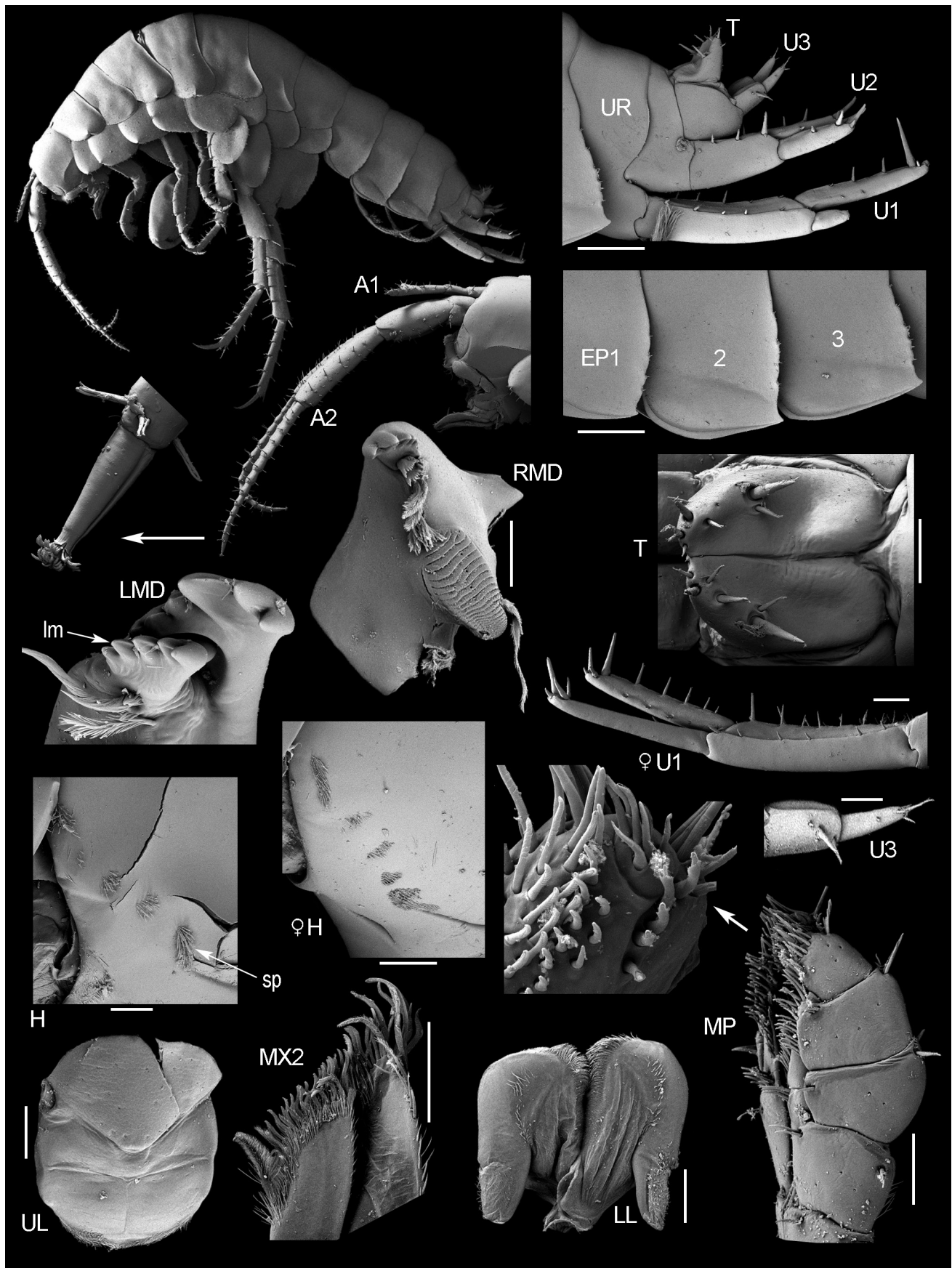


Figure 5. *Thiorchestia caledoniana* sp. nov., holotype, male, 9.8 mm, AM P.100367; paratype, female, AM P.100368, New Caledonia. Scale: EP, H, MD, U1, UR 0.2 mm; remainder 0.1 mm.

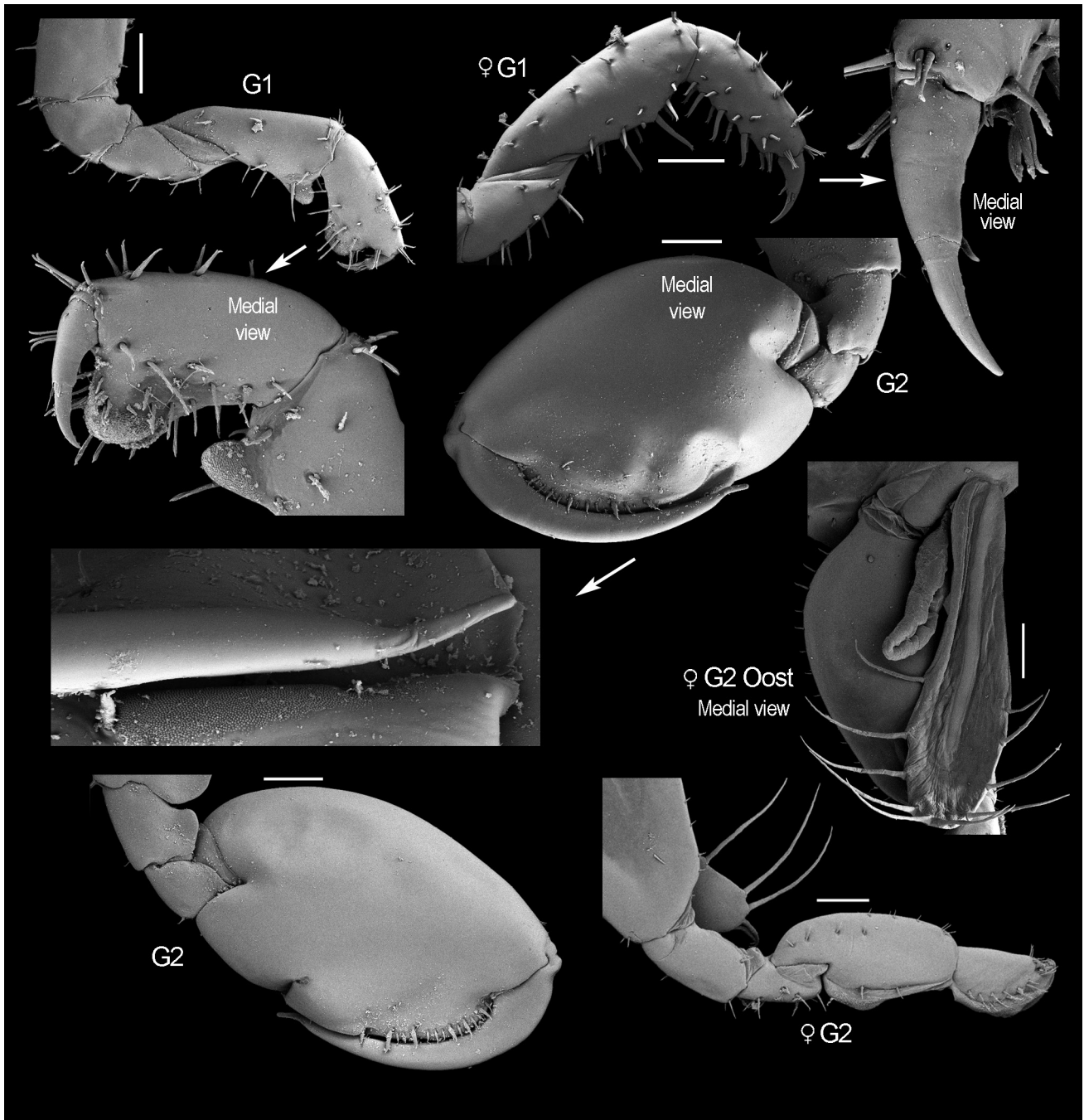


Figure 6. *Thiorchestia caledoniana* sp. nov., holotype, male, 9.8 mm, AM P.100367; paratype, female, AM P.100368, New Caledonia. Scale: 0.2 mm.

Pereopod 7 not sexually dimorphic. *Epimera 1–3* without slits. *Pleopods* well-developed. *Uropod 1* exopod without marginal robust setae. *Uropod 3* subequal in length to peduncle. *Telson* completely cleft with 6 marginal and apical robust setae.

Female (sexually dimorphic characters; based on paratype, AM P.100368). *Gnathopod 1* posterior margin of merus, carpus, and propodus each without lobe covered in palmate setae. *Propodus* subrectangular, anterior margin with 4 groups of robust setae, palm acute. *Dactylus* simple, longer than palm. *Gnathopod 2* mitten-shaped; basis slightly

expanded; ischium without lobe on anterior margin. Posterior margin of *carpus* and *propodus* each with lobe covered in palmate setae. *Carpus* well developed (not enclosed by merus and propodus), posterior lobe present, projecting between merus and propodus; palm obtuse, nearly straight. *Dactylus* curved, posterior margin smooth, shorter than palm. *Oostegites* long (length greater than $2 \times$ width), longer than wide, setose, setae with simple smooth tips.

Distribution. New Caledonia: Thio mission and Mou, Grand Terre.

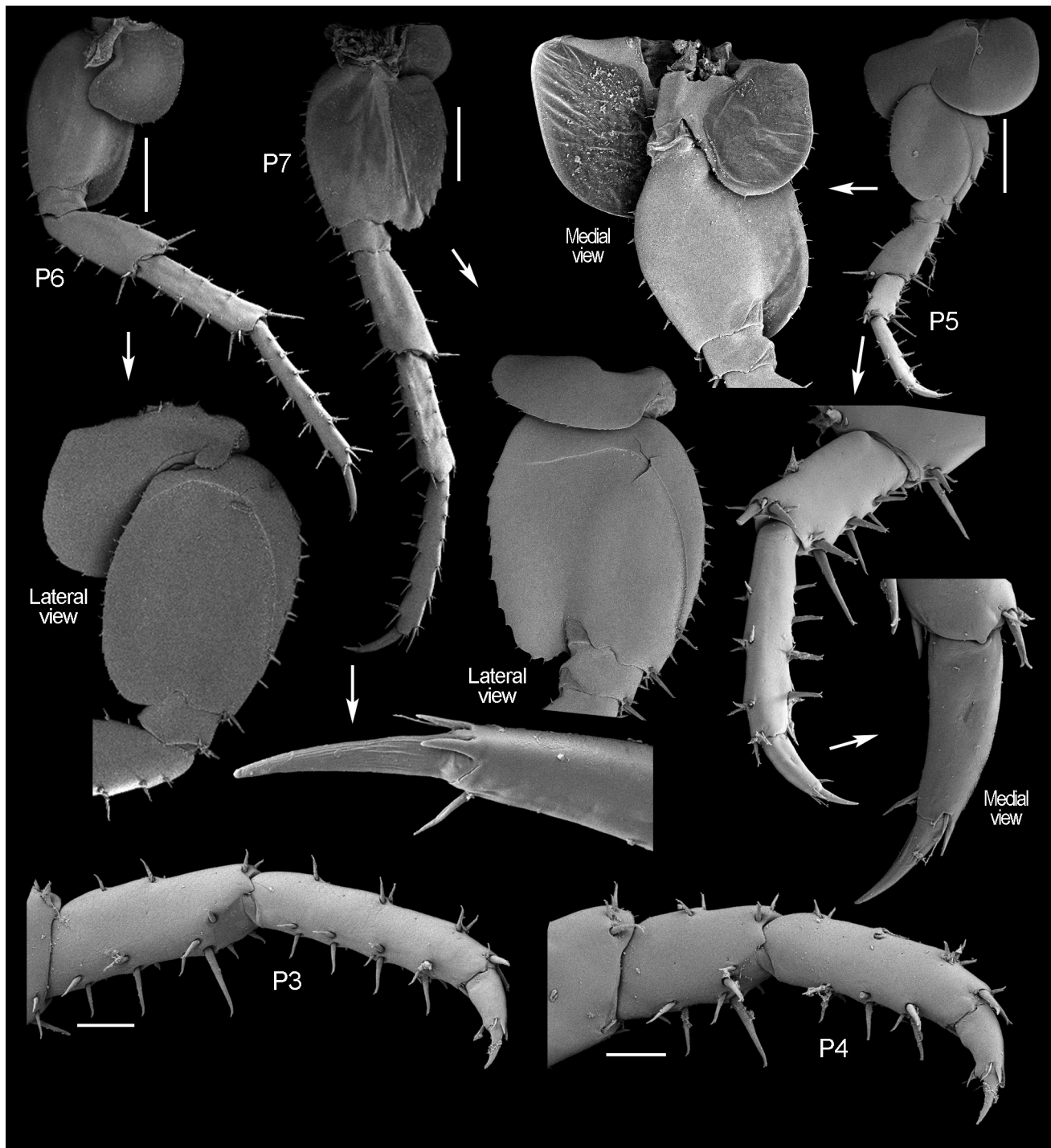


Figure 7. *Thiorchestia caledoniana* sp. nov., holotype, male, 9.8 mm, AM P.100367, New Caledonia. Scale: P3, P4 0.1 mm; remainder 0.2 mm.

***Talorchestia spinipalma* (Dana, 1852)**

Orchestia spinipalma Dana, 1852: 203.—Dana, 1853: 875, pl. 59, fig. 4a–e.—Bate, 1862: 28, pl. 4, fig. 9.
Talorchestia spinipalma.—Stebbing, 1906: 552 (in part, part = *T. terraereginae*). Stephensen, 1935: 12.—Schellenberg, 1938: 66.—J. L. Barnard, 1960: 24, figs 7, 8.—Bousfield, 1970: 163.—Morino & Miyamoto, 1988: 95, figs 4–6.—Lowry & Springthorpe, 2009: 905.—Serejo, 2009: 895, figs 3, 4.—Lowry & Bopiah, 2013: 354, figs 5–8.
 Not *Talorchestia spinipalma*.—Lowry & Stoddart, 2003: 276 (= *T. terraereginae* Haswell, 1880).

Neotype: Male, 16.5 mm, AM P.87317, just north of Liku’alofa Beach Resort, Tongatapu, Tonga, 21°04’50.29”S 175°20’39.10”W, fine white sand on steep narrow beach.

Other material examined. 5 males (adults and juveniles), 4 females AM P.97475, Thio mission, Grand Terre, New Caledonia, 21°37.261’S 166°15.598’E, supralittoral, and extended black sand beach with pumice, hand collection with entomological aspirator, J. K. Lowry & L. Fanini, 27 December 2014.

Osaka Museum of Natural History New Caledonian

Key to male New Caledonian talitroid amphipods

- 1 G1 posterior margin of carpus and propodus each with palmate lobe 2
- G1 posterior margin of merus, carpus, and propodus each with palmate lobe 4
- 2 G1 parachelate. G2 propodus palm with large, recurved robust setae lining palmar margin *Talorchestia spinipalma* Dana, 1852
- G1 subchelate. G2 propodus palm without large, recurved robust setae lining palmar margin 3
- 3 G2 dactylus attenuated distally *Chroestia amoa* sp. nov.
- G2 dactylus short, recurved distally *Thiorchestia caledoniana* gen. et sp. nov.
- 4 G2 propodus with midpalmar sinus *Chevreuxiana antennulata* (Chevreux, 1915)
- G2 propodus without palmar sinuses 5
- 5 Telson with apical and marginal robust setae *Ignamborchestia sarasini* (Chevreux, 1915)
- Telson with apical robust setae only 6
- 6 G2 dactylus apically acute. Gills bilobate. Telson with 2 apical setae *Chiltonorchestia pusilla* (Chevreux, 1915)
- G2 dactylus recurved distally. Gills quadrilobate. Telson with 4 apical setae *Chiltonorchestia starmuhlneri* (Ruffo & Vesentini Paiotta, 1972)

Collections (not examined). Six males, 3 females, Isle of Pines, New Caledonia, 6–13 June 1958; 4 males, 6 females, Magenta, New Caledonia, 8, 14 October 1958; 3 males, 4 females, Nou Vata, Noumea, New Caledonia, 8 October 1958; 1 male, 1 female, Mount d’Ore, New Caledonia, 18 October 1958.

Type locality. Just north of Liku’alofa Beach Resort, Tongatapu, Tonga, 21°04'50.29"S 175°20'39.10"W.

Habitat. Under dried *Turbinaria* and other algae in the supralittoral zone.

Remarks. Habitat reported referred to Tonga (Lowry & Bopiah, 2013); the habitat in New Caledonia is also supralittoral, an extended black sand beach with pumice.

Distribution. Australia: Queensland: Port Douglas (Serejo, 2009). Marshall Islands: Yap; Kusaie Island (J. L. Barnard, 1960). New Caledonia: NouVata, Noumea; Isle of Pines; Magenta (Morino & Miyamoto, 1988), Thio mission, Grand Terre (this paper). Papua New Guinea: Ralum, Bismarck Archipelago (Schellenberg, 1938); Motupore Island (9°31'30"N 147°16'40"E) (Morino & Miyamoto, 1988). Philippine Islands: Ubay, Bohol (Schellenberg, 1938). Solomon Islands: Gizo (Morino & Miyamoto, 1988). Rennell Islands (Bousfield, 1970). Tonga: Tongatapu (Dana, 1852; Lowry & Bopiah, 2013).

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