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Monograph

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Solomon's Gold Mine: Description or redescription of 24 species of *Caridina* (Crustacea: Decapoda: Atyidae) freshwater shrimps from the Solomon Islands, including 11 new species

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Abstract. Following recent (2014–2017) collections made in the Solomon Islands by the MNHN and the NGO ESSI, we provide a checklist of the species of amphidromous freshwater shrimps of the genus *Caridina* H. Milne Edwards, 1837 from this region. Using morphological as well as molecular data in an integrative taxonomic perspective, we found a total of 24 species, including 11 new for science, that are described or re-described, illustrated and discussed in relation to their habitat and distribution. Newly described species are *Caridina barakoma* sp. nov., *C. choiseul* sp. nov., *C. intermedia* sp. nov., *C. maeana* sp. nov., *C. nana* sp. nov., *C. piokerai* sp. nov., *C. pisuku* sp. nov., *C. paratypus* sp. nov., *C. poarae* sp. nov., *C. sikipozo* sp. nov. and *C. turipi* sp. nov. *Caridina gueryi* Marquet, Keith & Kalfatak, 2009 is re-validated as a species distinct from *C. buehleri* Roux, 1934. Lectotypes are designated for *C. mertoni* Roux, 1911 and *C. papuana* Nobili, 1905. Diagnoses for 6 informative species groups are provided: *C. brevicarpalis* group, *C. gracilirostris* group, *C. nilotica* group, *C. typus* group, *C. serratirostris* group and *C. weberi* group. A map of the species distribution in the Solomon Islands, as well as the phylogenetic relationships between the species and their relatives, are provided.

Keywords. Amphidromous shrimp, Pacific Ocean, integrative taxonomy, morphology, 16S.

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Introduction

The freshwater shrimp genus *Caridina* H. Milne-Edwards, 1837, comprising 311 species (WoRMS database: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=240672> as of March 2020) and mostly present in the Indo-Pacific region, is the most diversified genus of the family Atyidae (De Grave *et al.* 2015) and an important ecological component in the tropical streams (Covich *et al.* 1999; Pringle *et al.* 1993). Their high diversity combined with the lack of informative morphological characters have led to a confused taxonomy (Richard & Clark 2009). Indeed, until recently, their taxonomy was mainly based on morphological characters. Some have been proven highly variable within a species (e.g., rostrum shape and indentation (de Mazancourt *et al.* 2017b) or coloration) and so taxonomically non-informative, making it difficult to establish good species delimitations (von Rintelen & Cai 2009). There is thus a need for an integrative and standardized approach to improve the taxonomy of the group, focusing on informative morphological features and using molecular characters (Page *et al.* 2005; Page & Hughes 2011; de Mazancourt *et al.* 2017b). In Indo-Pacific islands, amphidromous shrimps have been grouped into six main complexes: (1) *C. nilotica* complex (Johnson 1963; Holthuis 1978; Jalihal *et al.* 1984; Choy 1991; Richard & Clark 2005; Karge & Klotz 2007), (2) *C. weberi* complex (Richard & Chandran 1994; Cai & Shokita 2006a), (3) *C. gracilirostris* complex (Cai & Ng 2007), (4) *C. typus* complex (Karge & Klotz 2007; Bernardes *et al.* 2017), (5) *C. serratirostris* complex (Cai & Shokita 2006b), (6) *C. brevicarpalis* complex (Short 2009). Little work has been done to differentiate among the species clustered within these complexes, possibly due to the difficulty and costs associated with genetic analyses and the highly similar morphology of shrimps from different populations.

To illustrate this problem, species of the genus *Caridina* from the Solomon Islands were studied. Before this study, the neighboring islands belonging to the Bismarck and Admiralty archipelagoes in Papua New Guinea (Roux 1934) or those of the Vanuatu archipelago (Keith *et al.* 2010; de Mazancourt *et al.* 2017a) were inventoried, but none of the Solomon Islands were surveyed for freshwater shrimps. In order to fill this gap, in the context of the CEPF “Melanesia Hotspot”, an inventory of freshwater fauna was done in the Solomon Islands between 2014 and 2017, supported by the French Ichthyological Society. This archipelago, consisting of six major islands and over 900 smaller islands lies in Oceania to the east of Papua New Guinea and northwest of Vanuatu and covers a land area of 28 400 km². Six islands (Fig. 1) were prospected: Choiseul in October 2014, Malaita in June 2015, Kolombangara in November 2015, Vella Lavella and Ranongga in October 2016 and Isabel in October 2019. We examined all the specimens collected by combining morphological data with a 16S mtDNA analysis.

Material and methods

Collection of specimens

Specimens from the Solomon Islands were collected by electrofishing (portable Dekka 3000 electric device, Germany) (Lamarque *et al.* 1975). All material was preserved in 75–95% ethanol and has been deposited in the collections of the Muséum national d’histoire naturelle of Paris (MNHN).

Morphological comparison

The rostrum, the general cephalon, the pereopods 1–3 and 5 and the abdomen were observed using a stereoscopic microscope. The proportions of the various joints of the appendages were measured using microphotographs and the AnalySIS Works software (Olympus). Drawings were made using the “Digital Inking” method (Coleman 2003, 2006) by tracing vectoral paths on high-resolution photographs using Adobe Illustrator.

DNA extraction, amplification and sequencing

DNA was extracted from abdominal tissues using the semi-automatic Eppendorf ep-Motion 5075 robot. Fragments of the mitochondrial 16S rRNA (~ 520 bp) were amplified using newly designed primers, adapted from Palumbi (1996) to our taxa: 16Sar-Lmod (TACTTCTGCCTGTTTATCAAAAA) and 16Sbmod (GGTCTGAACTCAAATCATGTAAA). DNA amplification was performed in 20 µl PCR reactions, containing approximately 3 ng of template DNA, 2.5 mM MgCl₂, 0.26 mM of each nucleotide, 0.3 µM of each primer, 5% DMSO, 1 ng of BSA and 1.5 units of QBIOTAQ polymerase (MPBiomedicals). Amplification products were generated by an initial denaturation step of 4 min at 94°C followed by 35 cycles of denaturation at 94°C for 30 s, annealing at 52°C for 40 s, extension at 72°C for 60 s and a final extension step at 72°C for 7 min.

PCR products were sequenced using the same primers and in both directions to ensure the accuracy of base calls. Chromatograms were edited using Geneious ver.8 software (<http://www.geneious.com/>; Kearse *et al.* 2012). All sequences were deposited in GenBank (numbers MT303883 to MT303942).

Molecular analyses

DNA sequences were aligned using MEGA7 software (Kumar *et al.* 2016) with the Muscle algorithm (Edgar 2004). Using the Bayesian information criterion in jModelTest (Darriba *et al.* 2012; Guindon & Gascuel 2003) we retained the GTR + G + I model. Best-scoring ML trees were estimated by RAxML HPC2 ver. 8.2.10 (Stamatakis 2014) and best-scoring Bayesian Inference (BI) trees were estimated using MrBayes ver. 3.2.6 (Ronquist & Huelsenbeck 2003), both methods implemented in CIPRES with the previously determined model, running for 10 000 000 generations, a sampling frequency of 2000 and a burn in of 10%. Support for nodes was determined using posterior probabilities calculated by

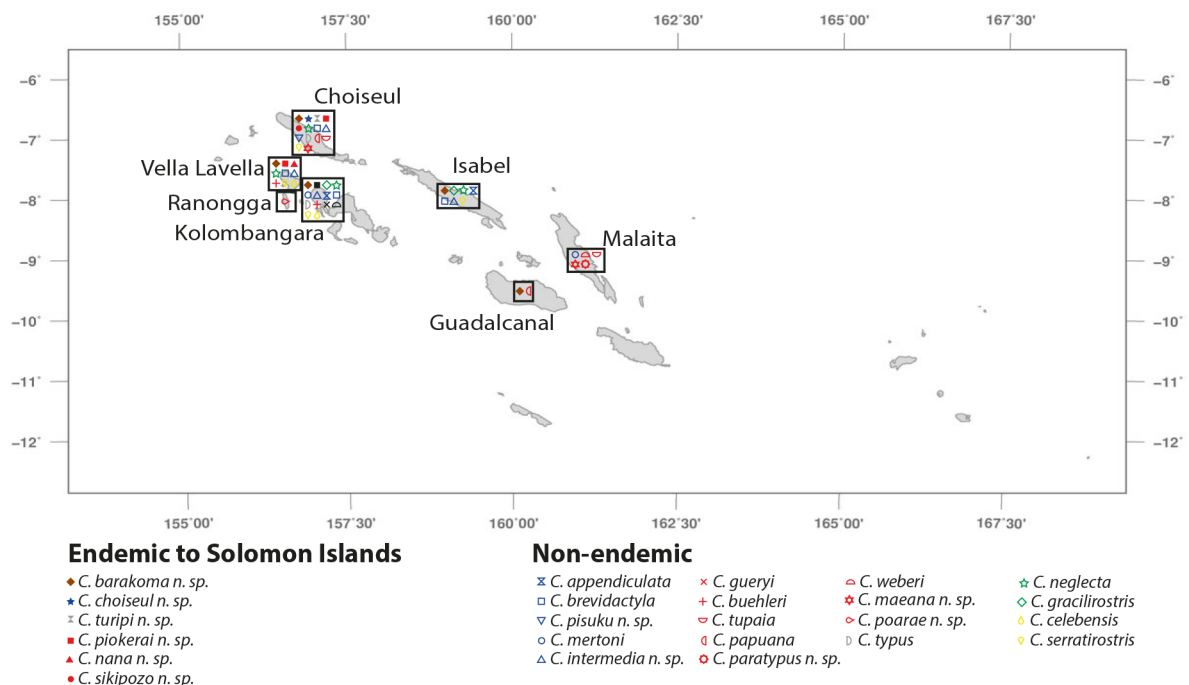


Fig. 1. Distribution of the species studied in the Solomon Islands. Symbols are colored according to the different species complexes (see Fig. 2): brown for *C. brevicarpalis* complex, blue for *C. nilotica* complex, red for *C. weberi* complex, grey for *C. typus* complex, green for *C. gracilirostris* complex and yellow for *C. serratirostris* complex.

MrBayes implemented in the Cyber Infrastructure for Phylogenetic Research (CIPRES) portal v.3.1. (Miller *et al.* 2010; <https://www.phylo.org/>). One hundred independent searches, each starting from distinct random trees, were conducted. Robustness of the nodes was assessed using non-parametric bootstrapping (Felsenstein 1985) with 1000 bootstrap replicates. We considered a group to be ‘moderately supported’ if it had a bootstrap support value (B) between 75 and 89%, and Bayesian posterior probabilities (PP) between 0.8 and 0.95, and ‘highly supported’ when $B \geq 90\%$ and $PP \geq 0.95$. For the analysis, we included 49 specimens collected during the authors’ field trips to the Solomon Islands to which were added 18 specimens of species occurring in the Solomon Islands collected by the authors from other Indo-Pacific localities. Five sequences were also retrieved from GenBank (Table 1). Two species of *Paratya* Miers, 1882 were used as outgroups. Three different species delimitation methods were tested on the dataset. First, ABGD (Puillandre *et al.* 2012) was implemented on the web server <https://bioinfo.mnhn.fr/abi/public/abgd/abgdweb.html>, for which a pairwise distances matrix was built from the sequence’s alignment using the JC69 Jukes-Cantor model. We used $P_{min} = 0.001$ and $P_{max} = 0.1$ with 10 steps and $X = 1.0$. A graphical representation of the distribution of the distances showed a barcoding gap between 0.04 and 0.05 divergence. Second, we ran a bPTP analysis (Zhang *et al.* 2013) from the web server <http://species.h-its.org/ptp/> using the ML tree as input. Other parameters were left as default. Finally, we used the GMYC method (Pons *et al.* 2006) implemented in the web server <https://species.h-its.org/gmyc/> using only the single threshold method (phylogeny composed of several species with one coalescent time value), as species studied are phylogenetically close to each other. To run this analysis, an ultrametric tree is required, which was constructed using BEAST ver. 1.10.4 (Suchard *et al.* 2018). We used a relaxed lognormal clock with a coalescent tree prior, as these have been identified as best prior parameters for GMYC analyses (Esselstyn *et al.* 2012; Monaghan *et al.* 2009). Monte Carlo Markov chains (MCMC) ran for 10 000 000 generations, sampling every 2000 generations. Chain convergence was assessed using Tracer ver. 1.6 (Rambaut *et al.* 2014). The consensus tree (maximum clade credibility tree; 10% burn in; tree not presented) was constructed with TreeAnnotator ver. 1.10.4 (Drummond & Rambaut 2007).

Institutional abbreviations

HNHM	=	Hungarian Natural History Museum, Budapest
MNHN	=	Muséum national d’histoire naturelle, Paris
MZB	=	Museum Zoologicum Bogoriense, Bogor, Indonesia
NHM	=	Natural History Museum, London
NMB	=	Naturhistorisches Museum Basel, Basel
RMNH	=	Rijksmuseum van Natuurlijke Historie (now in the Naturalis Biodiversity Center, Leiden)
ZMA	=	Zoological Museum Amsterdam (now in the Naturalis Biodiversity Center, Leiden)
ZMB	=	Museum für Naturkunde, Berlin
ZRC	=	Zoological Research Collection, National University of Singapore, Singapore

Abbreviations for morphological analyses

The following abbreviations are used in the present text:

cl	=	carapace length (mm): measured from the post-orbital margin to the posterior margin of the carapace
ovig.	=	ovigerous
P1	=	first pereopod
P2	=	second pereopod
P3	=	third pereopod
P5	=	fifth pereopod
P11	=	first pleopod
P12	=	second pleopod

Table 1 (continued on next page). List of sequenced specimens.

Species	Locality	DNA voucher	Registration n°	Type status	GenBank n°	Reference
<i>C. appendiculata</i>	Kolombangara	CA1494	MNHN-IU-2018-135		MH497525	de Mazancourt <i>et al.</i> 2018
	Kolombangara	CA1493	MNHN-IU-2018-133		MH497524	de Mazancourt <i>et al.</i> 2018
<i>C. barakoma</i> sp. nov.	Choiseul	CA1364	MNHN-IU-2014-20807	Paratype	MT303885	This study
	Kolombangara	CA1521	MNHN-IU-2014-20809	Paratype	MT303884	This study
	Vella Lavella	CA1942	MNHN-IU-2014-20810	Paratype	MT303883	This study
	Guadalcanal	GUC881			DQ478485	Page <i>et al.</i> , 2007
<i>C. brevidactyla</i>	Kolombangara	CA1500			MT303892	This study
	Choiseul	CA1345	MNHN-IU-2018-172		MH497518	de Mazancourt <i>et al.</i> , 2018
	Vella Lavella	CA1940	MNHN-IU-2018-185		MH497558	de Mazancourt <i>et al.</i> 2018
<i>C. buehleri</i>	Vella Lavella	CA1997	MNHN-IU-2018-2846		MT303913	This study
	Kolombangara	CA1520	MNHN-IU-2015-20		MT303912	This study
	Papua New Guinea	CA2252	MNHN-IU-2018-2849		MT303915	This study
	Vanuatu	CA1014	MNHN-IU-2015-23		MT303914	This study
<i>C. celebensis</i>	Kolombangara	CA1518	MNHN-IU-2018-2943		MT303941	This study
	Vanuatu	CA1381	MNHN-IU-2018-2946		MT303942	This study
	Indonesia		ZMB:DNA-652		FN995356	von Rintelen <i>et al.</i> 2012
<i>C. choiseul</i> sp. nov.	Choiseul	CA1277	MNHN-IU-2014-20827	Paratype	MT303894	This study
	Choiseul	CA1285	MNHN-IU-2014-20830	Paratype	MT303893	This study
<i>C. gracilirostris</i>	Kolombangara	CA1497	MNHN-IU-2018-2804		MT303886	This study
	Australia	CA1677	MNHN-IU-2018-2805		MT303887	This study
	Australia	CA1681	MNHN-IU-2018-2807		MT303888	This study
<i>C. gueryi</i>	Kolombangara	CA1519	MNHN-IU-2015-19		KY350244	de Mazancourt <i>et al.</i> , 2017
	Indonesia	CA1161	ZMB 29002		KY350241	de Mazancourt <i>et al.</i> 2017
	Vanuatu	CA2428	MNHN-IU-2015-1769	Paratype	MT303916	This study
	Vanuatu	CA1016	MNHN-IU-2015-23		KY350239	de Mazancourt <i>et al.</i> 2017
<i>C. intermedia</i> sp. nov.	Choiseul	CA1326	MNHN-IU-2014-20844	Paratype	MT303895	This study
	Kolombangara	CA1499	MNHN-IU-2014-20847	Paratype	MT303896	This study
	Vella Lavella	CA1939		Paratype	MT303897	This study
<i>C. maeana</i> sp. nov.	Malaita	CA1509	MNHN-IU-2018-2888	Holotype	MT303925	This study
	Vanuatu	CA1417	MNHN-IU-2018-2895	Paratype	MT303926	This study
<i>C. mertoni</i>	Malaita	CA2000	MNHN-IU-2018-2818		MT303898	This study
	Kolombangara	CA1505	MNHN-IU-2017-2109		MG707141	de Mazancourt <i>et al.</i> 2019a
	Indonesia	CA056	NMB.693a	Lectotype	MG707139	de Mazancourt <i>et al.</i> 2017
<i>C. nana</i> sp. nov.	Vella Lavella	CA1903	MNHN-IU-2018-2912	Holotype	MT303931	This study
	Vella Lavella	CA1902	MNHN-IU-2018-2913	Paratype	MT303930	This study
<i>C. neglecta</i>	Choiseul	CA1310	MNHN-IU-2018-2808		MT303891	This study
	Vella Lavella	CA1703	MNHN-IU-2018-2813		MT303889	This study
	Kolombangara	CA1938			MT303890	This study
<i>C. papuana</i>	Choiseul	CA1361	MNHN-IU-2018-2856		MT303917	This study

Table 1. (continued) List of sequenced specimens.

Species	Locality	DNA voucher	Museum n°	Type status	GenBank n°	Reference
<i>C. paratypus</i> sp. nov.	Choiseul	CA1286	MNHN-IU-2018-2862		MT303918	This study
	Malaita	CA1999	MNHN-IU-2018-2925	Holotype	MT303934	This study
	Vanuatu	CA1371	MNHN-IU-2018-2926	Paratype	MT303935	This study
<i>C. piokerai</i> sp. nov.	Kolombangara	CA1909	MNHN-IU-2018-2896	Holotype	MT303927	This study
	Choiseul	CA1930	MNHN-IU-2018-2904	Paratype	MT303928	This study
	Vella Lavella	CA1981	MNHN-IU-2018-2911	Paratype	MT303929	This study
<i>C. pisuku</i> sp. nov.	Choiseul	CA1282	MNHN-IU-2014-20864	Paratype	MT303899	This study
	Choiseul	CA1347	MNHN-IU-2014-20865	Paratype	MT303900	This study
	Australia	CA1685	MNHN-IU-2014-20874	Paratype	MT303901	This study
<i>C. poarae</i> sp. nov.	Australia	CA1699	MNHN-IU-2014-20875	Paratype	MT303902	This study
	Ranongga	CA2350	MNHN-IU-2018-2920	Holotype	MT303938	This study
	Ranongga	CA2348	MNHN-IU-2018-2921	Paratype	MT303936	This study
	Ranongga	CA2349	MNHN-IU-2018-29222	Paratype	MT303937	This study
<i>C. serratirostris</i>	Choiseul	CA1351	MNHN-IU-2018-2927		MT303939	This study
	Kolombangara	CA1523	MNHN-IU-2018-2931		MT303940	This study
	Australia	GUCCS1			DQ478515	Page <i>et al.</i> 2007
<i>C. sikipozo</i> sp. nov.	Choiseul	CA1928	MNHN-IU-2018-2914	Holotype	MT303932	This study
	Choiseul	CA2310	MNHN-IU-2018-2915	Paratype	MT303933	This study
<i>C. tupaia</i>	Choiseul	CA1927	MNHN-IU-2018-2882		MT303924	This study
	Malaita	CA1508	MNHN-IU-2018-2886		MT303923	This study
	French Polynesia	CA2058	MNHN-IU-2018-260	Holotype	MK204717	de Mazancourt <i>et al.</i> 2019b
<i>C. turipi</i> sp. nov.	Choiseul	CA1359	MNHN-IU-2014-20876	Holotype	MT303911	This study
	Choiseul	CA1349	MNHN-IU-2014-20883	Paratype	MT303910	This study
<i>C. typus</i>	Choiseul	CA1355	MNHN-IU-2018-2824		MT303903	This study
	Choiseul	CA1356	MNHN-IU-2018-2825		MT303904	This study
	Japan	CA1917	MNHN-IU-2018-2828		MT303908	This study
	Madagascar	CA1038	MNHN-IU-2018-2829		MT303907	This study
	Papua New Guinea	CA2278	MNHN-IU-2018-2836		MT303905	This study
	South Africa	CA2090	MNHN-IU-2018-2844		MT303906	This study
	New Caledonia	CA1568			MT303909	This study
	Sri Lanka	2311SL			AY708118	Bossuyt <i>et al.</i> 2004
	Vanuatu	GUC721			DQ478563	Page <i>et al.</i> , 2007
	Australia	GUCCY1			DQ478562	Page <i>et al.</i> 2007
<i>C. weberi</i>	Kolombangara	CA1516	MNHN-IU-2018-2867		MT303920	This study
	Malaita	CA1511	MNHN-IU-2018-2868		MT303919	This study
	Papua New Guinea	CA2254	MNHN-IU-2018-2874		MT303922	This study
	Papua New Guinea	CA2244	MNHN-IU-2018-2876		MT303921	This study
<i>P. caledonica</i>	New Caledonia	CA1800			MK189918	de Mazancourt <i>et al.</i> 2019a
<i>P. compressa</i>	Japan	Pcomp_366			AY661483	Page <i>et al.</i> 2005

Results

Molecular analyses

The species delimitation methods each yielded a different result: 23 species were recognised by ABGD, 29 by GMYC and 33 by bPTP (Fig. 2). Following an integrative taxonomy, we considered that 24 species could be characterised by both molecular and morphological data.

All of these are highly supported both in ML and BI analyses (PP > 0.99). Species belonging to the *C. serratiostris* complex do not form a monophyletic group, as clade B seems to be a sister group to all the others, excluding clade A. This cluster is, however, poorly supported in the ML analysis (B = 59.8%). Likewise, the *C. typus* complex (clades C and D) does not appear as a monophyletic group due to an unresolved polytomy. However, all the other complexes seem monophyletic, with strong supports

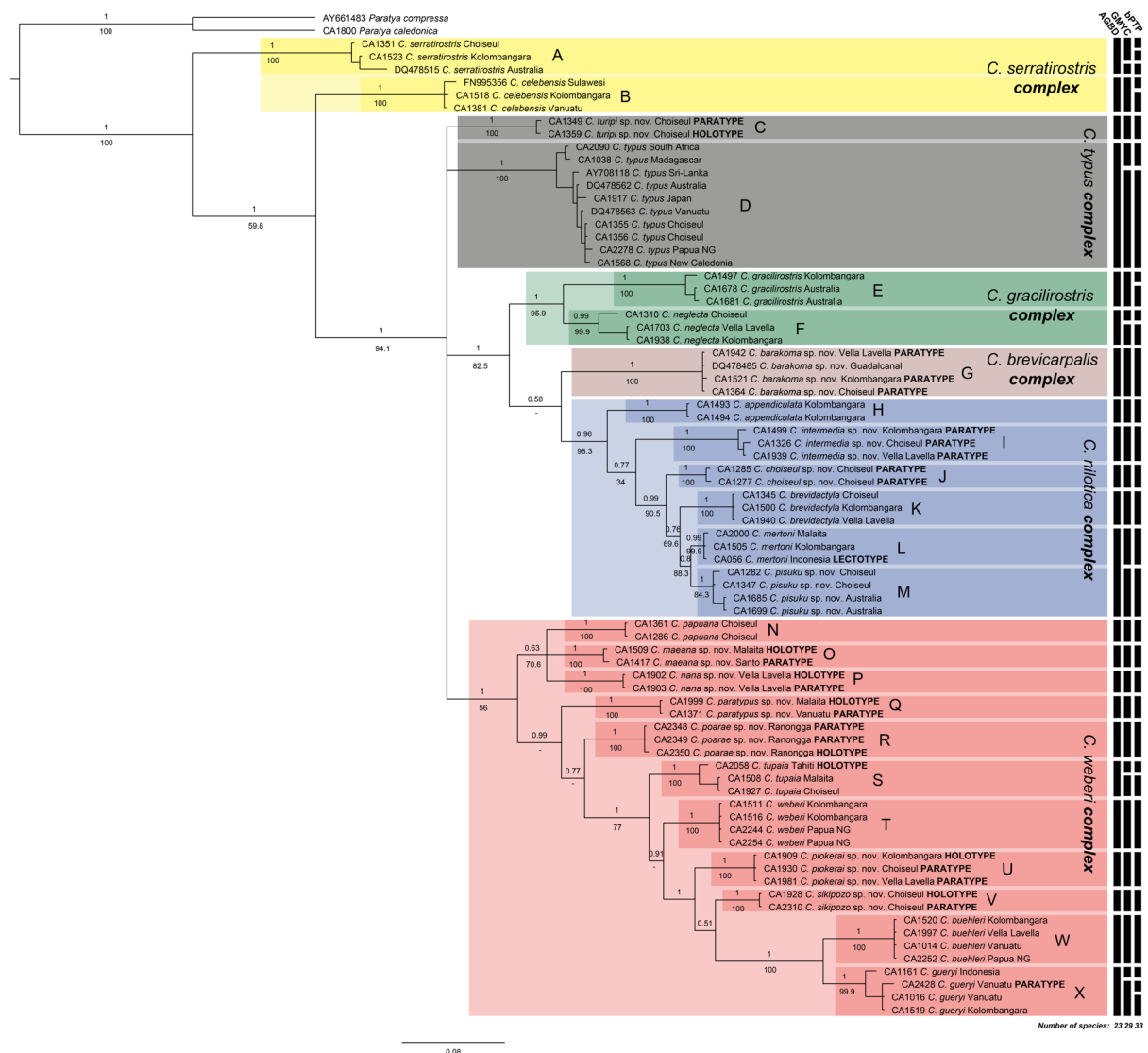


Fig. 2. Bayesian inference phylogenetic tree of the species studied. Numbers above branches are Bayesian posterior probabilities, numbers under branches are Maximum Likelihood bootstrap values. Results of the three species delimitation methods are indicated by the black bars on the right of the tree. Each bar represents a species recognized by the analysis.

in the BI analysis (PP ranging from 0.96 for the *C. nilotica* complex to 1 for all the others) and low to strong supports in the ML analysis (B ranging from 56% for the *C. weberi* complex to 100% for the *C. brevicarpalis* complex). It is interesting to note that the *C. gracilirostris* complex, *C. brevicarpalis* complex and *C. nilotica* complex are clustered in a moderately to highly supported clade (PP = 1; B = 82.5%).

Morphological analyses

Measures and observations made on the specimens allowed us to confirm the molecular results in recognising the clades as 24 different species, including 11 new for science (see hereafter).

Taxonomy

Class Malacostraca Latreille, 1802
Order Decapoda Latreille, 1802
Family Atyidae De Haan, 1849
Genus *Caridina* H. Milne Edwards, 1837

***Caridina brevicarpalis* species group**

Diagnosis

Moderately robust morphology, with a long rostrum (passing end of antennular peduncle), always armed on the dorsal margin, without apical teeth, antennal spine below the suborbital angle, a long antennular peduncle (more than 0.70 times as long as carapace), pterygostomial margin subrectangular, stout legs, the carpus of the first pereiopod often deeply excavated, sixth abdominal somite about half of carapace length, high pre-anal carina bearing a spine, few spinules on the uropodal diaeresis (around 10), few, medium to short and smooth terminal setae on the telson; a subtriangular endopod of the first male pleopod with an appendix on the subdistal outer margin which reaches beyond the distal end of the endopod with most of its length.

***Caridina barakoma* sp. nov.**

[urn:lsid:zoobank.org:act:E0FB6A6C-EDA8-4667-81F4-695A9632658D](https://doi.org/10.3896/BI.2019.696.1.1)

Figs 2G, 3

Caridina brevicarpalis – Page *et al.*, 2007: 649 (GenBank: DQ478485). — de Mazancourt *et al.* 2019a: 166, 169–170.

Etymology

This new species is named after the village near the type locality. The name is used as an apposition.

Material examined

Holotype

SOLOMON ISLANDS • ♂, cl 3.7 mm; Vella Lavella Island, Vala Kadju River; 07°49.860' S, 156°42.644' E; 18 m a.s.l.; 28 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2014-20805.

Paratypes

SOLOMON ISLANDS – **Vella Lavella Island** • 1 ♂, cl 2.7 mm; same collection data as for holotype; DNA voucher: CA1942; MNHN-IU-2014-20810. – **Choiseul Island** • 1 ♀ ovig., cl 5.6 mm; Turipi River; 07°00.661' S, 156°49.075' E; 50 m a.s.l.; 15 Sep. 2014; P. Keith, G. Marquet and M. Mennesson leg.; MNHN-IU-2014-20806 • 1 ♀ ovig., cl 5.6 mm; Lopakare River downstream; 07°01.834' S, 156°45.789' E; 14 m a.s.l.; 21 Sep. 2014; P. Gerbeaux, P. Keith and G. Marquet leg; DNA voucher:

CA1364; MNHN-IU-2014-20807 • 1 ♀ ovig., cl 5.8 mm; same collection data as for preceding; MNHN-IU-2014-20808. – **Kolombangara Island** • 1 ♀, cl 3.6 mm; Vagé River; 08°05.112' S, 156°59.867' E; 10 Nov. 2015; 21 m a.s.l.; P. Keith, C. Lord and G. Marquet leg.; DNA voucher: CA1521; MNHN-IU-2014-20809. – **Isabel Island** • 1 specimen; Suavanao, Rakata River; 15 m a.s.l.; 07.64456° S, 158.71918° E; 27 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2511; MNHN • 1 specimen; same collection data as for preceding; DNA voucher: CA2512; MNHN • 1 specimen; same collection data as for preceding; DNA voucher: CA2515; MNHN • 1 specimen; same collection data as for preceding; DNA voucher: CA2516; MNHN.

INDONESIA • 1 ♀ ovig., cl 7.0 mm; West Papua, Kayumera, found in a fish's gut content; 03°53.525' S, 134°28.621' E; 22 Oct. 2010; P. Keith leg.; MNHN-IU-2014-20820.

PAPUA NEW GUINEA – **New Britain Island** • 1 ♀ ovig., cl 5.1 mm; Wara Creek; 05°38.843' S, 150°39.012' E; 29 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2014-20811 • 1 ♀ ovig., cl 6.6mm; same collection data as for preceding; MNHN-IU-2014-20812 • 1 ♀, cl 6.1 mm; same collection data as for preceding; MNHN-IU-2014-20813 • 1 ♀ ovig., cl 5.4 mm; Walindi Creek; 05°21.187' S, 150°02.693' E; 30 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2014-20814 • 1 ♀ ovig., cl 5.6mm; same collection data as for preceding; MNHN-IU-2014-20815 • 1 ♀ ovig., cl 5.3 mm; Vaavu River; 05°22.584' S, 150°03.724' E; 30 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2014-20816 • 1 ♀ ovig., cl 5.9 mm; same collection data as for preceding; MNHN-IU-2014-20817 • 1 ♀ ovig., cl 6.2 mm; Crusher; 05°38.603' S, 150°10.957' E; 31 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2014-20818 • 1 ♀ ovig., cl 6.5 mm; same collection data as for preceding; MNHN-IU-2014-20819.

Description

CEPHALOTHORAX. Antennal spine below suborbital angle. Pterygostomian margin sub rectangular. Rostrum (Fig. 3m) long, 0.9–1.2 of cl, passing end of scaphocerite, armed with 12–16 teeth on dorsal margin, without apical teeth, 0–1 of them situated on carapace behind orbital margin, ventral margin with 5–10 teeth. Eyes well developed, anterior end reaching to 0.50–0.60 length of basal segment of antennular peduncle. Antennular peduncle 0.72 (♀) or 0.88 (♂) times as long as carapace. Anterolateral angle reaching 0.20 length of second segment, basal segment of antennular peduncle longer than sum of second and third segment lengths, second segment distinctly longer than third segment. Stylocerite reaching 0.75–0.78 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 3a): chela about 1.9–2.1 times as long as wide, movable finger 2.3–2.9 times as long as wide, 0.7–1.0 times length of palm; carpus 1.1–1.6 times as long as wide. P2 (Fig. 3b) more slender and longer than first pereopod, with chela 1.8–2.1 times as long as wide: movable finger 3.1–3.8 times as long as wide, 1.2–1.3 times length of palm; carpus stout 2.8–3.7 times as long as wide. P3 (Fig. 3c): stout, very short dactylus (Fig. 3e) 2.1–2.8 times as long as wide (terminal spiniform seta included) with 5–6 spiniform setae on flexor margin including terminal one; short propodus 2.1–2.8 times as long as wide, 4.3–5.4 times as long as dactylus. P5 (Fig. 3d): dactylus (Fig. 3f) very short, 2.0–2.5 as long as wide with 6–17 spiniform setae on flexor margin; propodus 2.0–2.5 times as long as wide, 5.1–9.0 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.58 times cl, 1.6 times as long as fifth somite, shorter than telson.

TELSON (Fig. 3h). 3.2–3.4 times as long as wide, with four to six pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with a median process, it is rounded with 4 intermediate setae shorter than lateral ones.

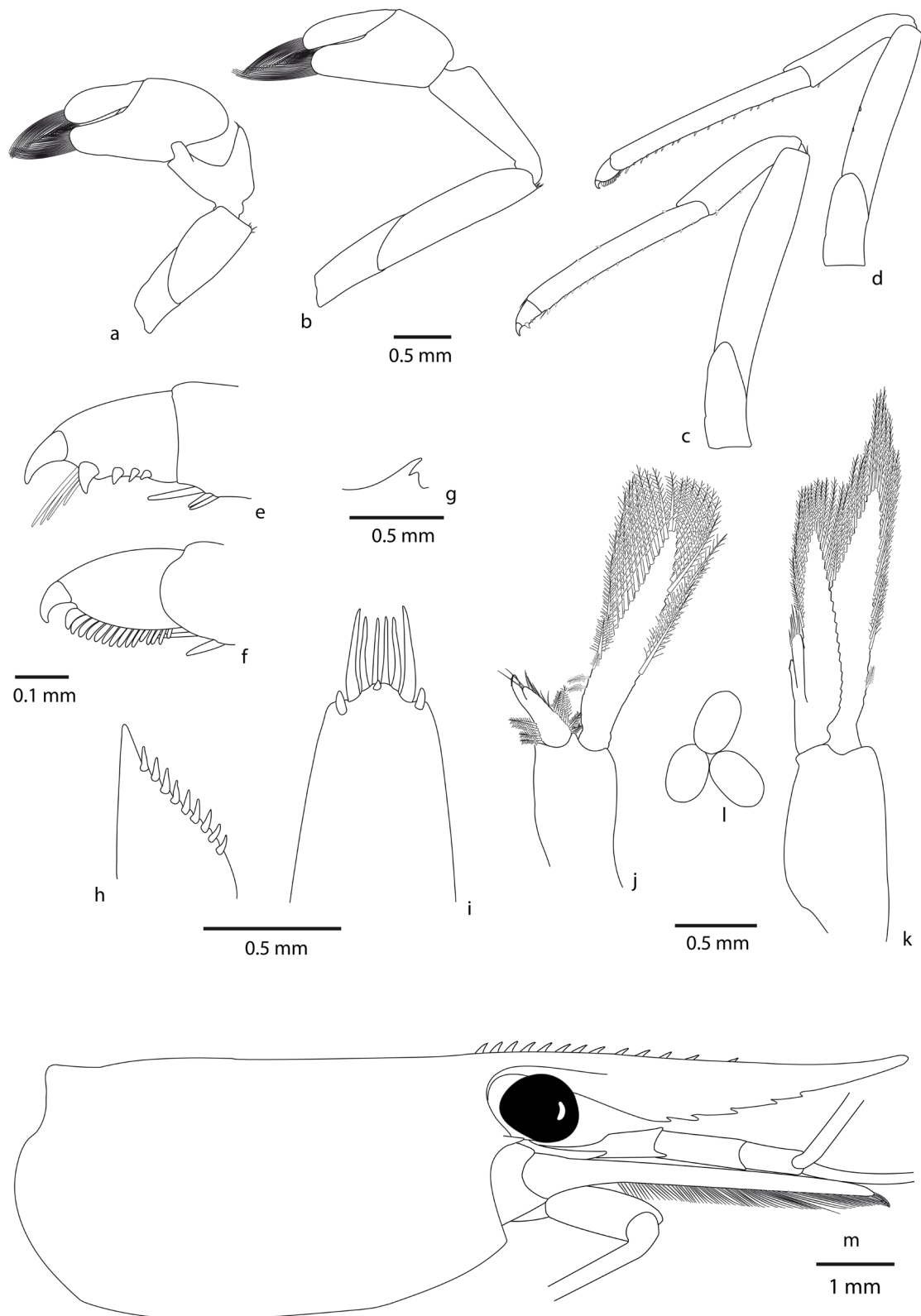


Fig. 3. *Caridina barakoma* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. MNHN-IU-2014-20807 (a–i, l–m) and MNHN-IU-2014-20805 (j–k).

MALE PLEOPODS. P11 (Fig. 3j): endopod subtriangular, 2.3 times as long as wide, reaching 0.29–0.41 length of exopod, with an appendix on subdistal outer margin which reaches beyond distal end of endopod with most of its length. P12 (Fig. 3k): appendix masculina reaching 0.54–0.56 times length of endopod; appendix interna reaching 0.77 of appendix masculina.

PRE-ANAL CARINA (Fig. 3g). High, armed with a spine.

UROPODAL DIAERESIS (Fig. 3h). With 8–10 spinules.

EGGS (Fig. 3l). Size: 0.21–0.25 × 0.37–0.40 mm.

Habitat

In the vegetation at the edge of the rivers in flowing water in the lower course of rivers.

Colour pattern

Unknown.

Distribution

Only collected in the Solomon Islands (Choiseul, Kolombangara, Vella Lavella, Isabel and Guadalcanal).

Remarks

This new species looks like the type specimens of *C. brevicarpalis* and *C. endehensis* both described by De Man (1892), with their very long rostrum, passing the end of the scaphocerite, without apical tooth and its P1 carpus deeply excavated. It can, however, easily be distinguished from *C. brevicarpalis* by its rostrum armed with more teeth on the dorsal margin, 12–16 (vs 11–14 for *C. brevicarpalis*) and on the ventral margin 5–10 teeth (vs 4–7), by its P3 propodus 4.3–5.4 times as long as dactylus (vs 4), by its P5 dactylus with fewer spiniform setae on flexor margin 6–17 (vs 20) and by its P5 propodus 5.1–9.0 times as long as dactylus (vs 5). Egg sizes are smaller, 0.21–0.25 × 0.37–0.40 (vs 0.33 × 0.53 according to Bouvier 1925). From *C. endehensis*, it can easily be separated by its rostrum slightly overreaching the antennal peduncle (vs far overreaching antennal scale for *C. endehensis*), dorsal margin nearly horizontal (vs ascendant in anterior ½), armed with 12–16 teeth on posterior ⅔ (vs 9–23 in posterior ½), armed ventrally with 5–10 teeth (vs 4–24).

In the literature on *C. brevicarpalis*, we only find 3 drawings: in De Man (1892), Bouvier (1925) and Edmondson (1935). The latter studied specimens from Viti Levu (Fiji) which seem different from our species by their rostrum armed with 18 teeth on the dorsal margin and 7 on the ventral margin (vs respectively 12–16 and 5–10 in *C. barakoma* sp. nov. and 11–14 and 4–7 in the type specimens of *C. brevicarpalis*). By their uropodal diaeresis, 10–13, it also seems different from our new species (8–10) and the type specimens (8–9 according Bouvier 1925). Fiji is the easternmost limit of the *C. brevicarpalis* complex in the Pacific, as no species of this group occur in Futuna, Samoa or French Polynesia (Keith *et al.* 2013). In this paper we postulate that the *C. brevicarpalis* group includes several different species allied to *C. brevicarpalis* like *C. barakoma* sp. nov., *C. endehensis* and the Fijian species.

Caridina gracilirostris species group

Diagnosis

Slender morphology with a very long and upcurved rostrum (twice the carapace length), armed with few dorsal teeth (fewer than 10), apical teeth present, the antennal spine ventral to the inferior orbital angle, a long antennular peduncle (more than 0.70 times as long as carapace), pterygostomian margin rounded, segments of walking legs slender, a typical dorsal hump over the third abdominal somite, a long sixth

abdominal somite (always more than half of carapace length), a small pre-anal carina bearing or not an acute spine, few spinules on the uropodal diaeresis (>10), very few short terminal setae on the telson, endopod of the first male pleopod subtriangular mostly without an appendix, but when it is present, on the subdistal outer margin, reaches beyond distal end of endopod by a short length.

Caridina gracilirostris De Man, 1892

Figs 2E, 4, 25A

Caridina gracilirostris De Man, 1892: 399, pl. 25: fig. 31a–d (type locality: several localities, Sulawesi (Celebes) Indonesia).

Caridina gracilirostris – Bouvier 1925: 142, figs 305–307. — Blanco 1935: 32, pl. 2, figs 11–17. — de Mazancourt *et al.* 2019a: 166, 169–170.

Material examined

Paralectotypes (lectotype designated by Cai & Ng 2007)

INDONESIA • 2 ♂♂, cl 3.5–3.7 mm, 1 ♀ ovig., cl 5.1 mm; Sulawesi, Balangnipa; Oct.–Nov. 1888; M. Weber leg.; MNHN-IU-2015-1737.

Other material

SOLOMON ISLANDS – **Kolombangara Island** • 1 ♂, cl 3.0 mm; Jack Harbour River; 08°03.085' S, 157°10.945' E; 11 m a.s.l.; 11 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; DNA voucher: CA1497; MNHN-IU-2018-2804. – **Isabel Island** • 1 specimen; Kolopakissa, Zari River; 07°36.314' S, 158°40.103' E; ca 0–5 m a.s.l.; 26 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2506; MNHN.

AUSTRALIA • 1 ♂, cl 4.2 mm; Queensland, Johnstone River; 17°30.456' S, 145°59.525' E; 7 m a.s.l.; 11 Jun. 2016; B. Mos leg.; DNA: CA1677; MNHN-IU-2018-2805 • 1 ♀ ovig., cl 5.6 mm; Queensland, Mulgrave River; 17°08.841' S, 145°52.786' E; 10 m a.s.l.; 7 Jun. 2016; B. Mos leg.; DNA voucher: CA1681; MNHN-IU-2018-2806 • 1 ♂, cl 4.2 mm; same collection data as for preceding; MNHN-IU-2018-2807.

Description

CEPHALOTHORAX. Antennal spine short, situated below inferior orbital angle. Pterygostomian margin sub-rectangular. Rostrum (Fig. 4m): strongly upturned, very long, 1.3–2.6 of cl, reaching far beyond distal end of scaphocerite, armed with 5–9 teeth on dorsal margin, with 1–2 apical teeth, 0–1 of them situated on carapace behind orbital margin, ventral margin with 21–35 teeth. Eyes well developed, anterior end reaching to 0.54–0.87 length of basal segment of antennular peduncle. Antennular peduncle 0.70 (♀) – 0.93 (♂) times as long as carapace. Anterolateral angle pointed, reaching to 0.40 length of second segment, second segment distinctly longer than third segment. Stylocerite reaching to 0.72–0.80 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereio pods. P1 (Fig. 4a): chela about 1.9–2.9 times as long as wide, movable finger 2.8–4.0 times as long as wide, 0.7–1.3 times length of palm; carpus 1.5–1.9 times as long as wide. P2 (Fig. 4b) more slender and longer than first pereio pod, with chela 2.0–2.5 times as long as wide: movable finger 3.3–4.2 times as long as wide, 1.1–1.8 times length of palm; carpus slender, 3.2–5.1 times as long as wide. P3 (Fig. 4c): dactylus stout (Fig. 4e), 3.3–3.8 times as long as wide (terminal spiniform seta included), with 7–10 spiniform setae on flexor margin in addition to terminal one; propodus 11.7–14.0 times as long as wide, 3.6–4.5 times as long as dactylus. P5 (Fig. 4d): dactylus

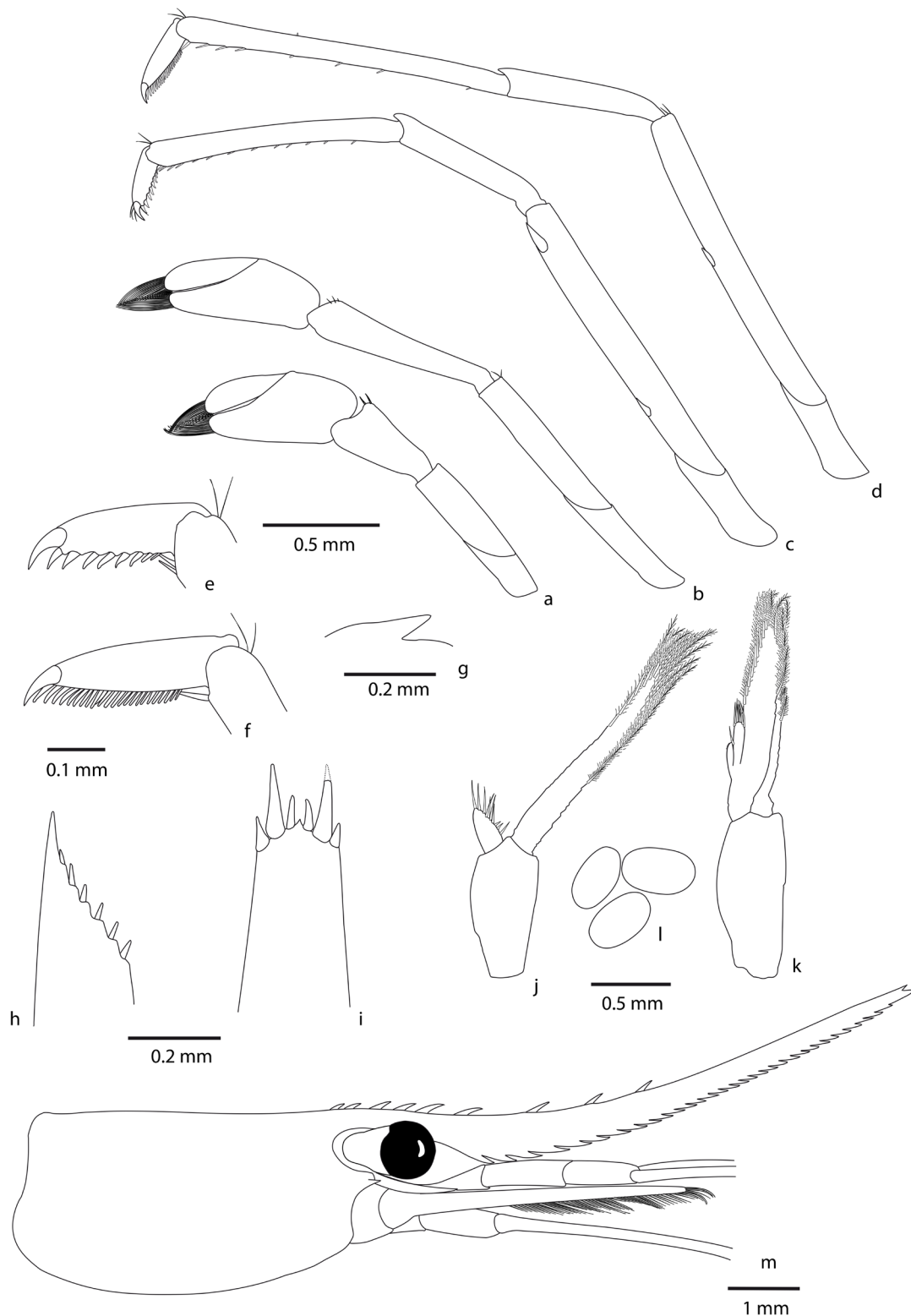


Fig. 4. *Caridina gracilirostris* (De Man, 1892). **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. MNHN-IU-2018-2804 (a–b, d, f–k), MNHN-IU-2018-2805 (c,e,m) and MNHN-IU-2018-2807 (l).

(Fig. 4f) 4.0–4.4 as long as wide, with 26–33 spiniform setae on flexor margin; propodus 14.9–22.4 times as long as wide, 3.8–4.4 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.8 times as long as carapace, 2.0 times as long as fifth somite, as long as telson.

TELSON (Fig. 4i). Very slender, 4.5 times as long as wide, with four pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin without a median process; distal setae very stout, lateral pair distinctly longer than intermediate setae (mostly one pair).

MALE PLEOPODS. P11 (Fig. 4j): endopod subtriangular, 2.1 times as long as wide, 0.21 times as long as exopod, without appendix interna. P12 (Fig. 4k): appendix masculina reaching 0.50 times length of endopod; appendix interna reaching 0.50 of appendix masculina.

PRE-ANAL CARINA (Fig. 4g). With spine.

UROPODAL DIAERESIS (Fig. 4h). With 6–10 spinules.

EGGS (Fig. 4l). Size: 0.34–0.43 × 0.19–0.26 mm.

Habitat

In the lower course of streams under marine influence, very often in brackish water.

Colour pattern (Fig. 25A)

Totally translucent body with a rostrum alternating black and red areas.

Distribution

Widely distributed in the tropical and subtropical Indo-Pacific region: Indonesia, the Philippines, India, Australia and the Solomon Islands.

Remarks

Our specimens fit well with the description given by Cai & Ng (2007): rostrum very long, reaching far beyond distal end of scaphocerite, strongly upturned, with presence of 0–1 postorbital teeth (vs 0 in Cai & Ng (2007)), 5–9 dorsal teeth (vs 3–9) and 21–35 ventral teeth (vs 28–36); P1 carpus 1.5–1.9 times as long as wide (vs 1.7); P2 carpus 3.2–5.1 times as long as wide (vs 4). P3 dactylus with 7–10 spiniform setae (vs 8), propodus 3.6–4.5 times as long as dactylus (vs 4.0); P5 dactylus with about 26–33 spiniform setae (vs 37) and propodus 3.8–4.4 times as long as dactylus (vs 3.8); uropodal diaeresis 6–10 (vs 5–11); small eggs 0.32–0.43 × 0.19–0.26 mm (vs 0.40 × 0.25 mm); no appendix interna on the endopod of the male first pleopod.

Caridina neglecta Cai & Ng, 2007
Figs 2F, 5, 25B

Caridina neglecta Cai & Ng, 2007: 1595, figs 4–5 (type locality: Sungai Batang, 13 km on road from Palopo to Wotu, Sulawesi, Indonesia).

Material examined

Holotype

INDONESIA • ♂, cl 4.3 mm; Sulawesi, Sungai Batang, 13 km on road from Palopo to Wotu; Mar. 1989; M. Kottelat and A. Werner leg.; MZB Cru 1570.

Paratype

INDONESIA • 1 ♀, cl 4.4 mm; same collection data as for holotype; ZRC 2007.0096.

Other material

SOLOMON ISLANDS – **Choiseul Island** • 1 ♂, cl 4.5 mm; Lokasereke River; 06°58.024' S, 156°47.861' E; 45 m a.s.l.; 13 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; DNA voucher: CA1310; MNHN-IU-2018-2808. – **Kolombangara Island** • 1 ♀ ovig., cl 4.2 mm; Liva River; 08°03.863' S, 157°10.633' E; 18 m a.s.l.; 11 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2019-106 • 1 ♂, cl 3.1 mm; same collection data as for preceding; MNHN-IU-2019-105 • 1 ♀ ovig., cl 5.0 mm; Jack Harbour River; 08°03.085' S, 157°10.945' E; 11 m a.s.l.; 11 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2811 • 1 ♀ ovig., cl 4.7mm; Vanga 2 River; 07°54.825' S, 156°57.762' E; 17 m a.s.l.; 18 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2812. – **Vella Lavella Island** • 1 ♀ ovig., cl 4.9 mm; Vala Kadju River; 07°49.860' S, 156°42.644' E; 17 m a.s.l.; 28 Oct. 2016; P. Keith and C. Lord leg.; DNA voucher: CA1703; MNHN-IU-2018-2813 • 1 ♀, cl 4.1 mm; Joroveto River; 07°49.918' S, 156°42.887' E; 18 m a.s.l.; 28 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2018-2814.

VANUATU – **Santo Island** • 1 ♀ ovig., cl 5.6 mm; Sarataka River; 15°30.078' S, 167°09.261' E; 25 Jul. 2003; D. Kalfatak, P. Keith and G. Marquet leg.; MNHN-IU-2015-1767. – **Isabel Island** • 1 specimen; Kolopakissa, Fufuna River; 07.64456° S, 158.71918° E; 15 m a.s.l.; 25 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2504; MNHN • 1 specimen; same collection data as for preceding; DNA voucher: CA2505; MNHN • 1 specimen; Rakata River confluence; 07.64190° S, 158.71504° E; 27 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2513; MNHN.

Description

CEPHALOTHORAX. Antennal spine short, situated below inferior orbital angle. Pterygostomian margin rectangular round. Rostrum (Fig. 5m): strongly upturned, very long, 1.6–2.2 of cl, reaching far beyond distal end of scaphocerite, armed with 5–9 teeth on dorsal margin, with 1–2 apical teeth, non of them situated on carapace behind orbital margin, ventral margin with 21–27 teeth. Eyes well developed, anterior end reaching to 0.7 times length of basal segment of antennular peduncle. Antennular peduncle 0.69 (♀) – 0.88 (♂) times as long as carapace. Anterolateral angle reaching 0.32 length of second segment, second segment distinctly longer than third segment. Stylocerite reaching to 0.86 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 5a): chela about 2.2–2.5 times as long as wide, movable finger 3.2–4.2 times as long as wide, 1.1–1.5 times length of palm; carpus 2.3–3.1 times as long as wide. P2 (Fig. 5b) more slender and longer than first pereopod, with chela 2.5–3.1 times as long as wide; movable finger 3.7–4.9 times as long as wide, 1.2–1.6 times length of palm; carpus slender, 5.2–6.4 times as long as wide. P3 (Fig. 5c): stout, dactylus (Fig. 5e) 3.3–4.7 times as long as wide (terminal spiniform seta included), with 5–7 spiniform setae on flexor margin in addition to the terminal one; propodus 11.8–17.3 times as long as wide, 4.1–5.4 times as long as dactylus. P5 (Fig. 5d): dactylus (Fig. 5f) 4.0–5.3 as long as wide, with 31–53 spiniform setae on flexor margin; propodus 12.9–21.1 times as long as wide, 3.7–4.5 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.80 as long as carapace, 1.76 times as long as fifth somite, slightly shorter than telson.

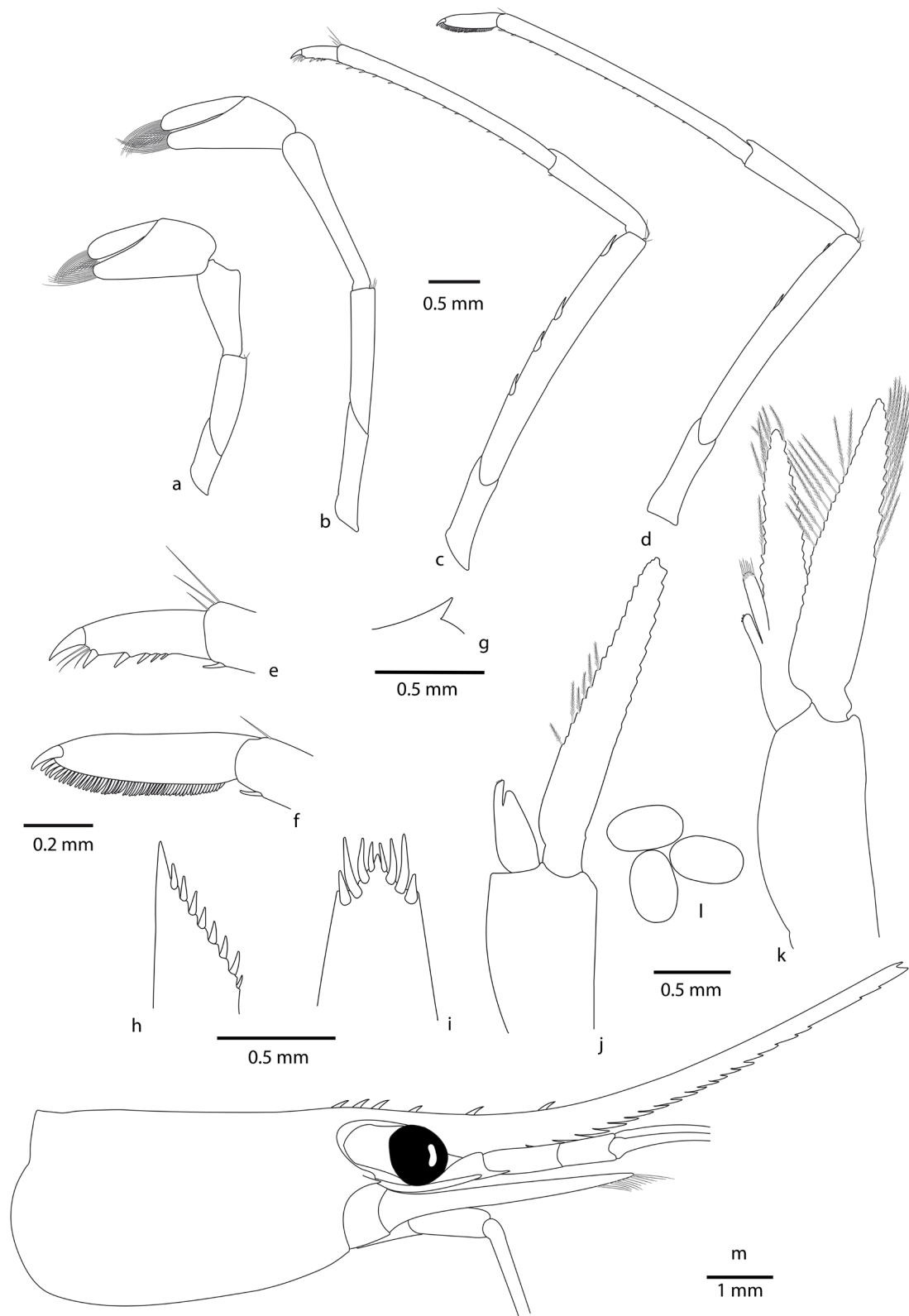


Fig. 5. *Caridina neglecta* Cai & Ng, 2007. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. MNHN-IU-2018-2811 (a–i, l) and MNHN-IU-2018-2808 (j–k, m).

TELSON (Fig. 5i). 3.4–3.7 times as long as wide, with three or four pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with a median process, distal setae short, lateral pair slightly longer than intermediate setae (mostly two pairs).

MALE PLEOPODS. P11 (Fig. 5j): endopod subtriangular, 1.5 times as long as wide, 0.17 times as long as exopod, with an appendix interna, on the subdistal outer margin, which reaches beyond distal end of endopod by a short length. P12 (Fig. 5k): appendix masculina reaching 0.57 times length of endopod; appendix interna reaching 0.71 of appendix masculina.

PRE-ANAL CARINA (Fig. 5g). With a spine.

UROPODAL DIAERESIS (Fig. 5h). With 7–10 spinules.

EGGS (Fig. 5l). Size: 0.40–0.53 × 0.24–0.30 mm.

Habitat

In the lower course of streams, near the estuary.

Colour pattern (Fig. 25B)

Totally translucent body with a characteristic red ventral margin on the rostrum.

Distribution

This species occurs in Indonesia, the Philippines, the Solomon Islands and Vanuatu.

Remarks

Our specimens fit well with the description given by Cai & Ng (2007): rostrum very long, reaching far beyond distal end of scaphocerite, strongly upturned, with presence of 0 postorbital teeth (vs 0 in Cai & Ng (2007)), 5–9 dorsal teeth (vs 4–8) and 21–27 ventral teeth (vs 21–30); P1 carpus 2.3–3.1 times as long as wide (vs 2.3–2.9); P2 carpus 5.2–6.4 times as long as wide (vs 6.2–6.7). P3 dactylus with 5–7 spiniform setae (vs 6), propodus 4.1–5.4 as long as dactylus (vs 4.1–5.1); P5 dactylus with about 31–53 spiniform setae (vs 37–44) and propodus 3.7–4.5 times as long as dactylus (vs 3.7–3.8); uropodal diaeresis 7–10 (vs 9); small eggs 0.40–0.51 × 0.24–0.30 mm (vs 0.40 × 0.25 mm); appendix interna on the endopod of the male first pleopod.

The presence of an appendix interna on the endopod of the male first pleopod (vs no appendix interna) and a longer P1 carpus, 2.3–3.1 times as long as wide (vs 1.5–1.9), and P2 carpus, 5.2–6.4 times as long as wide (vs 3.2–5.1), separates *C. neglecta* from *C. gracilirostris*.

Caridina nilotica species group

Diagnosis

Slender morphology, with a mostly long rostrum (longer than the antennular peduncle) but variable, the antennal spine ventral to the inferior orbital angle, a long antennular peduncle (subequal to carapace length), segments of walking legs slender, a typical dorsal hump over the third abdominal somite, a long sixth abdominal somite (always more than half of carapace length), a small pre-anal carina sometimes bearing an acute spine, a moderate number of spinules on the uropodal diaeresis (<15), fewer, medium to short and terminal setae on the telson and a subtriangular endopod of the first male pleopod with or without an appendix on the subdistal outer margin or even placed at the distal end. An oblique red band on the cephalothorax is very characteristic.

Caridina appendiculata Jalihal & Shenoy, 1998
Figs 2H, 25C

Caridina appendiculata Jalihal & Shenoy, 1998: 128.

Caridina appendiculata – Klotz, Karge & von Rintelen 2007: 7–9, figs 3 (in part)–4.— de Mazancourt *et al.* 2018c: 1433–1435, fig.4. — de Mazancourt *et al.* 2019a: 166, 169–170.

Material examined

SOLOMON ISLANDS – **Kolombangara Island** • 1 ♂, cl 3.5 mm; Zamba River; 08°05.934' S, 157°00.830' E; 0 m a.s.l.; 9 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-133 • 1 ♂, cl 3.6 mm; same collection data as for preceding; MNHN-IU-2018-134 • 1 ♀ ovig., cl 4.0 mm; Vanga 2 River; 07°54.825' S, 156°57.762' E; 5 m a.s.l.; 18 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; DNA voucher: CA1494; MNHN-IU-2018-135 • 1 ♀ ovig., cl 4.1 mm; same collection data as for preceding; DNA voucher: CA1495; MNHN-IU-2018-136 • 1 ♂, cl 3.3 mm; same collection data as for preceding; MNHN-IU-2018-137. – **Isabel Island** • 1 specimen; Kia, Hobolito River; 07.62419° S, 158.54004° E; 0–9 m a.s.l.; 24 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2502; MNHN.

Remarks

de Mazancourt *et al.* (2018c) recently redescribed *C. appendiculata* in detail. This species is known from Australia, Indonesia (Flores, Obira and Sulawesi), Solomon Islands (Kolombangara, Isabel), Micronesia (Pohnpei), Palau and Vanuatu (Aneityum, Efate, Epi and Santo). This species lives in a typical brackish water environment (brackish water pool or lower part of rivers, near the estuary).

Caridina brevidactyla Roux, 1919
Figs 2K, 25D

Caridina nilotica var. *brevidactyla* J. Roux, 1919: 320–321.

Caridina nilotica var. *brevidactyla* – J. Roux 1926: 204–206.

Caridina brevidactyla – Cai & Ng 2001: 671, fig. 5.— de Mazancourt *et al.* 2018c: 1435–1438, fig. 5; 2019a: 166, 169–170.

Not *Caridina nilotica* var. *brachydactyla* form *peninsularis* Edmondson, 1935: 5, fig. 1g–k.

Material examined

SOLOMON ISLANDS – **Choiseul Island** • 1 ♀, cl 5.3 mm; Gu'ma River; 07°01.764' S, 156°49.899' E; 50 m a.s.l.; 17 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-168 • 1 ♀ ovig., cl 5.0 mm; Lokasereke River; 06°58.024' S, 156°47.861' E; 13 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-169 • 1 ♀ ovig., cl 5.1 mm; same collection data as for preceding; MNHN-IU-2018-170 • 1 ♀ ovig., cl 5.7 mm; same collection data as for preceding; MNHN-IU-2018-171 • 1 ♀ ovig., cl 5.8 mm; same collection data as for preceding; DNA voucher: CA1345; MNHN-IU-2018-172 • 1 ♀, cl 4.4 mm; Lopakare River; 07°01.834' S, 156°45.789' E; 21 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-173 • 1 ♂, cl 3.3 mm; same collection data as for preceding; MNHN-IU-2018-174 • 1 ♀ ovig., cl 5.0 mm; Vorama River; 06°58.687' S, 156°46.746' E; 15 m a.s.l.; 11 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-175 • 1 ♀ ovig., cl 5.3 mm; same collection data as for preceding; MNHN-IU-2018-176 • 1 ♂, 3.1 mm; same collection data as for preceding; MNHN-IU-2018-177. – **Kolombangara Island** • 1 ♀, cl 4.2 mm; Lodumoe River; 07°50.961' S, 157°04.320' E; 16 Nov. 2015; 0 m a.s.l.; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-178 • 1 ♀ ovig., cl 4.9 mm; same collection data as for preceding; DNA voucher:

CA1500; MNHN-IU-2018-179 • 1 ♀ ovig., cl 3.7 mm; Vanga River; 07°54.825' S, 156°57.762' E; 18 Nov. 2015; 5 m a.s.l.; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-180 • 1 ♀ ovig., cl 3.9 mm; same collection data as for preceding; MNHN-IU-2018-181 • 1 ♂, cl 3.8 mm; same collection data as for preceding; MNHN-IU-2018-182. – **Vella Lavella Island** • 1 ♀ ovig., cl 4.6 mm; Maravari River; 07°51.703' S, 156°41.748' E; 31 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2018-183 • 1 ♂; same collection data as for preceding; MNHN-IU-2018-184 • 1 ♀ ovig., cl 4.0 mm; Wariassi River; 29 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2018-186 • 1 ♂, cl 4.2 mm; same collection data as for preceding; MNHN-IU-2018-187. – **Isabel Island** • 1 specimen; Kupikolo, Rapa River; 07°28.527' S 158°17.105' E; 0–7 m a.s.l.; 23 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2500; MNHN • 1 specimen; same collection data as for preceding; DNA voucher: CA2501; MNHN • 1 specimen; Kolopakissa River; 07°35.377' S, 158°39.854' E; 40 m a.s.l.; 26 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2507; MNHN • 1 specimen; same collection data as for preceding; DNA voucher: CA2508; MNHN • 1 specimen; Rakata River confluence; 07.64190° S, 158.71504° E; 27 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2514; MNHN.

Remarks

de Mazancourt *et al.* (2018c) recently designated a lectotype for *C. brevidactyla* Roux, 1919 and redescribed it in detail. This species is now known from Indonesia (Aru Island, Halmahera), Papua New Guinea (New Britain), Solomon Islands (Choiseul, Kolombangara, Vella Lavella, Isabel), Vanuatu (Efate, Epi, Malekula and Santo), New Caledonia and Fiji. This species is encountered in the lower part of rivers, sometimes in brackish conditions near the estuary.

Caridina choiseul sp. nov.

urn:lsid:zoobank.org:act:4C3B5DD9-C268-4876-AE84-5FF7CDD01DAE

Figs 2J, 6, 25E

Caridina sp. 2 Solomon – de Mazancourt *et al.* 2019a: 166, 169–170.

Etymology

Named after the island of Choiseul, where this new species occurs. The name is used as a noun in apposition.

Material examined

Holotype

SOLOMON ISLANDS • ♂, cl 3.9 mm; Choiseul Island, Creek 2; 06°59.027' S, 156°47.913' E; 93 m a.s.l.; 14 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20821.

Paratypes

SOLOMON ISLANDS – **Choiseul Island** • 1 ♀, cl 4.5 mm; same collection data as for holotype; MNHN-IU-2014-20822 • 1 ♂, cl 3.8 mm; Lopakare River; 07°01.613' S, 156°46.567' E; 20 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20823 • 1 ♂, cl 4.0 mm; same collection data as for preceding; MNHN-IU-2014-20824 • 1 ♀ ovig., cl 4.5 mm; same collection data as for preceding; MNHN-IU-2014-20825 • 1 ♀ ovig., cl 4.7 mm; same collection data as for preceding; MNHN-IU-2014-20826 • 1 ♀, cl 4.6 mm; same collection data as for preceding; DNA voucher: CA1277; MNHN-IU-2014-20827 • 1 ♀, cl 4.8 mm; same collection data as for preceding; MNHN-IU-2014-20828 • 1 ♂, cl 4.0 mm; Pisuku River, sector 1; 06°58.951' S, 156°46.582' E; 15 m a.s.l.; 10 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20829 • 1 ♂, cl 4.1 mm; same collection data as for preceding; DNA voucher: CA1285; MNHN-IU-2014-20830 • 1 ♀, cl 4.7 mm; same collection data as for preceding; MNHN-IU-2014-20831 • 1 ♀ ovig., cl 5.1 mm; same collection data

as for preceding; MNHN-IU-2014-20832 • 1 ♀ ovig., cl 5.5 mm; same collection data as for preceding; MNHN-IU-2014-20833 • 1 ♂, cl 4.2 mm; Pisuku River, sector 2; 06°58.900' S, 156°46.685' E; 66 m a.s.l.; 10 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20834 • 1 ♀, cl 5.4 mm; same collection data as for preceding; MNHN-IU-2014-20835 • 1 ♂, 4.2 mm; Pisuku River, upstream; 06°58.965' S, 156°46.718' E; 12 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20836 • 1 ♀, cl 4.5 mm; same collection data as for preceding; MNHN-IU-2014-20837 • 1 ♀, cl 4.1 mm; same collection data as for preceding; MNHN-IU-2014-20838 • 1 ♀, cl 5.1 mm; same collection data as for preceding; MNHN-IU-2014-20839.

Comparative material

Caridina variabilirostris (de Mazancourt, Marquet & Keith, 2018)

See de Mazancourt *et al.* (2018a)

Caridina brachydactyla (De Man, 1908)

INDONESIA • lectotype (designated by Richard & Clark 2010), ♀ ovig., cl 4.8 mm; Flores Island, river near Reo; Nov. 1888; M. Weber leg.; RMNH Crust D. 977 • 2 paralectotypes, ♀♀ ovig., cl 5.3–5.4 mm; Flores Island, river in Mbawa; Jan. 1889; M. Weber leg.; RMNH 2552 • 1 ♀, cl 5.8 mm; Bali Island; NMB 1054a • 2 ♂♂, cl 2.7–3.7 mm, 1 ♀ ovig., cl 4.3 mm, 1 ♀, cl 4.8 mm; Sulawesi, Palopo, Macaui (locality code: 63.10); W. Klotz leg.; ZMB • 1 ♀ ovig., cl 4.0 mm; Sulawesi, Palopo, Tojo (locality code: 64.10); W. Klotz leg.; ZMB.

Caridina elongapoda (Liang & Yan, 1977)

CHINA • 3 ♂♂, cl 2.8–3.5 mm, 1 ♀, cl 4.2 mm; Hong Kong, Pak Tam Chung and Kai Sai Chau (locality codes 14.11 and 22.09); W. Klotz leg.; ZMB.

MALAYSIA • 1 ♂, cl 4.2 mm, 1 ♀, cl 4.3 mm, 1 ♀ ovig., cl 4.3 mm; Pulau Tioman, Sungai Asah; 24 Jun. 1997; Ng *et al.* leg.; ZRC 1998.0865.

Caridina peninsularis (Kemp, 1918)

MALAYSIA • lectotype (designated by Cai *et al.* 2007), ♂, cl 3.2 mm; Penang Island, Botanical Garden; Feb. 1916; N. Anandale leg.; MNHN-IU-2015-1749 • 1 paralectotype, ♀ ovig., cl 5.4 mm; same collection data as for lectotype; MNHN-IU-2015-1750 • 1 paralectotype, ♀, cl 3.4 mm, 1 paralectotype, ♀ ovig., cl 5.2 mm, 1 paralectotype, ♂, cl 3.9 mm; same collection data as for lectotype; NHM 1919.11.1.12-21 (1761124).

SINGAPORE • 1 ♀ ovig., cl 5.1 mm, 1 ♂, cl 4.2 mm; Tanglin [incorrectly spelt Tangtum in NHM register and on label, see Richard & Clark 2014]; 1958; Bedford and Lanchester leg.; NHM 1958.8.7.14–17 (1749569).

Caridina variabilis (de Mazancourt, Rogers & Keith, 2018)

See de Mazancourt *et al.* (2018b).

Caridina sundanella (Holthuis, 1978)

INDONESIA • 1 syntype ♂, cl 3.6 mm, 1 syntype, ♀, cl 5.2 mm; Sumba Island, West Sumba, 4 km N of Waimangura, Waikamburu Brook, Station 450; 250 m a.s.l.; 19 Aug. 1949; E. Sutter and A. Bühler leg.; NMB 989a.

Description

CEPHALOTHORAX. Carapace (Fig. 6m) smooth, glabrous, with sharp antennal spine placed at lower orbital angle. Pterygostomial margin subrectangular. Variable length rostrum, 0.5–1.2 of cl, 16–28 dorsal teeth closely set, leaving 0.0–0.35 unarmed distally, 1–4 post-orbital teeth present. 7–12 teeth present on ventral margin extending from proximal end either to tip or with short distal part unarmed. Number of dorsal teeth on rostrum before first ventral tooth 13–19. Eyes well developed, anterior end reaching to 0.72 times length of basal segment of antennular peduncle. Antennular peduncle 0.75 (♀) – 0.88 (♂) times as long as carapace. Anterolateral angle reaching 0.30 length of second segment, second segment distinctly longer than third segment. Stylocerite reaching to 0.83 length of basal segment of antennular peduncle.

PEREIOPODS. Slender P1 (Fig. 6a): chela about 1.8–2.3 times as long as wide, dactylus 3.3–4.8 times as long as wide, 1.3–1.8 length of palm; carpus 1.9–2.4 times as long as wide with shallow excavation on anterior margin. P2 (Fig. 6b) more slender and longer than first pereopod: chela 2.0–2.7 times as long as wide, dactylus 3.8–6.3 times as long as wide, 1.3–1.8 times length of palm; carpus 4.6–7.7 times as long as wide. P3 (Fig. 6c): dactylus (Fig. 6e) 2.7–3.8 times as long as wide (terminal spiniform setae included) with 5–6 spiniform setae on flexor margin in addition to terminal one; propodus 13.0–19.6 times as long as wide, 5.0–6.8 times as long as dactylus. P5 (Fig. 6d): dactylus (Fig. 6f) 3.3–4.9 times as long as wide, with 28–41 spiniform setae on flexor margin; propodus 13.6–25.5 times as long as wide, 4.8–6.5 times as long as dactylus.

ABDOMEN. A typical dorsal hump over third abdominal somite. Sixth abdominal somite 0.7 as long as carapace, 1.9 times as long as fifth somite, slightly shorter than telson.

TELSON (Fig. 6i). 2.9–3.2 times as long as wide, with four pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with a median process, distal setae short, lateral pair slightly longer than intermediate setae (4–7).

MALE PLEOPODS. P11 (Fig. 6j): endopod subtriangular, 2.1 times as long as wide, 0.15 times as long as exopod, with an appendix interna placed at distal end. P12 (Fig. 6k): appendix masculina reaching 0.56 times length of endopod; appendix interna reaching 0.70 of appendix masculina.

PRE-ANAL CARINA (Fig. 6g). With a spine or not.

UROPODAL DIAERESIS (Fig. 6h). With 9–14 spinules.

EGGS (Fig. 6l). Size: 0.40–0.45 × 0.24–0.28 mm.

Habitat

This species prefers fresh and well-oxygenated waters. It is found from the lower to the higher course. It is more abundant in the areas situated above waterfalls, where predators are less numerous.

Colour pattern (Fig. 25E)

The colour of the body is hyaline with many red dots.

Distribution

As far as we know, this species is known only from Choiseul Island.

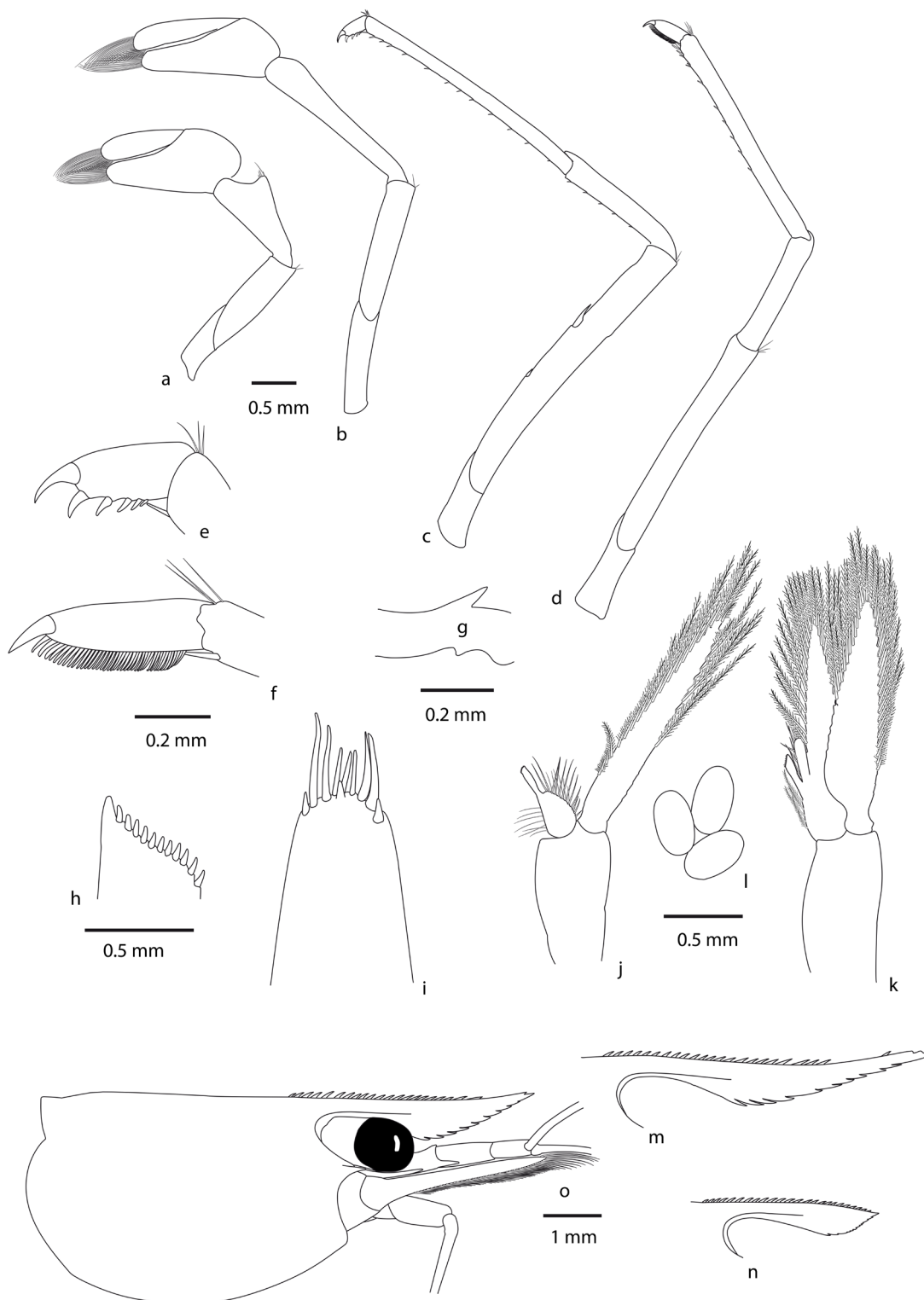


Fig. 6. *Caridina choiseul* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m–n.** Rostrum variations. **o.** Cephalothorax. MNHN-IU-2014-20833 (a–g (top, with spine), h, l), MNHN-IU-2014-20836 (g (bottom, without spine)), MNHN-IU-2014-20831 (i), MNHN-IU-2014-20829 (j–k), MNHN-IU-2014-20827 (m), MNHN-IU-2014-20837 (n) and MNHN-IU-2014-20826 (o).

Remarks

In this new species, rostrum length is variable (cl 0.5–1.2), being longer in the lower course and shorter in the upper course, as recently found by de Mazancourt *et al.* (2017b) who highlighted the “Pinocchio-shrimp effect” on *C. variabilirostris* de Mazancourt, Marquet & Keith, 2018 from Pohnpei. When the rostrum is short, the general appearance resembles that of *C. mertoni* Roux, 1911, whereas when the rostrum is long, the general appearance is similar to that of *C. brachydactyla* De Man, 1908. Similarly, *C. variabilis* de Mazancourt, Rogers & Keith, 2018 from Guam and Palau shows a longer or a shorter rostrum depending on the altitude.

Caridina choiseul sp. nov. looks like *C. variabilis* and *C. variabilirostris* from Micronesia by the number of teeth and their placement on the rostrum, the proportions between the joints of pereopods and egg size. However, it can be differentiated by the pre-anal carina that sometimes has a spine (vs always unarmed in *C. variabilis* and *C. variabilirostris*) and the P5 dactylus that has more spiniform setae on the flexor margin: 28–41 (vs 13–30 and 18–29, respectively). *Caridina choiseul* sp. nov. is most similar to *C. brachydactyla* De Man, 1908 and *C. peninsularis* Kemp, 1918, but its P2 chela is stouter (2.0–2.7 times as long as wide vs 2.7–3.2 and 2.8–3.0, respectively) and the pre-anal carina which has a spine or not (vs always armed). *Caridina choiseul* sp. nov. looks like *Caridina elongapoda* Liang & Yan, 1977, but the pre-anal carina has a spine or not (vs always unarmed) and its P3 dactylus with 5–6 spiniform setae on the flexor margin in addition to the terminal one (vs 6–7). *Caridina choiseul* sp. nov. looks like *C. mertoni* Roux, 1911 and *C. sundanella* Holthuis, 1978, but the pre-anal carina has a spine or not (vs always unarmed) and its rostrum has 7–12 ventral teeth (vs 4–9 and 7–9, respectively).

Caridina intermedia sp. nov.

urn:lsid:zoobank.org:act:7A52CFEB-5BA8-483F-9C70-69958430DF8E

Figs 2I, 7, 25F

Caridina sp. Sol.2 – Page *et al.* 2007: 649 (GenBank: DQ478545).

Caridina sp. 1 Solomon – de Mazancourt *et al.* 2019a: 166, 169–170.

Etymology

Caridina intermedia sp. nov. was named for its intermediate morphometry between those of *C. brevidactyla* and *C. grandirostris*.

Material examined

Holotype

SOLOMON ISLANDS • ♀, cl 5.4 mm; Choiseul Island, Gu'ma River; 07°01.764' S, 156°49.899' E; 50 m a.s.l.; 17 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20840.

Paratypes

SOLOMON ISLANDS – **Choiseul Island** • 1 ♀ ovig., cl 5.4 mm; Lokasereke River; 06°58.024' S, 156°47.861' E; 13 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20841 • 1 ♀ ovig., cl 4.9 mm; same collection data as for preceding; MNHN-IU-2014-20842 • 1 ♂, cl 3.4 mm; same collection data as for preceding; MNHN-IU-2014-20843 • 1 ♂, cl 3.4 mm; Pisuku River, downstream; 06°58.848' S, 156°46.582' E; 12 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; DNA voucher: CA1326; MNHN-IU-2014-20844 • 1 ♂, cl 3.5 mm; same collection data as for preceding; MNHN-IU-2014-20845 • 1 ♂, cl 3.7 mm; same collection data as for preceding; MNHN-IU-2014-20846. – **Kolombangara Island** • 1 ♂, cl 3.5 mm; Poitete River; 07°52.413' S, 157°07.982' E; 15 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; DNA voucher: CA1499; MNHN-IU-2014-20847. – **Vella Lavella Island** • 1 ♂, cl 3.1 mm; Vala Kadju River; 07°49.860' S, 156°42.644' E; 28 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2014-20848 • 1 ♀ ovig., cl 3.9 mm; same collection data as for preceding;

MNHN-IU-2014-20849 • 1 ♂, cl 2.8 mm; Joroveto River; 07°49.918' S, 156°42.887' E; 28 Oct. 2016, P. Keith and C. Lord leg.; MNHN-IU-2014-20850 • 1 ♀ ovig., cl 3.9 mm; same collection data as for preceding; MNHN-IU-2014-20851. – **Isabel Island** • 1 specimen; Rakata River; 15 m a.s.l.; 07.64456° S, 158.71918° E; 27 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2509; MNHN • 1 specimen; same collection data as for preceding; DNA voucher: CA2510; MNHN.

Other material

PAPUA NEW GUINEA – **New Britain** • 1 ♂, cl 4.1 mm; Ore River; 05°43.145' S, 49°34.128' E; 25 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2014-20852 • 1 ♀ ovig., cl 5.7 mm; same collection data as for preceding; MNHN-IU-2014-20853 • 1 ♀ ovig., cl 6.3 mm; same collection data as for preceding; MNHN-IU-2014-20854 • 1 ♀ ovig., cl 5.7 mm; same collection data as for preceding; MNHN-IU-2014-20855 • 1 ♂, cl 4.3 mm; Garu road; 05°27.278' S, 149°58.415' E; 26 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2014-20856 • 1 ♀, cl 4.5 mm; same collection data as for preceding; MNHN-IU-2014-20857 • 1 ♂, cl 4.2 mm; Galuku River; 05°45.187' S, 150°35.001' E; 20 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2014-20858 • 1 ♀ ovig., cl 5.9 mm; same collection data as for preceding; MNHN-IU-2014-20859 • 1 ♀ ovig., cl 5.4 mm; Kokori River; 05°42.650' S, 150°37.693' E; 22 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2014-20860 • 1 ♀ ovig., cl 5.7 mm; Rangih swamp; 05°34.549' S, 149°28.943' E; 24 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2014-20861.

Comparative material

Caridina longirostris (H. Milne Edwards, 1837)

See de Mazancourt *et al.* 2018c.

Caridina appendiculata (Jalihal & Shenoy, 1998)

See de Mazancourt *et al.* 2018c.

Caridina brevidactyla (Roux, 1919)

See de Mazancourt *et al.* 2018c.

Caridina gracilipes (De Man, 1892)

See de Mazancourt *et al.* 2018c.

Description

CEPHALOTHORAX. Carapace (Fig. 7m) smooth, glabrous, with sharp antennal spine placed at lower orbital angle. Pterygostomial margin subrectangular. Long rostrum, 1.1–1.8 of cl, curved up distally, reaching well beyond scaphocerite. 16–26 dorsal teeth closely set, leaving 0.4–1.3 unarmed distally except for one or two subapical teeth, 1–3 post-orbital teeth present. 9–20 teeth present of ventral margin, extending from proximal end either to tip or with short distal part unarmed. Number of dorsal teeth on rostrum before first ventral tooth 11–16. Eyes well developed, anterior end reaching to 0.60–0.63 length of basal segment of antennular peduncle. Antennular peduncle 0.69 (♀) – 0.90 (♂) times as long as carapace. Anterolateral angle pointed reaching to 0.37 length of the second segment; second segment distinctly longer than third segment. Stylocerite reaching to 0.83–0.90 length of basal segment of antennular peduncle.

PEREIOPODS. Slender P1 (Fig. 7a): chela about 2.0–2.4 times as long as wide, dactylus 3.4–4.2 times as long as wide, 1.1–1.5 length of palm; carpus 2.4–3.1 times as long as wide, with shallow excavation on anterior margin. P2 (Fig. 7b) more slender and longer than first pereopod: chela 2.3–2.9 times as long as wide, dactylus 4.1–5.4 times as long as wide, 1.1–1.6 times length of palm; carpus 5.8–6.7 times as long as wide. P3 (Fig. 7c): dactylus (Fig. 7e) 2.9–4.2 times as long as wide, with 6–7 spiniform setae on flexor margin in addition to terminal one; propodus 15.3–21.7 times as long as wide, 4.4–6.6 times

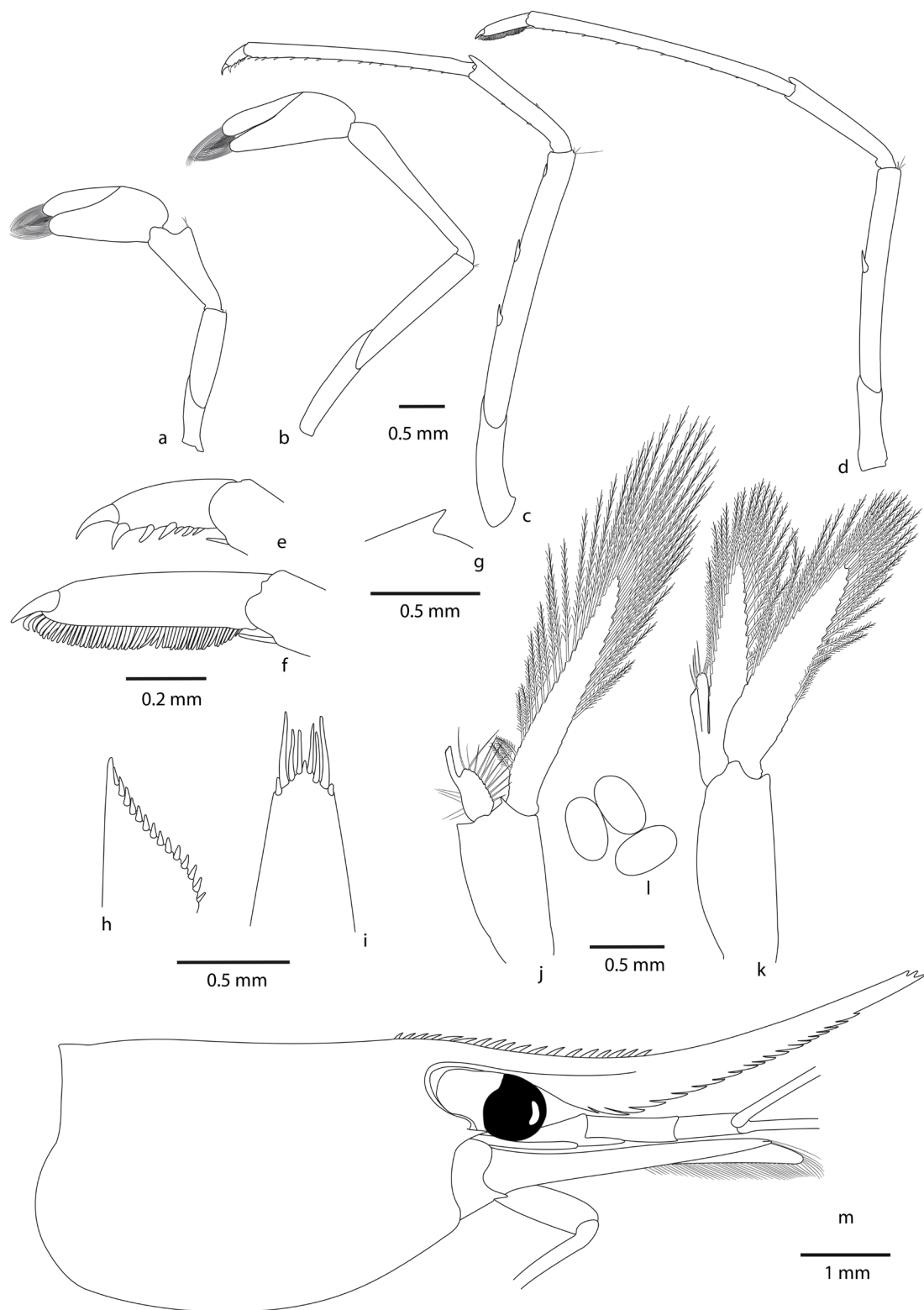


Fig. 7. *Caridina intermedia* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. MNHN-IU-2014-20842 (a–h, l), MNHN-IU-2014-20843 (i), MNHN-IU-2014-20850 (j–k) and MNHN-IU-2014-20860 (m).

as long as dactylus. P5 (Fig. 7d): dactylus (Fig. 7f) 4.1–5.6 long as wide, with 31–59 spiniform setae on flexor margin; propodus 18.9–27.9 times as long as wide, 4.7–6.1 as long as dactylus.

ABDOMEN. Typical dorsal hump over third abdominal somite, sixth abdominal somite 0.74 as long as carapace, 1.9 times as long as fifth somite, 1.0 times as long as telson.

TELSON (Fig. 7i). 3.8 times as long as wide, with four pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with median process, distal setae short, lateral pair slightly longer than intermediate setae (4).

MALE PLEOPODS. P11 (Fig. 7j): endopod subtriangular, 2.2 times as long as wide, 0.22 times as long as exopod, with appendix interna placed on subdistal outer margin. P12 (Fig. 7k): appendix masculina reaching 0.55 times length of endopod; appendix interna reaching 0.90 of appendix masculina.

PRE-ANAL CARINA (Fig. 7g). With spine.

UROPODAL DIAERESIS (Fig. 7h). With 9–14 spinules.

EGGS (Fig. 7l). Size: 0.33–0.43 × 0.20–0.25 mm.

Habitat

All specimens were collected in a typical brackish water environment (brackish water pool or lower part of rivers, near the estuary). In rivers of Solomon Islands, *C. intermedia* sp. nov. is syntopic with *C. brevidactyla* and *C. appendiculata*.

Colour pattern (Fig. 25F)

The colour of the body is hyaline with many reds dots.

Distribution

Caridina intermedia sp. nov. is known from the Solomon Islands (Choiseul, Kolombangara, Vella Lavella and Isabel) and Papua New Guinea (New Britain).

Remarks

Caridina intermedia sp. nov. differs from *C. longirostris* by its longer P1 and P2 carpus, respectively 2.4–3.1 (vs 1.4–1.8 in *C. longirostris*) and 5.8–6.7 (vs 4.0–4.2) times as long as wide, a stouter P3 dactylus 2.9–4.2 (vs 4.0–4.8) times as long as wide, with propodus 4.4–6.6 (vs 3.4–4.1) times as long as dactylus, and a stouter P5 propodus, 4.1–5.6 (vs 3.2–3.5) times as long as dactylus. *C. intermedia* sp. nov. has an appendix interna on the endopod of the male first pleopod (vs none).

Caridina intermedia sp. nov. differs from *C. appendiculata* by its greater number of teeth on the proximal part of the dorsal margin of the rostrum, 16–26 closely set (vs 12–17 teeth somewhat irregular spaced in *C. appendiculata*), greater number of dorsal teeth before the first ventral teeth 11–16 (vs 8–12) and a slightly greater number of spiniform setae on the dactylus of the fifth pereopod 31–59 (vs 33–44).

Caridina intermedia sp. nov. differs from *C. gracilipes* by its longer P2 carpus, 5.8–6.7 (vs 4.4–5.9 in *C. gracilipes*), by a lower number of spiniform setae on the dactylus of the third pereopod, 6–7 (vs 9–10), with its more slender P3 propodus, 4.4–6.6 times as long as dactylus (vs 3.8–4.6), and its longer and more slender P5 propodus, 18.9–27.9 times as long as wide (vs 16.2–19.3).

Caridina intermedia sp. nov. is similar to *C. grandirostris* and *C. brevidactyla* by its rostrum with a similar number of dorsal teeth, 16–26 (vs 17–21 in *C. grandirostris* and 17–30 in *C. brevidactyla*).

However, even though *C. intermedia* sp. nov. like *C. grandirostris* always has a pre-anal carina with a spine, *C. brevidactyla* never has one. *C. intermedia* sp. nov. can be separated from *C. grandirostris* by its greater P3 dactylus, 2.9–4.2 (vs 2.3–2.9 in *C. grandirostris*), its longer P3 propodus, 15.3–21.7 times as long as wide (vs 13–15), and its longer P5 propodus, 18.9–27.9 times as long as wide (vs 13.4–16.1).

Caridina mertoni Roux, 1911

Figs 2L, 8, 25G

Caridina mertoni Roux, 1911: 84.

Caridina mertoni – Bouvier 1925: 191, figs 398–408. — de Mazancourt *et al.* 2019a: 166, 169–170.

Material examined

Lectotype (here designated)

INDONESIA • ♂, cl 3.8 mm; Kei Besar Island, Elat; 1908; H. Merton leg.; DNA voucher: CA056; NMB 693a.

Paralectotypes

INDONESIA – **Kei Besar Island** • 1 ♂, cl 2.7 mm, 1 ♀, cl 4.1 mm; same collection data as for lectotype; NMB 693a • 1 ♂, cl 3.8 mm; same collection data as for lectotype; MNHN-IU-2018-1819 • 1 ♂, cl 3.4 mm; same collection data as for lectotype; MNHN-IU-2015-1820 • 1 ♂, cl 3.1 mm, 1 ♀ ovig., cl 4.8 mm; Warka; 1908; H. Merton leg.; NMB 693b • 1 ♀, cl 4.3 mm; Enralang; 1908; H. Merton leg.; NMB 693c.

Other material

SOLOMON ISLANDS – **Kolombangara Island** • 1 ♂, cl 2.9 mm; Manolu River; 08°05.312' S, 157°00.813' E; 28 m a.s.l.; 10 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2017-2108 • 1 ♂, cl 3.8 mm; same collection data as for preceding; MNHN-IU-2017-2107 • 1 ♂, cl 3.7 mm; same collection data as for preceding; DNA voucher: CA1505; MNHN-IU-2017-2109 • 1 ♀ ovig., cl 3.9 mm; same collection data as for preceding; MNHN-IU-2018-2815 • 1 ♂, cl 4.0 mm; Sulumuni River; 08°02.253' S, 157°09.257' E; 148 m a.s.l.; 12 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2816 • 1 ♀, cl 6.2 mm; same collection data as for preceding; MNHN-IU-2018-2817. – **Malaita Island** • 1 ♂, cl 4.5 mm; Tanana River; 09°17.383' S, 167°07.012' E; 276 m a.s.l.; 16 Jun. 2015; D. Boseto leg.; DNA voucher: CA2000; MNHN-IU-2018-2818 • 1 ♂, cl 4.6 mm; same collection data as for preceding; MNHN-IU-2018-2819 • 1 ♀, cl 5.6 mm; same collection data as for preceding; MNHN-IU-2018-2820 • 1 ♂, cl 4.4 mm; Wairahuta River; 09°16.967' S, 161°07.285' E; 258 m a.s.l.; 17 Jun. 2015; D. Boseto leg.; MNHN-IU-2018-2821 • 1 ♀, cl 5.5 mm; same collection data as for preceding; MNHN-IU-2018-2822 • 1 ♀, cl 5.6 mm; same collection data as for preceding; MNHN-IU-2018-2823.

Description

CEPHALOTHORAX. Carapace (Fig. 8m) smooth, glabrous, suborbital angle obscure, largely fused with antennal spine angle; pterygostomian margin rectangularly rounded. Rostrum (Fig. 8m–o) straight or slightly curved down, 0.6–1.1 of cl, sometimes slightly inclined distally, reaching as far as distal end of antennular peduncle. 17–24 dorsal teeth closely set, leaving 0.0–0.25 unarmed distally except for one or two subapical teeth, 2–5 post-orbital teeth present. 4–9 teeth present of ventral margin. Number of dorsal teeth on rostrum before first ventral tooth 12–19. Eyes well developed, anterior end reaching to 0.70–0.77 length of basal segment of antennular peduncle. Antennular peduncle 0.64 (♀) – 0.81 (♂) times as long as carapace. Anterolateral angle pointed, reaching to 0.40 length of second segment;

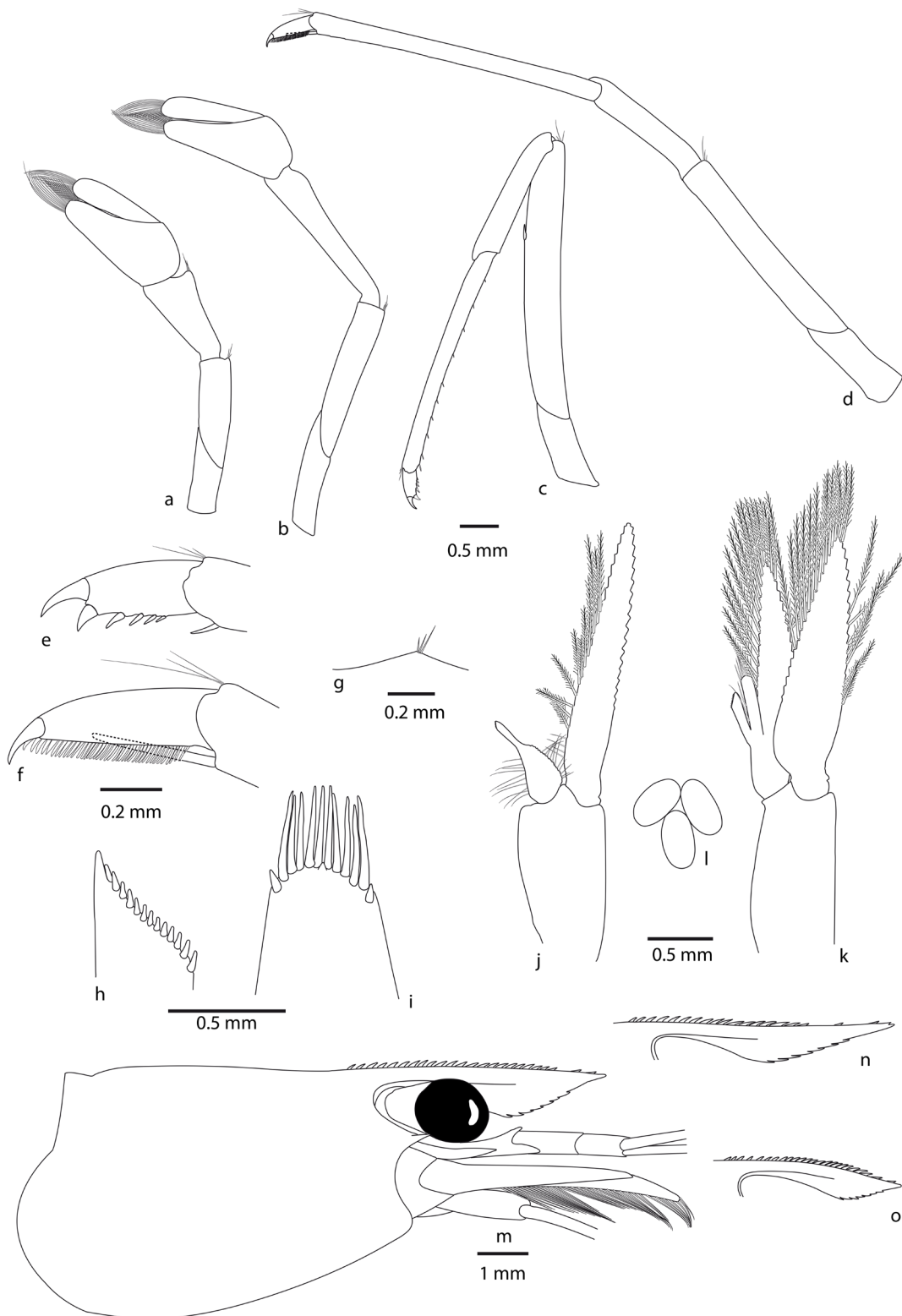


Fig. 8. *Caridina mertoni* Roux, 1911. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. **n–o.** Rostrum variations. MNHN-IU-2018-2817 (a–f, m), MNHN-IU-2018-2815 (h–i, l), MNHN-IU-2018-2816 (j–k), MNHN-IU-2017-2109 (n) and MNHN-IU-2018-2819 (g, o).

second segment distinctly longer than third segment. Stylocerite reaching to 0.77–0.80 length of basal segment of antennular peduncle.

PEREIOPODS. Slender P1 (Fig. 8a): chela about 1.8–2.1 times as long as wide, dactylus 2.9–4.5 times as long as wide, 1.1–2.0 length of palm; carpus 1.9–2.6 times as long as wide, with shallow excavation on anterior margin. P2 (Fig. 8b): more slender and longer than first pereopod: chela 1.9–2.5 times as long as wide, dactylus 3.6–5.0 times as long as wide, 1.4–2.1 times length of palm; carpus 4.4–5.6 times as long as wide. P3 (Fig. 8c): dactylus (Fig. 8e) 2.8–3.4 times as long as wide (terminal spiniform setae included), with 5–6 spiniform setae on flexor margin in addition to terminal one; propodus 12.8–18.3 times as long as wide, 4.5–6.7 times as long as dactylus. P5 (Fig. 8d): dactylus (Fig. 8f) 2.6–4.5 times as long as wide, with 27–44 spiniform setae on flexor margin; propodus 15.6–25.1 times as long as wide, 4.8–9.0 times as long as dactylus.

ABDOMEN. Typical dorsal hump over third abdominal somite, sixth abdominal somite 0.71 times as long as carapace, 1.7 times as long as fifth somite, slightly shorter than telson.

TELSON (Fig. 8i). 2.7 times as long as wide, with four pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with a median process, distal setae short, lateral pair slightly shorter or longer than intermediate setae (5–8).

MALE PLEOPODS. P11 (Fig. 8j): endopod subtriangular, 1.6 times as long as wide, 0.20 times as long as exopod, with appendix interna placed at distal end. P12 (Fig. 8k): appendix masculina reaching 0.54 times length of endopod; appendix interna reaching 0.87 of appendix masculina.

PRE-ANAL CARINA (Fig. 8g). Without spine.

UROPODAL DIAERESIS (Fig. 8h). With 8–14 spinules.

EGGS (Fig. 8l). Size: 0.44–0.49 × 0.24–0.29 mm.

Habitat

This species prefers fresh and well-oxygenated waters. It is found from the middle to the higher course of rivers. They are more abundant in areas situated above waterfalls where predators are less numerous.

Colour pattern (Fig. 25G)

The colour of the body is hyaline with many red dots and oblique red bands.

Distribution

Caridina mertoni is known from Indonesia (Grand-Kei island and Waigeo (Roux 1928)) and the Solomon Islands (Kolombangara and Malaita).

Remarks

Our specimens from Solomon Islands look like the type specimens: rostrum with presence of 2–3 postorbital teeth (vs 2–5 in type specimens), 17–24 dorsal teeth (vs 20–23) and 4–9 ventral teeth (vs 4–7); P1 carpus 1.9–2.6 times as long as wide (vs. 2.0–2.5); P2 carpus 4.6–5.6 times as long as wide (vs 4.4–5.1). P3 dactylus with 5–6 spiniform setae (vs 5–6), propodus 4.8–6.7 times as long as dactylus (vs 4.5–5.9); P5 dactylus with about 27–39 spiniform setae (vs 36–44), propodus 18.2–25.1 times as long as width (vs 15.6–21.4) and dactylus 2.6–4.5 times as long as wide (vs 2.8–4.1); number of spinules on uropodal diaeresis 10–13 (vs 8–14); small eggs 0.44–0.49 × 0.28–0.29 (vs 0.44–0.46 × 0.24–0.26 mm). Some values given by Bouvier (1925) are also similar: P3 dactylus with 5–6 spiniform setae (vs 5–6

according to Bouvier (1925)), P5 dactylus with about 30–35 spiniform setae (vs 27–39), telson with 5 intermediate setae as long as or slightly longer than the lateral pair (vs 2–4 pairs of intermediate setae, lateral pair no longer than intermediate). The type specimens exhibit a shorter rostrum than those collected from Solomon Islands: 0.6–0.8 of cl (vs 0.9–1.1). However, the rostrum length widely used in *Caridina* taxonomy might not be as reliable as previously thought. It is highly plastic and varies with environmental parameters (de Mazancourt *et al.* 2017b).

***Caridina pisuku* sp. nov.**

[urn:lsid:zoobank.org:act:C2046392-256D-4485-8E85-8E94B9A37FF8](https://zoobank.org/act:C2046392-256D-4485-8E85-8E94B9A37FF8)

Figs 2M, 9

C. longirostris – Page *et al.* 2007: 647 (GenBank: DQ478506–DQ478507).

Caridina sp. 3 Solomon – de Mazancourt *et al.* 2019a: 166, 169–170.

Etymology

Named after the river Pisuku, in Choiseul Island, the type locality where this new species occurs. The name is used as a noun in apposition.

Material examined

Holotype

SOLOMON ISLANDS – **Choiseul Island** • ♂, cl 3.7 mm; Choiseul Island, Pisuku River, sector 1; 06°58.951' S, 156°46.582' E; 15 m a.s.l.; 10 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20862.

Paratypes

SOLOMON ISLANDS • 1 ♂, cl 3.7 mm; same collection data as for holotype; MNHN-IU-2014-20863 • 1 ♀ ovig., cl 5.6 mm; same collection data as for holotype; DNA voucher: CA1282; MNHN-IU-2014-20864 • 1 ♀ ovig., cl 5.8 mm; same collection data as for holotype; DNA voucher: CA1347; MNHN-IU-2014-20865 • 1 ♀, cl 4.8 mm; same collection data as for holotype; MNHN-IU-2014-20866 • 1 ♀, cl 5.0 mm; same collection data as for holotype; MNHN-IU-2014-20867 • 1 ♀, cl 5.1 mm; same collection data as for holotype; MNHN-IU-2014-20868 • 1 ♀, cl 5.0 mm; Pisuku River, sector 2; 06°58.900' S, 156°46.685' E; 66 m a.s.l.; 10 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20869 • 1 ♀, cl 5.1 mm; same collection data as for preceding; MNHN-IU-2014-20870 • 1 ♂, juvenile, cl 2.2 mm; Pisuku River, downstream; 06°58.848' S, 156°46.582' E; 12 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20871.

Other material

AUSTRALIA – **Queensland** • 1 ♂, cl 4.4 mm; Christian Creek; 17°20.100' S, 145°55.400' E; 34 m a.s.l.; 6 Jun. 2016; B. Mos leg.; MNHN-IU-2014-20873 • 1 ♀ ovig., cl 6.7 mm; same collection data as for preceding; DNA voucher: CA1685; MNHN-IU-2014-20874 • 1 ♂, cl 4.6 mm; Gordons Creek; 16°57.967' S, 145° 43.833' E; 39 m a.s.l.; 3 Jun. 2016; B. Mos leg.; DNA voucher: CA1699; MNHN-IU-2014-20875.

INDONESIA • tissue only; West Papua, Kayumera; 03°53.286' S, 134°28.658' E; 22 Oct. 2010; P. Keith leg.; MNHN-IU-2014-20872.

Comparative material

Caridina variabilirostris (de Mazancourt, Marquet & Keith, 2018)

See de Mazancourt *et al.* (2018a).

Caridina brachydactyla (De Man, 1908)

INDONESIA • lectotype (designated by Richard & Clark 2010), ♀ ovig., cl 4.8 mm; Flores Island, river near Reo; Nov. 1888; M. Weber leg.; RMNH Crust D. 977 • 2 paralectotypes, ♀♀ ovig., cl 5.3–5.4 mm; Flores Island, river in Mbawa; Jan. 1889; M. Weber leg.; RMNH 2552 • 1 ♀, cl 5.8 mm; Bali Island; NMB 1054a • 2 ♂♂, cl 2.7–3.7 mm, 1 ♀ ovig., cl 4.3 mm, 1 ♀, cl 4.8 mm; Sulawesi, Palopo, Macaui (locality code: 63.10); W. Klotz leg.; ZMB • 1 ♀ ovig., cl 4.0 mm; Sulawesi, Palopo, Tojo (locality code: 64.10); W. Klotz leg.; ZMB.

Caridina elongapoda (Liang & Yan, 1977)

CHINA • 3 ♂♂, cl 2.8–3.5 mm, 1 ♀, cl 4.2 mm; Hong Kong, Pak Tam Chung and Kai Sai Chau (locality codes 14.11 and 22.09); W. Klotz leg.; ZMB.

MALAYSIA • 1 ♂, cl 4.2 mm, 1 ♀, cl 4.3 mm, 1 ♀ ovig., cl 4.3 mm; Pulau Tioman, Sungai Asah; 24 Jun. 1997; Ng *et al.* leg.; ZRC 1998.0865.

Caridina peninsularis (Kemp, 1918)

MALAYSIA • lectotype (designated by Cai *et al.* 2007), ♂, cl 3.2 mm; Penang Island, Botanical Garden; Feb. 1916; N. Anandale leg.; MNHN-IU-2015-1749 • 1 paralectotype, ♀ ovig., cl 5.4 mm; same collection data as for lectotype; MNHN-IU-2015-1750 • 1 paralectotype, ♀, cl 3.4 mm, 1 paralectotype, ♀ ovig., cl 5.2 mm, 1 paralectotype, ♂, cl 3.9 mm; same collection data as for lectotype; NHM 1919.11.1.12-21 (1761124).

SINGAPORE • 1 ♀ ovig., cl 5.1 mm, 1 ♂, cl 4.2 mm; Tanglin [incorrectly spelt Tangtum in NHM register and on label, see Richard & Clark 2014]; 1958; Bedford and Lanchester leg.; NHM 1958.8.7.14–17 (1749569).

Caridina variabilis (de Mazancourt, Rogers & Keith, 2018)

See de Mazancourt *et al.* (2018b).

Caridina sundanella (Holthuis, 1978)

INDONESIA • 1 syntype, ♂, cl 3.6 mm, 1 syntype, ♀, cl 5.2 mm; Sumba Island, West Sumba, 4 km N of Waimangura, Waikamburu Brook, Station 450; 250 m a.s.l.; 19 Aug. 1949; E. Sutter and A. Bühler leg.; NMB 989a.

Description

CEPHALOTHORAX. Carapace (Fig. 9m) smooth, glabrous, with sharp antennal spine placed at lower orbital angle. Pterygostomial margin rounded. Antennular peduncle 0.64 (♀) – 0.80 (♂) times as long as carapace. Long rostrum (Fig. 9m–o), 0.8–1.1 of cl, 17–28 dorsal teeth closely set, leaving 0.20–0.80 of length unarmed distally, 1–3 post-orbital teeth present. 6–18 teeth present of ventral margin extending from proximal end either to tip or with short distal part unarmed. Number of dorsal teeth on rostrum behind first ventral tooth 11–21.

PEREIOPODS. Slender P1 (Fig. 9a): chela about 1.7–2.2 times as long as wide, dactylus 2.6–3.9 times as long as wide, 1.1–1.7 length of palm; carpus 1.4–2.6 times as long as wide with shallow excavation on anterior margin. P2 (Fig. 9b) more slender and longer than first pereopod: chela 2.2–2.6 times as long as wide, dactylus 3.9–5.2 times as long as wide, 1.2–2.1 times length of palm; carpus 4.8–5.7 times as long as wide. P3 (Fig. 9c): dactylus (Fig. 9e) 3.0–3.4 times as long as wide (terminal spiniform setae included), with 5–7 spiniform setae on flexor margin in addition to terminal one; propodus 10.6–17.9 times as long as wide, 4.1–6.2 times as long as dactylus. P5 (Fig. 9d): dactylus (Fig. 9f) 3.3–5.1 times as long as wide, with 22–46 spiniform setae on flexor margin; propodus 18.3–26.2 times as long as wide, 4.9–7.6 times as long as dactylus.

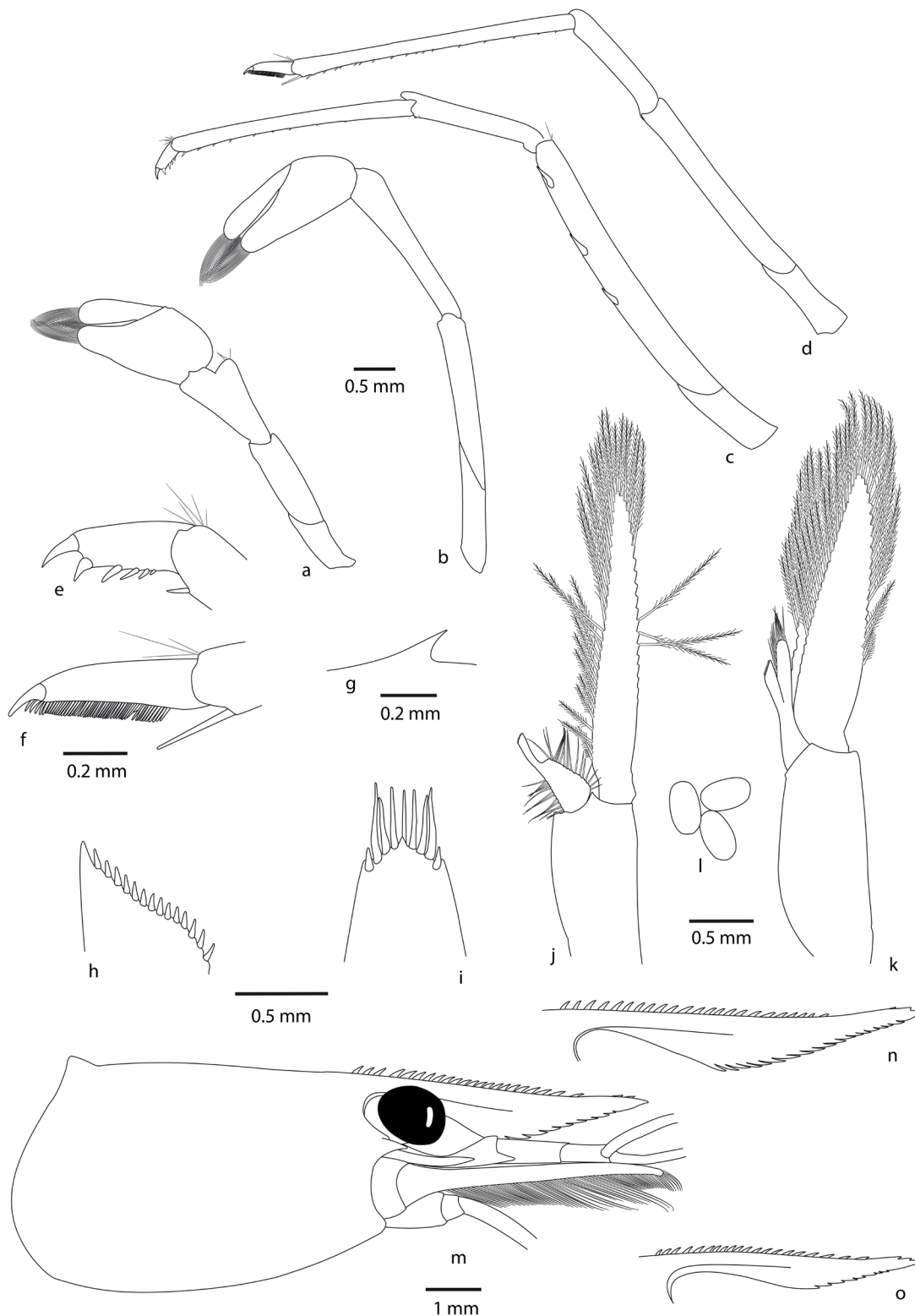


Fig. 9. *Caridina pisuku* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. **n–o.** Rostrum variations. MNHN-IU-2014-20865 (a–f, l), MNHN-IU-2014-20873 (g–h, j–k), MNHN-IU-2014-20864 (m), MNHN-IU-2014-20868 (i, n) and MNHN-IU-2014-20862 (o).

ABDOMEN. Typical dorsal hump over third abdominal somite. Sixth abdominal somite 0.64 as long as carapace, 1.6 times as long as fifth somite, slightly shorter than telson.

TELSON (Fig. 9i). 3.5 times as long as wide, four pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with median process, distal setae short, lateral pair slightly longer than intermediate setae (4–5).

MALE PLEOPODS. P11 (Fig. 9j): endopod subtriangular, 2.1 times as long as wide, 0.19 times as long as exopod, with appendix interna placed at distal end. P12 (Fig. 9k): appendix masculina reaching 0.60 times length of endopod; appendix interna reaching 0.66 of appendix masculina.

PRE-ANAL CARINA (Fig. 9g). With spine.

UROPODAL DIAERESIS (Fig. 9h). With 10–16 spinules.

EGGS (Fig. 9l). Size: 0.36–0.47 × 0.28–0.29mm.

Habitat

This species prefers fresh and well-oxygenated waters. It is found only in the lower course of rivers.

Colour pattern

Unknown.

Distribution

This species was found on Choiseul Island (Solomon Islands), Indonesia (West Papua) and Australia (Queensland).

Remarks

Caridina pisuku sp. nov. looks like *C. variabilis* and *C. variabilirostris* from Micronesia by the number of teeth and their placement on the rostrum, the proportions between the joints of pereopods and egg size. However, it can be distinguished by the presence of a spine on the pre-anal carina (vs the pre-anal carina always unarmed in *C. variabilis* and *C. variabilirostris*).

Caridina pisuku sp. nov. is most similar to *C. brachydactyla* De Man, 1908, *C. elongapoda* Liang & Yan, 1977, *C. mertoni* Roux, 1911, *C. peninsularis* Kemp, 1918 and *C. sundanella* Holthuis, 1978. In contrast to *C. elongapoda*, *C. mertoni* and *C. sundanella*, our new species has a spine on the pre-anal carina, like in *C. brachydactyla* and *C. peninsularis*, but its P2 chela is stouter 2.2–2.6 times as long as wide (vs 2.7–3.2 and 2.8–3.0, respectively).

Caridina pisuku sp. nov. looks like *C. choiseul* sp. nov. by the number of teeth and their placement on the rostrum, the proportions between the joints of pereopods, and the size of the eggs. However, the pre-anal carina always has a spine (vs the pre-anal with a spine or not in *C. choiseul* sp. nov.) and the pterygostomial margin is rounded (vs subrectangular).

Caridina typus species group

Diagnosis

Robust morphology with a straight rostrum, armed or not on the dorsal margin, without apical teeth, antennal spine fused with inferior orbital angle, antennular peduncle equal or more than half of carapace in length, pterygostomial margin blunt to rather narrowly rounded, stout walking legs, carpus of first

pereiopod excavated, short sixth abdominal somite (less than half of carapace length), high pre-anal carina with no spine or a small one, a great number of spinules on the uropodal diaeresis (>15), plumose terminal setae on the telson subequal to lateral ones or slightly longer, and a long subrectangular endopod of the first male pleopod with a short appendix on the subdistal outer margin.

Caridina typus H. Milne Edwards, 1837

Figs 2D, 10

Caridina typus H. Milne Edwards, 1837: 363, pl. 25, figs 4–5 (type locality: Mauritius).

Caridina exilirostris Stimpson, 1860: 98 (type locality: Okinawa (Loo Choo) Island, Ryukyu Islands, Japan).

Caridina typus f. *typica* Bouvier, 1925: 249–253, figs 271–297.

Caridina typus f. *caledonica* Bouvier, 1925: 253, figs 296–297 (type locality: New Caledonia).

Caridina typus – Richters 1880: 162, pl. 17, fig. 23. — De Man 1892: 367, pl. 21, fig. 22. — Holthuis 1965: 10–11, fig. 3. — Bossuyt *et al.* 2004: 480 (GenBank: AY708118). — Cai *et al.* 2006: 412–418, figs 13–15 (partim). — Page *et al.* 2007: 648–650 (Genbank: DQ478558–DQ478563). — de Mazancourt *et al.* 2019a: 166, 169–170.

Material examined

SOLOMON ISLANDS – **Choiseul Island** • 1 ♀, cl 3.8 mm; Creek 1; 06°59.085' S, 156°47.454' E; 132 m a.s.l.; 14 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; DNA voucher: CA1355; MNHN-IU-2018-2824 • 1 ♀, cl 4.0 mm; same collection data as for preceding; DNA voucher: CA1356; MNHN-IU-2018-2825. – **Kolombangara Island** • 1 ♂, cl 3.9 mm; Sulumuni River; 08°02.253' S, 157°09.257' E; 148 m a.s.l.; 12 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2826.

FEDERATED STATES OF MICRONESIA • 1 ♀, cl 3.6 mm; Pohnpei Island, Nanpil River, estuary; 06°56.683' N, 158°12.550' E; 5 m a.s.l.; 13 Mar. 2012; M. Castelin, P. Gerbeaux, P. Keith, G. Marquet and L. Taillebois leg.; MNHN-IU-2018-2837 • 1 ♀ ovig., cl 3.9 mm; same collection data as for preceding; MNHN-IU-2018-2838.

JAPAN • 1 ♀, cl 6.3 mm; Shikoku, Mugi, irrigation canal; 33°40.796' N, 134°26.024' E; 317 m a.s.l.; 16 Jun. 2017; M. Saito leg.; MNHN-IU-2018-2827 • 1 ♀, cl 6.7 mm; same collection data as for preceding; DNA voucher: CA1917; MNHN-IU-2018-2828.

MADAGASCAR • 1 ♀, cl 4.5 mm; Antsatoko River; 13°36.660' S, 50°00.341' E; 29 m a.s.l.; 6 Jul. 2008; C. Ellien, E. Feunteun, N. Mary and T. Robinet leg.; DNA voucher: CA1038; MNHN-IU-2018-2829 • 1 ♀ ovig., cl 6.9 mm; same collection data as for preceding; MNHN-IU-2018-2830 • 1 ♀ ovig., cl 7.1 mm; same collection data as for preceding; MNHN-IU-2018-2831.

MALAYSIA • 3 ♂♂, cl 8.0–8.5 mm; Pulau Langkavi, Sungai datai; 15 Mar. 2008; Schubart, Klaus and Koiler leg.; ZMB 28490.

NEW CALEDONIA • 1 ♀ ovig., cl 6.8 mm; Pirogues River; 22°11.208' S, 166°43.292' E; 102 m a.s.l.; 10 Nov. 2016; G. Marquet, P. Tiberghien and V. de Mazancourt leg.; MNHN-IU-2018-2832 • 1 ♀, cl 4.9 mm; Natoré River; 22°03.597' S, 166°53.983' E; 12 Nov. 2016; 5 m a.s.l.; G. Marquet, P. Tiberghien and V. de Mazancourt leg.; MNHN-IU-2018-2833.

PALAU • 1 ♀, cl 4.7 mm; Babeldaob Island, Ngerchokl River; 07°36.527' N, 134°36.958' E; 36 m a.s.l.; 27 Feb. 2011; M. Castelin, P. Gerbeaux, P. Keith, G. Marquet and L. Taillebois leg.; MNHN-

IU-2018-2839 • 1 ♀ ovig., cl 4.4 mm; same collection data as for preceding; MNHN-IU-2018-2840 • 1 ♀ ovig., cl 4.6 mm; same collection data as for preceding; MNHN-IU-2018-2841.

PAPUA NEW GUINEA – **New Britain** • 1 ♀ ovig., cl 8.7 mm; Walindi River; 05°21.187' S, 150°02.699' E; 30 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2018-2834 • 1 ♀ ovig., cl 5.8 mm; Rangih swamp; 05°34.549' S, 149°928.943' E; 24 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2018-2835 • 1 ♀ ovig., cl 6.4 mm; same collection data as for preceding; DNA voucher: CA2278; MNHN-IU-2018-2836.

SEYCHELLES • 1 ♀, cl 9.2 mm; Praslin Island, Nouvelle Découverte River; 04°19.200' S, 55°42.333' E; 16 m a.s.l.; 8 Oct. 2003; P. Bosc, H. Grondin, P. Keith and P. Valade leg.; MNHN-IU-2014-577.

SOUTH AFRICA • 1 ♀ ovig., cl 10.1mm; Umtata River; 31°55.511' S, 29°08.199' E; 2 m a.s.l.; 13 Feb. 2018; L. Maliwa, M. Mlambo, G. Marquet and P. Tiberghien leg.; MNHN-IU-2018-2843 • 1 ♂, cl 5.7 mm; Mpenjati River; 30°56.645' S, 030°13.660' E; 93 m a.s.l.; 15 Feb. 2018; P. Kubheka, N. McClurg, T. McClurg, L. Maliwa, M. Mlambo, G. Marquet and P. Tiberghien leg.; DNA voucher: CA2090; MNHN-IU-2018-2844.

VANUATU • 1 ♂, cl 3.9 mm; Epi Island, Buavinai River; 16°48.189' S, 168°11.084' E; 45 m a.s.l.; 27 Oct. 2014; A. Acou, D. Kalfatak, G. Marquet and M. Mennesson leg.; MNHN-IU-2018-2842.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Pterygostomian margin subrectangular. Rostrum (Fig. 10m): short, 0.3–0.6 of cl, reaching from end of basal segment to end of third segment of antennular peduncle, unarmed dorsally, ventral margin with 0–4 teeth. Eyes well developed. Prominent antennular keel. Antennular peduncle slender, 0.42 (♀)–0.54 (♂) times as long as carapace. Basal segment 0.50–0.54 times as long as length of the antennular peduncle, second segment 1.42–1.50 times as long as third. Stylocerite reaching 0.70–0.80 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 10a): chela about 1.9–2.7 times as long as wide, movable finger 1.9–3.9 times as long as wide, 0.6–1.3 times length of palm; carpus 1.0–2.2 times as long as wide. P2 (Fig. 10b) more slender and longer than first pereopod, with chela 2.4–3.3 times as long as wide: movable finger 3.8–5.4 times as long as wide, 1.3–1.8 times length of palm; carpus slender, 5.0–6.5 times as long as wide. P3 (Fig. 10c): stout, dactylus (Fig. 10e) 2.5–3.4 times as long as wide (terminal spiniform seta included), with 5–7 spiniform setae on flexor margin in addition to terminal one; propodus 7.9–10.0 times as long as wide, 3.6–4.6 times as long as dactylus. P5 (Fig. 10d): dactylus (Fig. 10f) 3.2–5.1 as long as wide, with 33–81 spiniform setae on flexor margin; propodus 10.4–16.9 times as long as wide, 3.2–5.7 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.43–0.48 times as long as carapace, 1.4 times as long as fifth somite, shorter than telson.

TELSON (Fig. 10i). 2.8 times as long as wide, with four to six pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with median process, rounded with 5–9 plumose intermediate setae subequal to lateral ones or slightly longer.

MALE PLEOPODS. P11 (Fig. 10j): endopod subrectangular, 3.6 times as long as wide, 0.44 times as long as exopod, with appendix interna, on subdistal outer margin, which reaches beyond distal end of endopod on a short length. P12 (Fig. 10k): appendix masculina elongated, reaching 0.59–0.76 times length of endopod; appendix interna reaching about 0.46–0.65 times appendix masculina length.

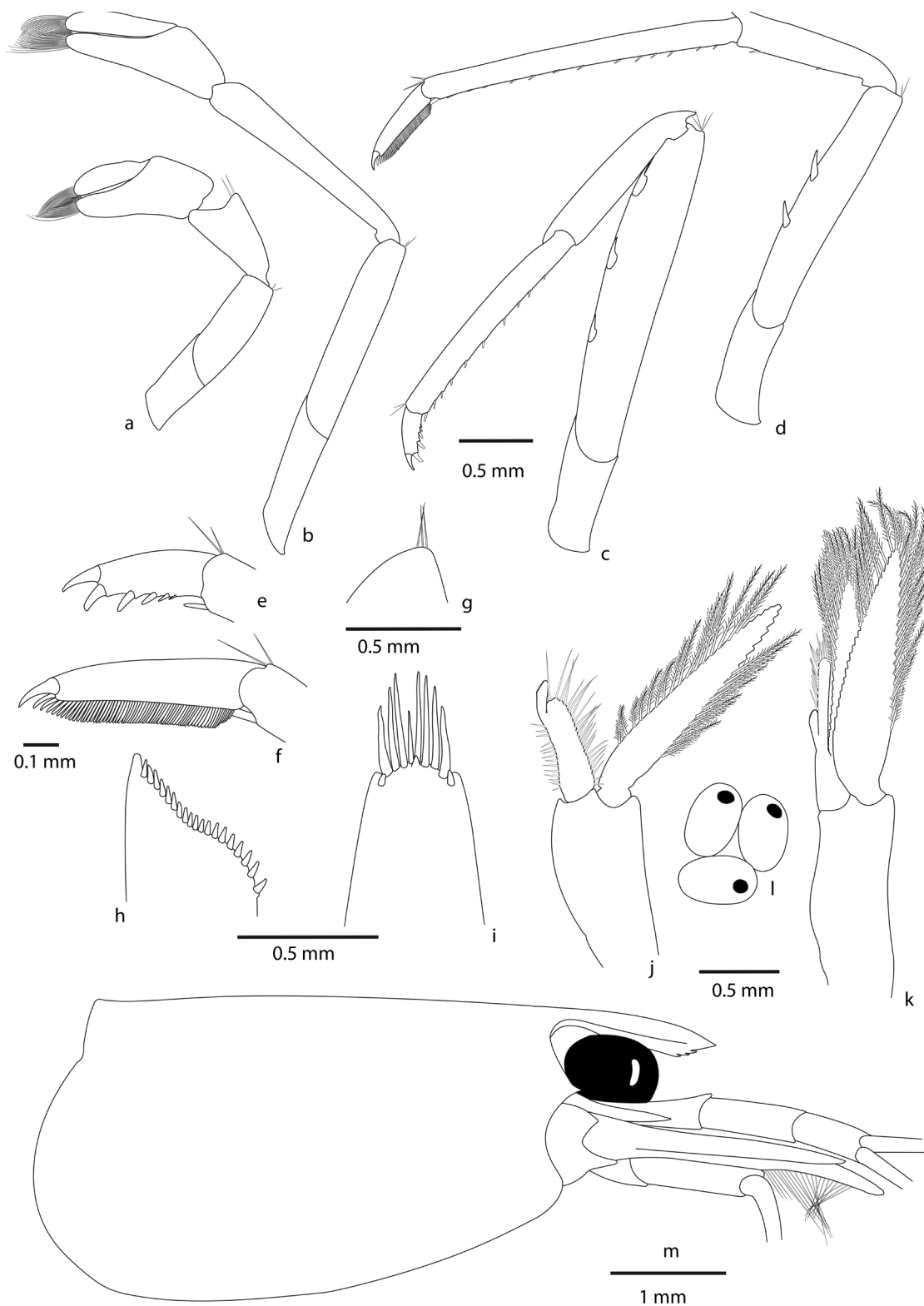


Fig. 10. *Caridina typus* H. Milne Edwards, 1837. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. MNHN-IU-2018-2825 (a–c, e, h), MNHN-IU-2018-2842 (d, f), MNHN-IU-2018-2826 (g, j–k), MNHN-IU-2018-2833 (i), MNHN-IU-2018-2832 (l) and MNHN-IU-2018-2824 (m).

PRE-ANAL CARINA (Fig. 10g). High, unarmed.

UROPODAL DIAERESIS (Fig. 10h). With 15–22 spinules.

EGGS (Fig. 10l). Size: 0.38–0.54 × 0.23–0.32 mm.

Habitat

This species is found from the lower to higher course of rivers (5–317 m). It can be found in areas where the current speed is low, rich in vegetation debris, as well as in zones where the current is strong.

Colour pattern

The colour of the body can vary from pink-orange to blackish brown, sometimes with a brown to white stripe on the back.

Distribution

Caridina typus, the type species of the genus, has a very wide distribution in the Indo-West Pacific area, ranging from South Africa, Madagascar and the Seychelles to Japan, Malaysia, Philippines, Australia, Micronesia (Pohnpei), Papua New Guinea, Solomon Islands, New Caledonia, Vanuatu and Fiji. In contrast to what Holthuis (1965) and Chace (1997) stated, *C. typus* does not occur in Polynesia, but a species allied to *C. jeani* Cai, 2010 (see below).

Remarks

According to Chace (1997) and Cai *et al.* (2006) the type locality of *C. typus* is unknown. Bouvier (1925) ensures that type specimens have been caught on Mauritius Island but were lost following a move in 1918 caused by bombardments of Paris.

Our specimens fit well with the descriptions of this species occurring in Japan by Cai *et al.* (2006) by its short rostrum reaching near the end to the third segment of the antennular peduncle (vs to end of second segment of antennular peduncle according to Cai *et al.* (2006)), unarmed dorsally and armed ventrally, with 0–4 teeth (vs 1–4). P1 carpus 1.0–2.2 (vs. 1.6); P2 carpus 5.0–6.5 (vs 5.0–6.2). P3 dactylus with 5–7 spiniform setae (vs 5–7), propodus 3.6–4.6 as long as dactylus (vs 3.7–4.4); P5 dactylus with about 33–81 spiniform setae (vs 60–77), propodus 10.4–16.9 times long as width (vs 11–14) and propodus 3.2–5.7 times as long as dactylus (vs 3.3–3.7); P11 endopod elongate, with distinct appendix interna near distal end of endopod; pre-anal carina lacking spine; telson terminating in posteromedian projection, lateral pair subequal (vs subequal). Uropodal diaeresis 15–22 (vs 19–24). Egg sizes 0.38–0.54 × 0.23–0.32 (vs 0.45–0.48 × 0.23–0.26).

Caridina turipi sp. nov.

[urn:lsid:zoobank.org:act:9DB3C416-1B20-4CF4-A3D2-CDC36AA8309C](https://zoobank.org/act:9DB3C416-1B20-4CF4-A3D2-CDC36AA8309C)

Figs 2C, 11

Caridina cf. *weberi* sp. 1 – de Mazancourt *et al.* 2019a: 166, 169–170.

Etymology

Named after the river Turipi, in Choiseul Island, the type locality where this new species occurs. The name is used as a noun in apposition.

Material examined

Holotype

SOLOMON ISLANDS • ♀, cl 5.9 mm; Choiseul Island, Turipi River; 07°00.661' S, 156°49.075' E; 51 m a.s.l.; 15 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; DNA voucher: CA1359; MNHN-IU-2014-20876.

Paratypes

SOLOMON ISLANDS – **Choiseul Island** • 1 ♀ ovig., cl 4.9 mm; same collection data as for holotype; MNHN-IU-2014-20877 • 1 ♀ ovig., cl 5.2 mm; same collection data as for holotype; MNHN-IU-2014-20878 • 1 ♀ ovig., cl 5.4 mm; same collection data as for holotype; MNHN-IU-2014-20879 • 1 ♀ ovig., cl 5.6 mm; same collection data as for holotype; MNHN-IU-2014-20880 • 1 ♀ ovig., cl 5.7 mm; same collection data as for holotype; MNHN-IU-2014-20881 • 1 ♀ ovig., cl 4.6 mm; Vorama River; MNHN-IU-2014-20882 • 1 ♀ ovig., cl 5.3 mm; 06°58.687' S, 156°46.745' E; 15 m a.s.l.; 11 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; DNA voucher: CA1349; MNHN-IU-2014-20883 • 1 ♀ ovig., cl 6.3 mm; Creek 2; 06°59.027' S, 156°47.913' E; 132 m a.s.l.; 14 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2014-20884.

Comparative material

Caridina sumatrensis (De Man, 1892)

INDONESIA • 1 syntype, ♀, cl 4.9 mm; Sumatra, Batak land, near Deli; Dec. 1890; C. Moesch leg.; MNHN-IU-2015-1758 • 1 ♀ ovig., cl 5.1 mm; Java; NMB 6.II.b.

THAILAND • 1 ♀ ovig., cl 4.8 mm; "Siam"; 1884; Harmand leg.; MNHN-IU-2015-1759.

VIETNAM • 1 ♀, cl 4.0 mm, 1 ♀ ovig., cl 4.0 mm; Conchinchina, forest ponds; Jul. 1884; Harmand leg.; MNHN-IU-2015-1760.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Pterygostomian margin rounded. Rostrum (Fig. 11k): straight, short, 0.4–0.5 of cl, reaching to end of second segment of antennular peduncle, armed with 11–15 teeth on dorsal margin, 2–4 of them situated on carapace behind orbital margin, ventral margin with 2–4 teeth. Eyes well developed, anterior end reaching to 0.76 length of basal segment of antennular peduncle. Antennular peduncle 0.37–0.50 times as long as carapace. Anterolateral angle reaching 0.36 length of second segment, second segment longer than third segment. Stylocerite reaching to 0.86 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 11a): chela about 1.9–2.1 times as long as wide, movable finger 2.6–3.0 times as long as wide, 0.9–1.0 times length of palm; carpus 1.5–1.8 times as long as wide. P2 (Fig. 11b) more slender and longer than first pereopod, with chela 2.6–3.1 times as long as wide: movable finger 4.6–4.9 times as long as wide, 1.5–2.1 times length of palm; carpus slender, 5.5–6.6 times as long as wide. P3 (Fig. 11c): stout, dactylus (Fig. 11e) 3.0–3.3 times as long as wide (terminal spiniform seta included) with 5–6 spiniform setae on flexor margin in addition to terminal one; propodus 8.8–10.5 times as long as wide, 4.1–4.7 times as long as dactylus. P5 (Fig. 11d): dactylus (Fig. 11f) 3.3–4.5 as long as wide, with 37–46 spiniform setae on flexor margin; propodus 13.5–15.3 times as long as wide, 4.1–5.2 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.43 times as long as carapace, 1.3 times as long as fifth somite, slightly shorter than telson.

TELSON (Fig. 11i). 2.3 times as long as wide, with four or five pairs of dorsal spinules and pair of dorsolateral spinules; posterior margin without median process, rounded, with 4–7 long intermediate setae longer than lateral ones.

MALE PLEOPODS. No males.

PRE-ANAL CARINA (Fig. 11g). High, unarmed.

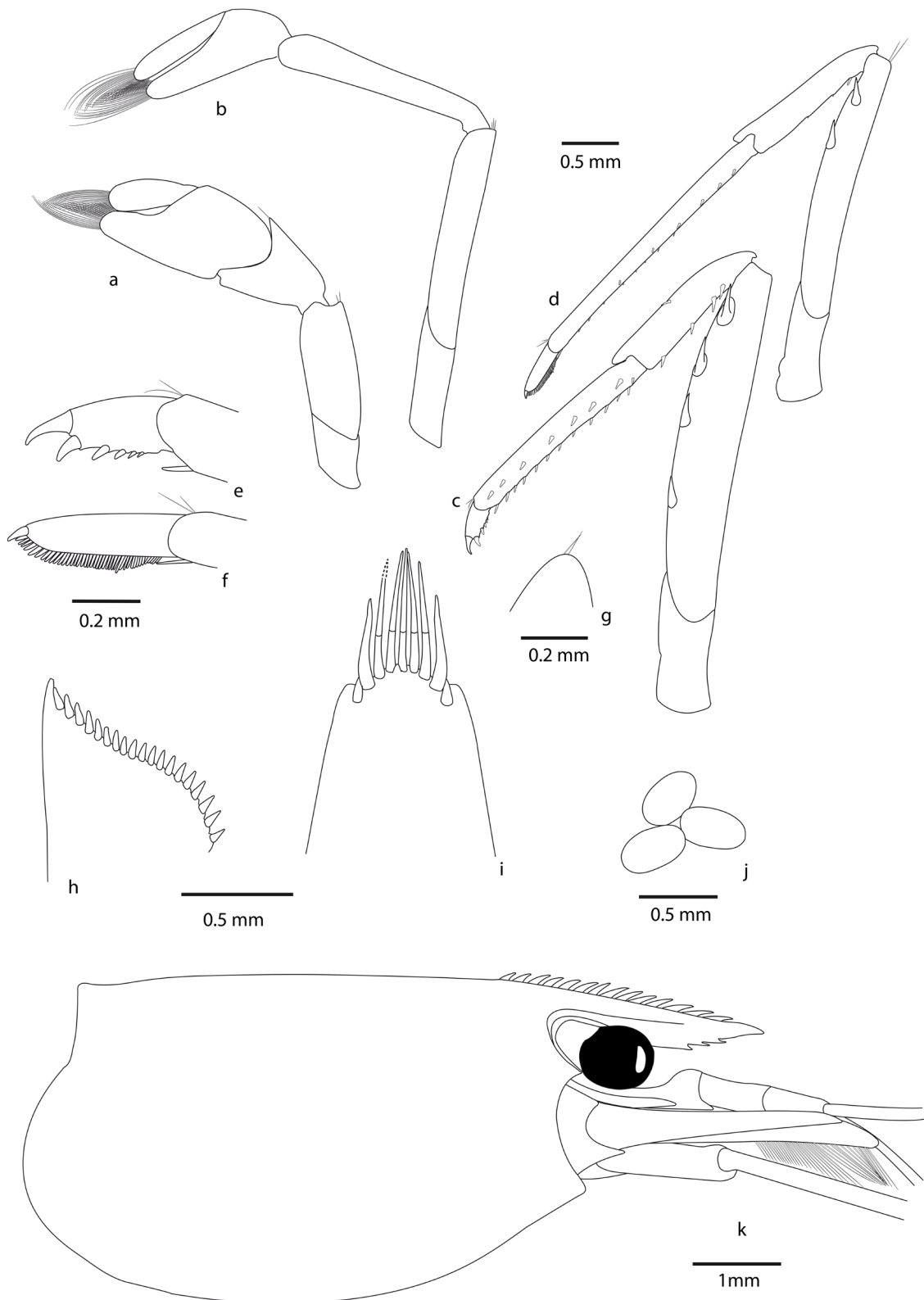


Fig. 11. *Caridina turipi* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** Eggs. **k.** Cephalothorax. MNHN-IU-2014-20883 (a–f, h, j–k), MNHN-IU-2014-20882 (g) and MNHN-IU-2014-20878 (i).

UROPODAL DIAERESIS (Fig. 11h). With 17–21 spinules.

EGGS (Fig. 11j). Size: 0.35–0.44 × 0.21–0.25 mm.

Habitat

This species is largely rheophile and prefers fresh and well-oxygenated waters from the lower to the higher course of rivers.

Colour pattern

Unknown.

Distribution

As far as we know, this species occurs only in Choiseul Island.

Remarks

This new species looks like *C. sumatrensis* De Man, 1892 by its number of dorsal teeth on the rostrum situated on carapace behind orbital margin 2–4 (vs 2–6 in *C. sumatrensis*) and the proportions between the joints of pereopods like P1 carpus 1.5–1.8 as long as wide (vs 1.6–2.0), P2 carpus 5.5–6.6 as long as wide (vs 5.2–6.4), P3 dactylus 3.0–3.3 as long as wide (vs 2.7–3.7), P5 dactylus 3.3–4.5 times as long as wide (vs 3.2–4.3). However, it differs by its rostrum that has fewer teeth the on dorsal margin, 11–15 (vs 15–22), as well as on its on the ventral margin, 2–4 (vs 2–7), its P1 chela is shorter, 1.9–2.1 times as long as wide (vs 2.0–2.4) and its P5 dactylus has more spiniform setae on the flexor margin, 37–46 (vs 36).

In contrast to previous definitions (Karge & Klotz, 2007), we consider that the *C. typus* group is not characterized by the absence of dorsal teeth on the rostrum. Bouvier (1925) includes many species with an armed rostrum in his “groupe du *C. typus*”; however, we consider some of them to be part of the *C. weberi* species group (see below).

According to our study, the length of setae on the telson (namely plumose terminal setae on the telson subequal to lateral ones or slightly longer) is a better criteria to characterize this group that agree with our molecular results (see de Mazancourt *et al.* 2019a where it appears as a monophyletic group). We thus consider some species like *C. turipi* or *C. sumatrensis* that have numerous dorsal teeth to be part of the *C. typus* group.

Caridina weberi species group

Diagnosis

Robust morphology with a straight or bent rostrum, armed or not on the dorsal margin, without apical teeth, the antennal spine fused with the inferior orbital angle, antennular peduncle equal to or more than half of carapace in length, pterygostomial margin rounded, stout walking leg segments, the carpus of the first pereopod often deeply excavated, a short sixth abdominal somite (around half of carapace length), a high pre-anal carina with no spine or a small one, a great number of spinules on the uropodal diaeresis (>15), long and plumose terminal setae on the telson clearly longer than lateral ones, and a long subrectangular endopod of the first male pleopod with a short appendix on the subdistal outer margin.

Caridina buehleri Roux, 1934

Figs 2W, 12, 26A

Caridina buehleri Roux, 1934: 219, figs 1–5 (type locality: Bimoun, New Ireland west coast, Papua New Guinea).

Caridina buehleri – de Mazancourt *et al.* 2019a: 166, 169–170.

Material examined

Holotype

PAPUA NEW GUINEA • ♀, cl 7 mm; New Ireland, Bimoun; F. Speiser, H. Hediger and A. Bühler leg.; NMB 822.

Other material

SOLOMON ISLANDS – **Kolombangara Island** • 1 ♀ ovig., cl 3.8 mm; Liva River; 08°03.863' S, 157°10.633' E; 11 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2015-18 • 1 ♀ ovig., cl 4.1 mm; Pipiro River; 07°53.083' S, 157°08.195' E; 13 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; DNA voucher: CA1520; MNHN-IU-2015-20 • 1 ♀ ovig., cl 4.3 mm; Vanga 2 River; 07°54.825' S, 156°57.762' E; 18 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2015-22 • 1 ♀ ovig., cl 2.8 mm; same collection data as for preceding; MNHN-IU-2016-5725 • 1 ♀ ovig., cl 4.5 mm; Vanga 1 River; 07°55.088' S, 156°57.624' E; 18 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2016-5726 • 1 ♀ ovig., cl 4.1 mm; Liva River; 08°03.863' S, 157°10.633' E; 11 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2016-28 • 1 ♀ ovig., cl 3.9 mm; Vagé River; 08°5.112' S, 156°59.867' E; 10 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2016-5732. – **Vella Lavella Island** • 1 ♀ ovig., cl 3.2 mm; Vala Kadju River; 07°49.860' S, 156°42.644' E; 17 m a.s.l.; 28 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2018-2845 • 1 ♀ ovig., cl 3.7 mm; Wariassi River; 29 Oct. 2016; P. Keith and C. Lord leg.; DNA voucher: CA1997; MNHN-IU-2018-2846.

PAPUA NEW GUINEA – **New Britain** • 1 ♀ ovig., cl 3.5 mm; Vaavu River; 05°22.584' S, 50°03.724' E; 30 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2018-2847 • 1 ♀ ovig., cl 4.0 mm; same collection data as for preceding; MNHN-IU-2018-2848 • 1 ♀ ovig., cl 4.2 mm; Walindi River; 05°21.187' S, 50°02.693' E; 30 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; DNA voucher: CA2252; MNHN-IU-2018-2849.

VANUATU • 1 ♀ ovig., cl 6.0 mm; Malekula Island, Brenwe River; 16°07.593' S, 167°16.779' E; 54 m a.s.l.; 20 Nov. 2008; P. Feutry, P. Keith, C. Lord and L. Taillebois leg.; DNA voucher: CA1014; MNHN-IU-2015-23.

Description

CEPHALOTHORAX. Antennal spine below suborbital angle. Pterygostomian margin sub rectangular. Rostrum (Fig. 12l): 0.4–0.7 of cl, reaching to distal end of antennular peduncle, armed with 13–16 teeth on dorsal margin, 2–5 of them situated on carapace behind orbital margin, ventral margin with 2–5 teeth. Eyes well developed, anterior end reaching to 0.66 length of basal segment of antennular peduncle. Antennular peduncle 0.50–0.55 (♀) times as long as carapace. Anterolateral angle reaching 0.30 length of second segment, basal segment of antennular peduncle longer than sum of second and third segment lengths, second segment distinctly longer than third segment. Stylocerite sharp, long, reaching to about half of second segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 12a): chela about 2.2–2.3 times as long as wide, movable finger 2.1–2.8 times as long as wide, 0.5–0.8 times length of palm; carpus 1.5–1.7 times as long as wide. P2 (Fig. 12b) more slender and longer than first pereopod, with chela 2.6–3.1 times as long as wide: movable finger 4.0–4.5 times as long as wide, 1.3–1.7 times length of palm; carpus slender, 5.5–6.2 times as long as wide. P3 (Fig. 12c): dactylus (Fig. 12e) 3.0–3.5 times as long as wide (terminal spiniform seta included) with 5–6 spiniform setae on flexor margin in addition to terminal one; propodus 9.0–10.2 times as long as wide, 3.6–4.4 times as long as dactylus. P5 (Fig. 12d): dactylus (Fig. 12f) 3.7–4.7 times as long as wide, with 27–33 spiniform setae on flexor margin; propodus 11.5–14.4 times as long as wide, 3.8–4.1 times as long as dactylus.

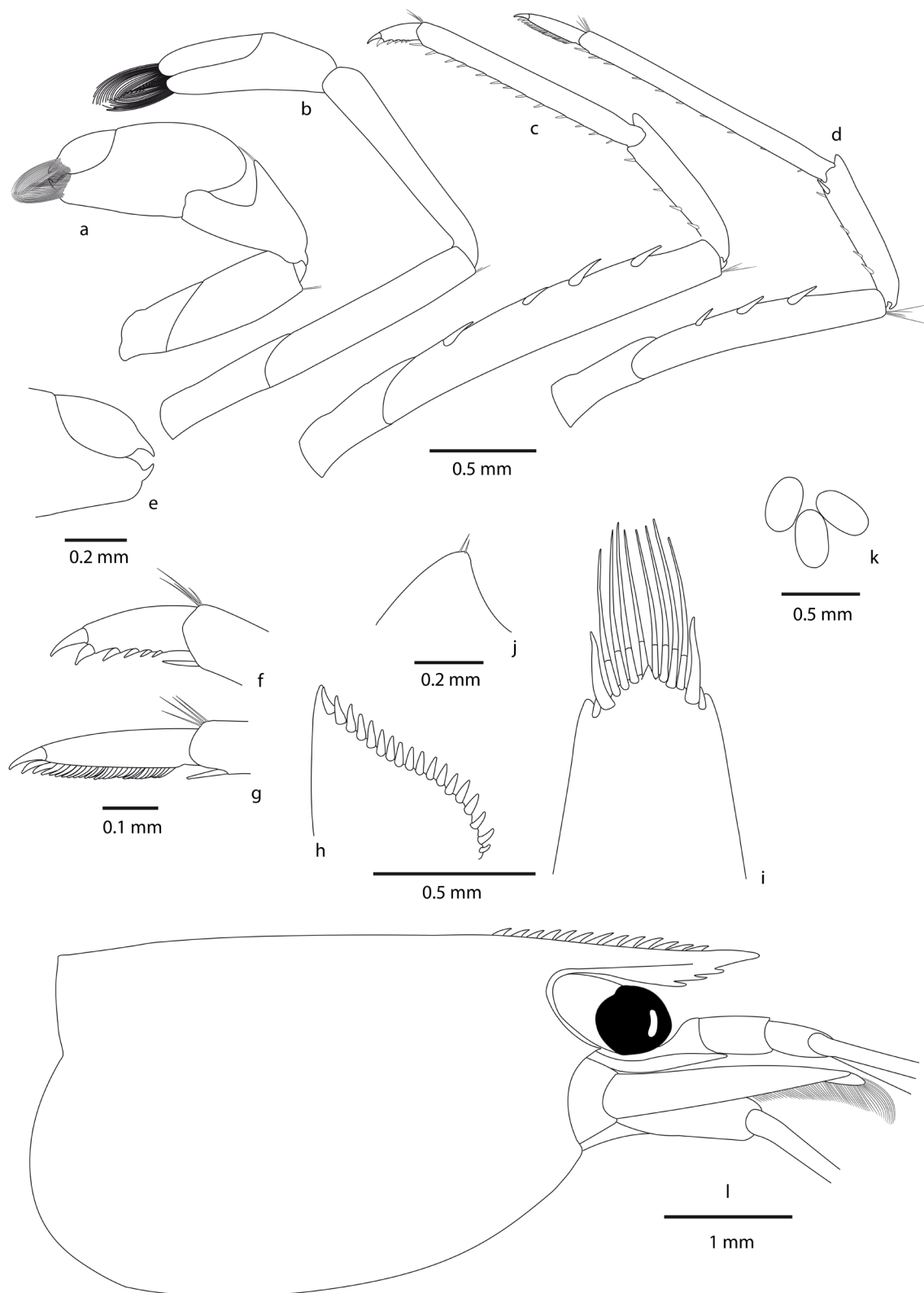


Fig. 12. *Caridina buehleri* Roux, 1934. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** Pre-anal carina. **k.** Eggs. **l.** Cephalothorax. MNHN-IU-2018-2845 (a–i, k), MNHN-IU-2015-20 (j) and MNHN-IU-2018-2846 (l).

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.47 times as long as carapace, 1.6 times as long as fifth somite, shorter than telson.

TELSON (Fig. 12i). 2.4 times as long as wide, with four pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with median process, broadly convex with 7–9 plumose intermediate setae much longer than lateral ones.

MALE PLEOPODS. No males.

PRE-ANAL CARINA (Fig. 12j). High, unarmed.

UROPODAL DIAERESIS (Fig. 12h). With 17–21 spinules.

EGGS (Fig. 12k). Size: 0.20–0.27 × 0.33–0.43.

Habitat

This species lives in a typical brackish water environment (brackishwater pools or lower part of rivers, near the estuary). The species is rarely found over the superior limit of the tide-influenced zone, and was not found in the true freshwater zone.

Colour pattern (Fig. 26A)

Body usually dark red to black, with a lighter dorsal band from the rostrum to the telson and sometimes white stripes on each abdominal somite.

Distribution

This species occurs in Solomon Islands (Kolombangara, Vella Lavella), in the Vanuatu archipelago (Malekula and Santo islands) and in Papua New Guinea (New Britain).

Remarks

de Mazancourt *et al.* (2017a) redescribed *C. buehleri* in detail, but their description actually represented two species: *C. buehleri* described by Roux *sensu stricto* and another species, *C. gueryi*, described by Marquet *et al.* 2009 and redescribed below. Indeed, our specimens fit well with the holotype from New Ireland (PNG) by its P5 dactylus 3.7–4.7 as long as wide (vs 3.6) with 27–33 spiniform setae on flexor margin (vs 30), propodus 11.5–14.4 times as long as wide (vs 9.4), 3.8–4.1 times as long as dactylus (vs 3.8).

***Caridina gueryi* Marquet, Keith & Kalfatak, 2009**
Figs 2X, 13, 26B

Caridina gueryi Marquet, Keith & Kalfatak, 2009: 159–166, figs 1–3 (type locality: unnamed river, 15°17'45.30" S, 167°9'35.98" E, Santo, Vanuatu).

Caridina buehleri – Klotz *et al.* 2007: 3–7.

Material examined

Holotype

VANUATU • ♀ ovig., cl 6.8 mm; Santo Island, unnamed river; 15°17'45.30" S; 167°9'35.98" E; 22 Jul. 2003; P. Keith and G. Marquet leg.; MNHN-IU-2015-1768.

Paratypes

VANUATU • 1 ♂, cl 3.6 mm; same collection data as for holotype; DNA voucher: CA2428; MNHN-IU-2015-1769 • 1 ♀ ovig., cl 6.0 mm; same collection data as for holotype; MNHN-IU-2015-1771 • 1 ♀ ovig., cl 5.5 mm; same collection data as for holotype; MNHN-IU-2015-1775.

Other material

SOLOMON ISLANDS – **Kolombangara Island** • 1 ♀ ovig., cl 4.3 mm; Jack Harbour River; 08°03.085' S, 157°10.945' E; 11 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; DNA voucher: CA1519; MNHN-IU-2015-19 • 1 ♀ ovig., cl 3.9 mm; Vagé River; 08°5.112' S, 156°59.867' E; 10 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2015-17 • 1 ♀ ovig., cl 4.5 mm; Vanga 1 River; 07°55.088' S, 156°57.624' E; 18 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2015-21.

INDONESIA • 1 ♀ ovig., cl 6.4 mm; Sulawesi, Luwuk Peninsula, W of Ampana, freshwater spring in Mallontong, brackish water pool (field code 70–05); 00°53.125' S, 121°31.371' E; 27 May 2005; M. Glaubrecht, T. von Rintelen and K. Zitzler leg.; ZMB 29000.

VANUATU • 3 ♀♀ ovig., cl 5–6 mm; Malekula Island, Brenwe River; 16°07.593' S, 167°16.779' E; 54 m a.s.l.; 20 Nov. 2008; P. Feutry, P. Keith, C. Lord and L. Taillebois leg.; MNHN-IU-2015-23.

Description

CEPHALOTHORAX. Antennal spine below suborbital angle. Pterygostomian margin sub rectangular. Rostrum (Fig. 13k): 0.5–1.4 of cl, reaching to or overreaching distal end of scaphocerite, armed with 9–17 teeth on dorsal margin, 3–5 of them situated on carapace behind orbital margin, ventral margin with 2–7 teeth. Eyes well developed, anterior end reaching to 0.63 length of basal segment of antennular peduncle. Antennular peduncle 0.56–0.57 (♀) times as long as carapace. Anterolateral angle reaching 0.33 length of second segment, basal segment of antennular peduncle longer than sum of second and third segment lengths, second segment distinctly longer than third segment. Stylocerite sharp, long, reaching to about half of second segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 13a–b): chela about 1.9–2.4 times as long as wide, movable finger 2.1–2.7 times as long as wide, 0.4–0.8 times length of palm; carpus 1.2–1.7 times as long as wide. P2 (Fig. 13c) more slender and longer than first pereopod, with chela 2.2–3.0 times as long as wide: movable finger 3.0–4.8 times as long as wide, 1.0–1.7 times length of palm; carpus slender, 4.2–6.7 times as long as wide. P3 (Fig. 13d): dactylus (Fig. 13f) 2.9–4.0 times as long as wide (terminal spiniform seta included), with 6–7 spiniform setae on flexor margin in addition to terminal one; propodus 8.1–14.0 times as long as wide, 3.5–5.3 times as long as dactylus. P5 (Fig. 13e): dactylus (Fig. 13g) 3.3–4.4 times as long as wide as with 26–31 spiniform setae on flexor margin; propodus 12.3–20.5 times as long as wide, 4.4–6.2 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.48 as long as carapace, 1.5 times as long as fifth somite, shorter than telson.

TELSON (Fig. 13j). 2.5 times as long as wide, with 5–6 pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with a median process, broadly convex with 7–12 plumose intermediate setae much longer than lateral.

MALE PLEOPODS. P11: endopod subtriangular, 2.9 times as long as wide, reaching 0.37 times length of endopod, with an appendix on subdistal outer margin which reaches beyond distal end of endopod with most of its length. P12: appendix masculina reaching 0.57 times length of endopod; appendix interna reaching 0.60 of appendix masculina.

PRE-ANAL CARINA (Fig. 13h). High, unarmed.

UROPODAL DIAERESIS (Fig. 13i). With 17–19 spinules.

EGGS. Size: 0.21–0.33 × 0.33–0.49.

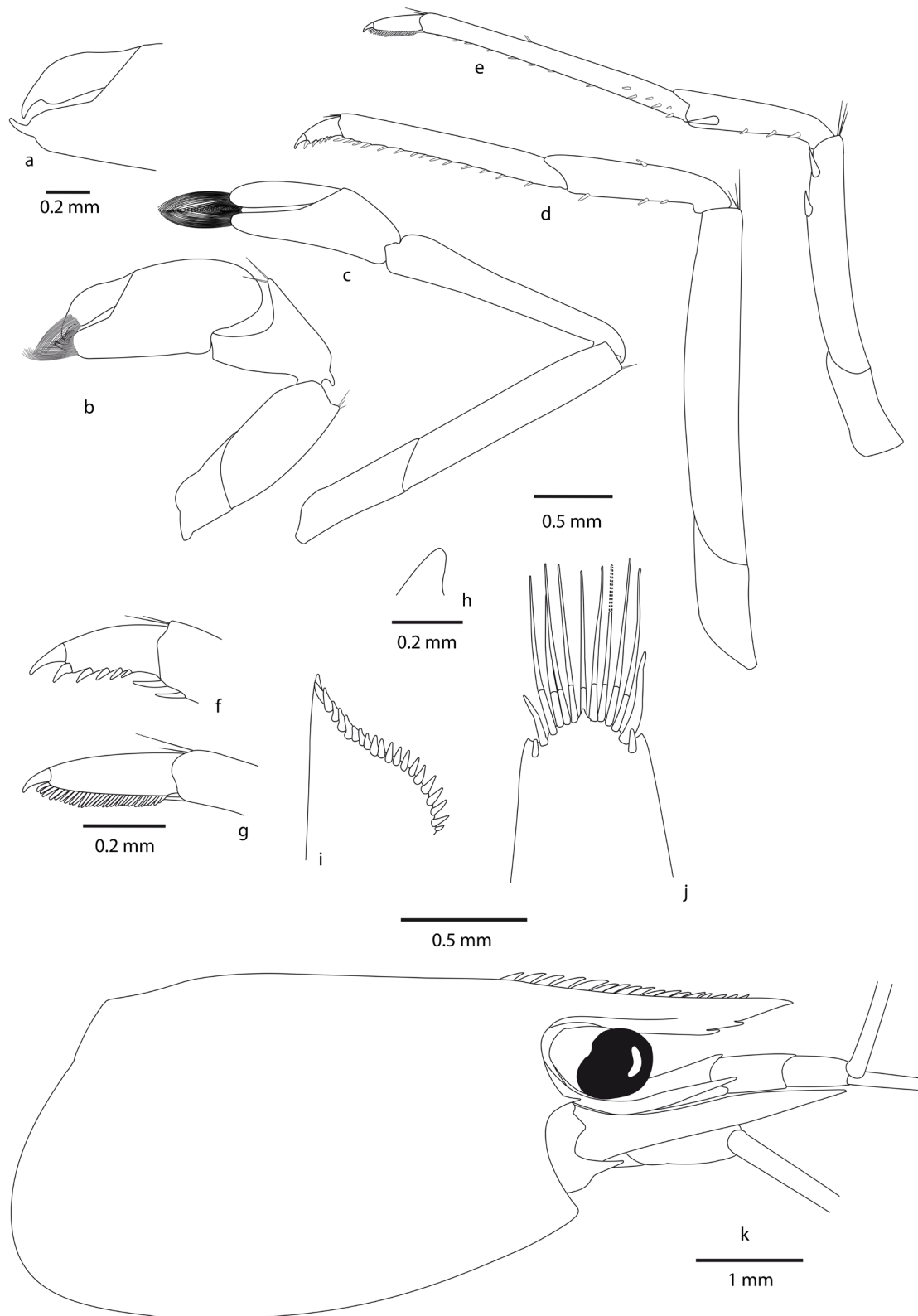


Fig. 13. *Caridina gueryi* Marquet, Keith & Kalfatak, 2009. **a.** Details of the fingers of the first pereiopod. **b.** First pereiopod. **c.** Second pereiopod. **d.** Third pereiopod. **e.** Fifth pereiopod. **f.** Dactylus of third pereiopod. **g.** Dactylus of fifth pereiopod. **h.** Pre-anal carina. **i.** Uropodal diaeresis. **j.** Telson. **k.** Cephalothorax. MNHN-IU-2015-19 (a-k).

Habitat

This species lives in a typical brackish water environment (brackishwater pools or lower part of rivers, near the estuary). The species is rarely found over the superior limit of the tide-influenced zone, and was not found in the true freshwater zone.

Colour pattern (Fig. 26B)

Body usually dark red to black, with a lighter dorsal band from the rostrum to the telson and sometimes white stripes on each abdominal somite.

Distribution

This species occurs in the Solomon Islands (Kolombangara), in the Vanuatu archipelago (Malekula and Santo Islands) and in Indonesia (Sulawesi).

Remarks

Our specimens are distinguished from the holotype of *C. buelheri* from New Ireland by its long P5 propodus, 12.3–20.5 times as long as wide (vs short P5 propodus 9.4 in the holotype of *C. buelheri*) and 4.4–6.2 times as long as the dactylus (vs 3.8). In contrast, they fit well with the holotype of *C. gueryi* from Santo (vs 12.3–15.9 and 4.6–5.2 in the holotype of *C. gueryi*, respectively). However, if we include other specimens of *C. buelheri*, the characters overlap, which is the reason why we previously mistakenly placed them in synonymy (de Mazancourt *et al.* 2017a). These two species can thus be considered to be cryptic.

According to our molecular results, studied specimens from Sulawesi, the Solomon Islands and the Vanuatu archipelago belong to *C. gueryi*.

Caridina papuana Nobili, 1905 Figs 2N, 14, 26E

Caridina weberi var. *papuana* Nobili, 1905: 481, pl. XII, fig. 1.

Caridina weberi var. *papuana* – Roux 1917: 591; 1928: 204–205; 1934: 221–222. — Bouvier 1925: 246.

Caridina cf. *weberi papuana* – Page *et al.* 2007: 649 (GenBank: DQ478543–DQ478544).

Caridina papuana – de Mazancourt *et al.* 2019a: 166, 169–170.

Material examined

Lectotype (here designated)

PAPUA NEW GUINEA • ♂, 3.2 mm; “German New Guinea”, Stephansort, in a small stream in the forest; L. Biró leg.; HNHN 1124-1893.

Paralectotypes

PAPUA NEW GUINEA • 4 ♂♂, cl 2.5–3.1 mm, 2 ♀♀ ovig., cl 4.1–4.6 mm; same collection data as for holotype; HNHN 1124-1893.

Other material

SOLOMON ISLANDS – **Choiseul Island** • 1 ♂, cl 3.2 mm; Creek 1; 06°59.085' S, 156°47.454' E; 132 m a.s.l.; 14 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-2850 • 1 ♂, cl 3.3 mm; Creek 2; 06°59.085' S, 156°47.913' E; 93 m a.s.l.; 14 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-2851 • 1 ♂, cl 3.6 mm; same collection data as for preceding; MNHN-IU-2018-2852 • 1 ♀, cl 3.2 mm; same collection data as for preceding; MNHN-IU-2018-2853

• 1 ♀, cl 5.1 mm; same collection data as for preceding; MNHN-IU-2018-2854 • 1 ♀ ovig., cl 4.6 mm; same collection data as for preceding; MNHN-IU-2018-2855 • 1 ♀ ovig., cl 3.4 mm; Lopakare River; 07°01.613' S, 156°46.567' E; 20 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; DNA voucher: CA1361; MNHN-IU-2018-2856 • 1 ♀ ovig., cl 3.4 mm; same collection data as for preceding; MNHN-IU-2018-2857 • 1 ♀ ovig., cl 3.4 mm; same collection data as for preceding; MNHN-IU-2018-2858 • 1 ♀ ovig., cl 3.5 mm; same collection data as for preceding; MNHN-IU-2018-2859 • 1 ♀ ovig., cl 3.6 mm; same collection data as for preceding; MNHN-IU-2018-2860 • 1 ♀, 4.6 mm; same collection data as for preceding; MNHN-IU-2018-2861 • 1 ♀, 4.6 mm; same collection data as for preceding; DNA voucher: CA1286; MNHN-IU-2018-2862 • 1 ♀, cl 5.0 mm; Pisuku River, sector 1; 06°58.951' S, 156°46.582' E; 15 m a.s.l.; 10 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-2863 • 1 ♀ ovig., cl 4.1 mm; Gu'ma River; 07°01.764' S, 156°49.899' E; 50 m a.s.l.; 17 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-2864 • 1 ♀ ovig., cl 5.3 mm; same collection data as for preceding; MNHN-IU-2018-2865 • 1 ♀, cl 4.7 mm; same collection data as for preceding; MNHN-IU-2018-2866.

Comparative material

Caridina weberi De Man, 1892

INDONESIA • 3 syntypes, 2 ♂♂, cl 4.4–4.5 mm, 1 ♀ ovig., cl 6.1 mm; Flores Island, Kotting; Dec. 1888; M. Weber leg.; MNHN-IU-2015-1755.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Pterygostomian margin rounded. Rostrum (Fig. 14m): curved down, short, 0.3–0.4 of cl, sometimes reaching middle of second segment of antennular peduncle, armed with 9–11 teeth on dorsal margin, 0–1 of them situated on carapace behind orbital margin, ventral margin with 2–4 teeth. Eyes well developed, anterior end reaching to 0.67 length of basal segment of antennular peduncle. Antennular peduncle 0.66 times as long as carapace. Anterolateral angle reaching 0.30 length of second segment, second segment of equal length with third segment. Stylocerite reaching to 0.8 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 14a): chela about 1.9–2.1 times as long as wide, movable finger 2.6–3.2 times as long as wide, 0.7–0.9 times length of palm; short carpus 1.3–1.5 times as long as wide. P2 (Fig. 14b) More slender and longer than first pereopod, with chela 2.2–2.5 times as long as wide: movable finger 4.3–5.0 times as long as wide, 1.6–2.0 times length of palm; carpus slender, 4.2–5.1 times as long as wide. P3 (Fig. 14c): stout, dactylus (Fig. 14e) 3.0–3.2 times as long as wide (terminal spiniform seta included), with 5–6 spiniform setae on flexor margin in addition to terminal one; propodus 8.9–10.7 times as long as wide, 3.8–4.5 times as long as dactylus. P5 (Fig. 14d): dactylus (Fig. 14f) 2.8–3.9 as long as wide, with 25–31 spiniform setae on flexor margin, first setae enlarged; propodus 12.1–15.1 times as long as wide, 4.2–5.0 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite about half length of carapace, 1.7 times as long as fifth somite, slightly shorter than telson.

TELSON (FIG. 14i). 2.6 times as long as wide, with four or five pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin without a median process, rounded, with 5–9 very long intermediate setae longer than lateral.

MALE PLEOPODS. P11 (Fig. 14j): endopod subrectangular, 3 times as long as wide, reaching 0.43 times length of endopod, with an appendix on subdistal outer margin which reaches beyond distal end of endopod on a short length. P12 (Fig. 14k): appendix masculina reaching 0.76 times length of endopod; appendix interna reaching 0.64 of appendix masculina.

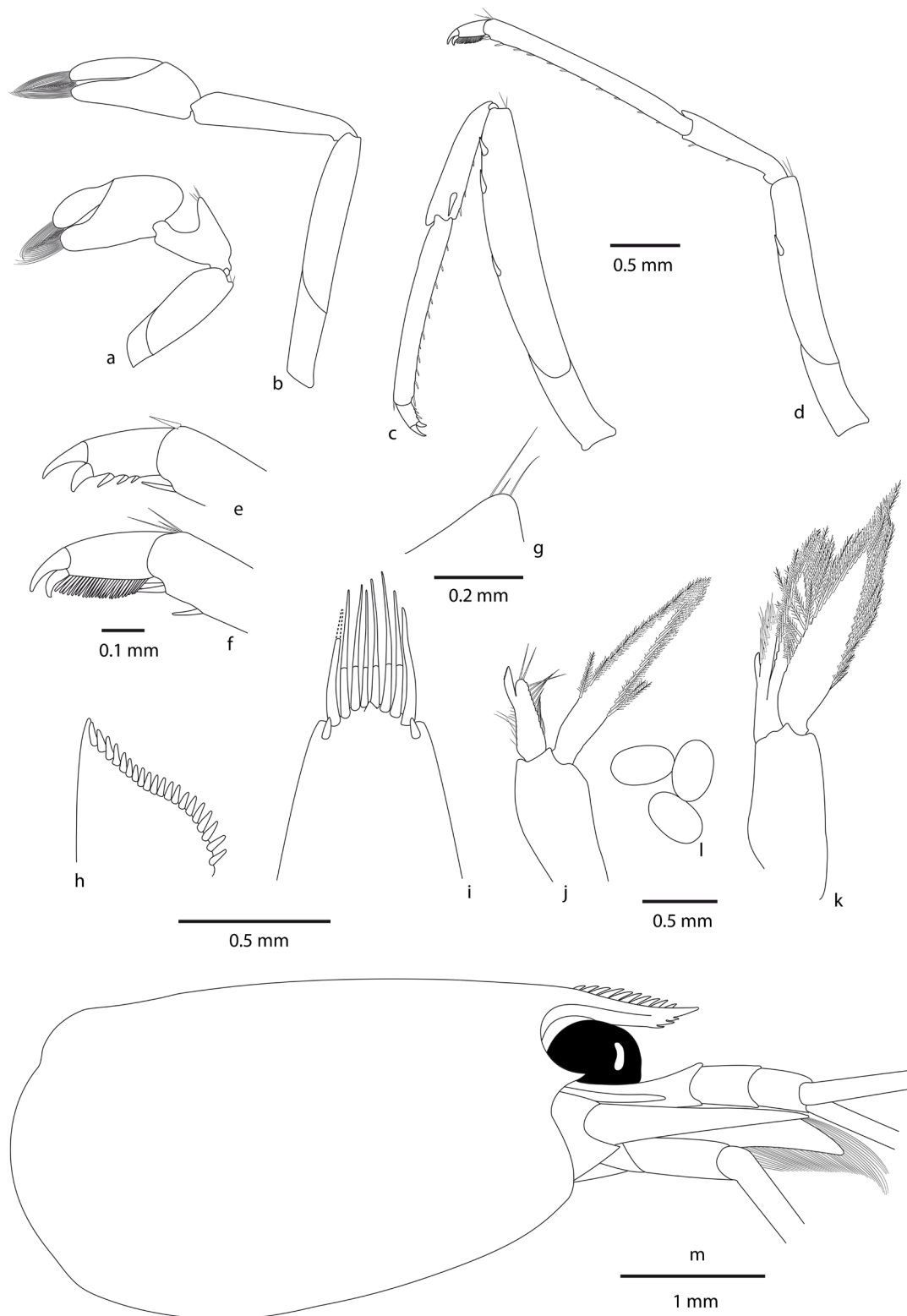


Fig. 14. *Caridina papuana* Nobili, 1905. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. MNHN-IU-2018-2856 (a–f, l), MNHN-IU-2018-2850 (g, j–k) and MNHN-IU-2018-2857 (h, m), MNHN-IU-2018-2859 (i).

PRE-ANAL CARINA (Fig. 14g). High, unarmed.

UROPODAL DIAERESIS (Fig. 14h). With 14–21 spinules.

EGGS. Size: 0.36–0.44 × 0.21–0.26mm.

Habitat

This species is largely rheophile and prefers fresh and well-oxygenated waters from the lower to the higher course of rivers.

Colour pattern (Fig. 26E)

Body dark all over, sometimes with a white dorsal band running from the rostrum to the telson.

Distribution

This species occurs in the Solomon Islands (Choiseul) and in Papua New Guinea.

Remarks

All former mentions of this taxa were subspecific; given the results of our study, we decided to erect it to specific level (de Mazancourt *et al.* 2019a). Our specimens fit well with the types from Papua New Guinea: Rostrum curved down, short, 0.3–0.4 of cl (vs 0.4 in type specimens) sometimes reaching middle of the second segment of the antennular peduncle, armed with 9–11 teeth on the dorsal margin (vs 9–14), 0–1 of them situated on the carapace behind the orbital margin (vs 0), ventral margin with 2–4 teeth (vs 2–5); P1 carpus 1.3–1.5 times as long as wide (vs. 1.4–1.7); P2 carpus 4.2–5.1 times as long as wide (vs 4.5–5.5); P3 dactylus with 5–6 spiniform setae (vs 5), propodus 3.8–4.5 times as long as dactylus (vs 4.3); P5 dactylus with 25–31 spiniform setae (vs 25); uropodal diaeresis 14–21 (vs 17–19); small eggs, 0.36–0.44 × 0.21–0.26 mm (vs 0.33–0.38 × 0.24–0.29); appendix interna on the endopod of the male first pleopod. Some specimens from Gu'ma River have one tooth situated on the carapace behind the orbital margin. However, their P5 are similar to those of *C. papuana*, with the dactylus 3.5 times as long as wide (vs 2.8–3.9), with 27 spiniform setae on the flexor margin (vs 25–31) and propodus 12.1 times as long as wide (vs 12.1–15.1), 4.4 times as long as dactylus (vs 4.2–5.0).

Caridina weberi De Man, 1892

Figs 2T, 15, 26C

Caridina weberi De Man, 1892: 371, pl. 22, fig. 23a (type locality: Kotting, Flores, Indonesia).

Caridina weberi – Bouvier 1925: 242, figs. 562–571. — Roux 1928: 203–204. — Cai & Ng 2001: 666, fig. 3.

Caridina cf. weberi sp. 2 – de Mazancourt *et al.* 2019a: 166, 169–170.

Not *Caridina weberi* Edmondson, 1935: 8; figs 3a–f.

Material examined

Syntypes

INDONESIA • 2 ♂♂, cl 4.4–4.5 mm, 1 ♀ ovig., cl 6.1 mm; Flores Island, Kotting; Dec. 1888; M. Weber leg.; MNHN-IU-2015-1755.

Other material

SOLOMON ISLANDS – **Kolombangara Island** • 1 ♀ ovig., cl 6.4 mm; Sulumuni River; 08°02.253' S, 157°09.257' E; 148 m a.s.l.; 12 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; DNA voucher:

CA1516; MNHN-IU-2018-2867. – **Malaita Island** • 1 ♂, cl 3.5 mm; Tanana River; 09°17.383' S, 167°07.012' E; 276 m a.s.l.; 16 Jun. 2015; D. Boseto leg.; DNA voucher: CA1511; MNHN-IU-2018-2868 • 1 ♂, cl 3.7 mm; same collection data as for preceding; MNHN-IU-2018-2869 • 1 ♂, cl 3.8 mm; same collection data as for preceding; MNHN-IU-2018-2870.

PAPUA NEW GUINEA – **New Britain** • 1 ♂, cl 4.6 mm; Bereme village, Huvenganga River; 05°45.187' S, 150°35.0014' E; 19 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2018-2871 • 1 ♂, cl 5.3 mm; same collection data as for preceding; MNHN-IU-2018-2872 • 1 ♀ ovig., cl 6.8 mm; same collection data as for preceding; MNHN-IU-2018-2873 • 1 ♀ ovig., cl 7.5 mm; same collection data as for preceding; DNA voucher: CA2254; MNHN-IU-2018-2874 • 1 ♀ ovig., cl 6.2 mm; Bereme district, Galaku River; 05°45.187' S, 150°35.0014' E; 20 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2018-2875 • 1 ♀ ovig., cl 6.5 mm; Bereme district, Wogan River; 05°45.187' S, 150°35.0014' E; 21 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; DNA voucher: CA2244; MNHN-IU-2018-2876.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Pterygostomian margin rounded. Rostrum (Fig. 15m): straight, short, 0.4 of cl, reaching to base or near middle of second segment of antennular peduncle, armed with 11–23 teeth on dorsal margin, 0–2 of them situated on carapace behind orbital margin, ventral margin with 2–5 teeth. Eyes well developed, anterior end reaching to 0.7 times length of basal segment of antennular peduncle. Antennular peduncle 0.64 times as long as carapace. Anterolateral angle reaching 0.21 length of second segment, second segment longer than third segment. Stylocerite reaching to 0.75 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 15a): chela about 2.0–2.3 times as long as wide, movable finger 2.6–4.1 times as long as wide, 0.8–1.5 times length of palm; carpus 1.4–2.0 times as long as wide. P2 (Fig. 15b) more slender and longer than first pereopod, with chela 2.5–2.9 times as long as wide: movable finger 3.9–5.1 times as long as wide, 1.3–1.7 times length of palm; carpus slender, 4.8–5.5 times as long as wide. P3 (Fig. 15c): stout, dactylus (Fig. 15e) 2.8–37 times as long as wide (terminal spiniform seta included), with 6–8 spiniform setae on flexor margin in addition to terminal one; propodus 9.5–12.7 times as long as wide, 4.0–4.6 times as long as dactylus. P5 (Fig. 15d): dactylus (Fig. 15f) 3.9–5.2 times as long as wide, with 47–66 spiniform setae on flexor margin; propodus 13.3–19.3 times as long as wide, 3.8–4.5 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite about half length of carapace, 1.7 times as long as fifth somite, reaching 0.84 times length of telson.

TELSON (Fig. 15i). 2.6 times as long as wide, with five to seven pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with median process, rounded, with 6–11 very long intermediate setae longer than one or two lateral ones.

MALE PLEOPODS. P11 (Fig. 15j): endopod of male subrectangular, 2.5 times as long as wide, reaching 0.40 length of endopod, with an appendix on distal outer margin which reaches beyond distal end of endopod on a short length. P12 (Fig. 15k): appendix masculina reaching 0.57 times length of endopod; appendix interna reaching 0.75 of appendix masculina.

PRE-ANAL CARINA (Fig. 15g). High, unarmed.

UROPODAL DIAERESIS (Fig. 15h). With 17–21 spinules.

EGGS. Ovigerous females with eggs size: 0.35–0.42 × 0.19–0.25mm.

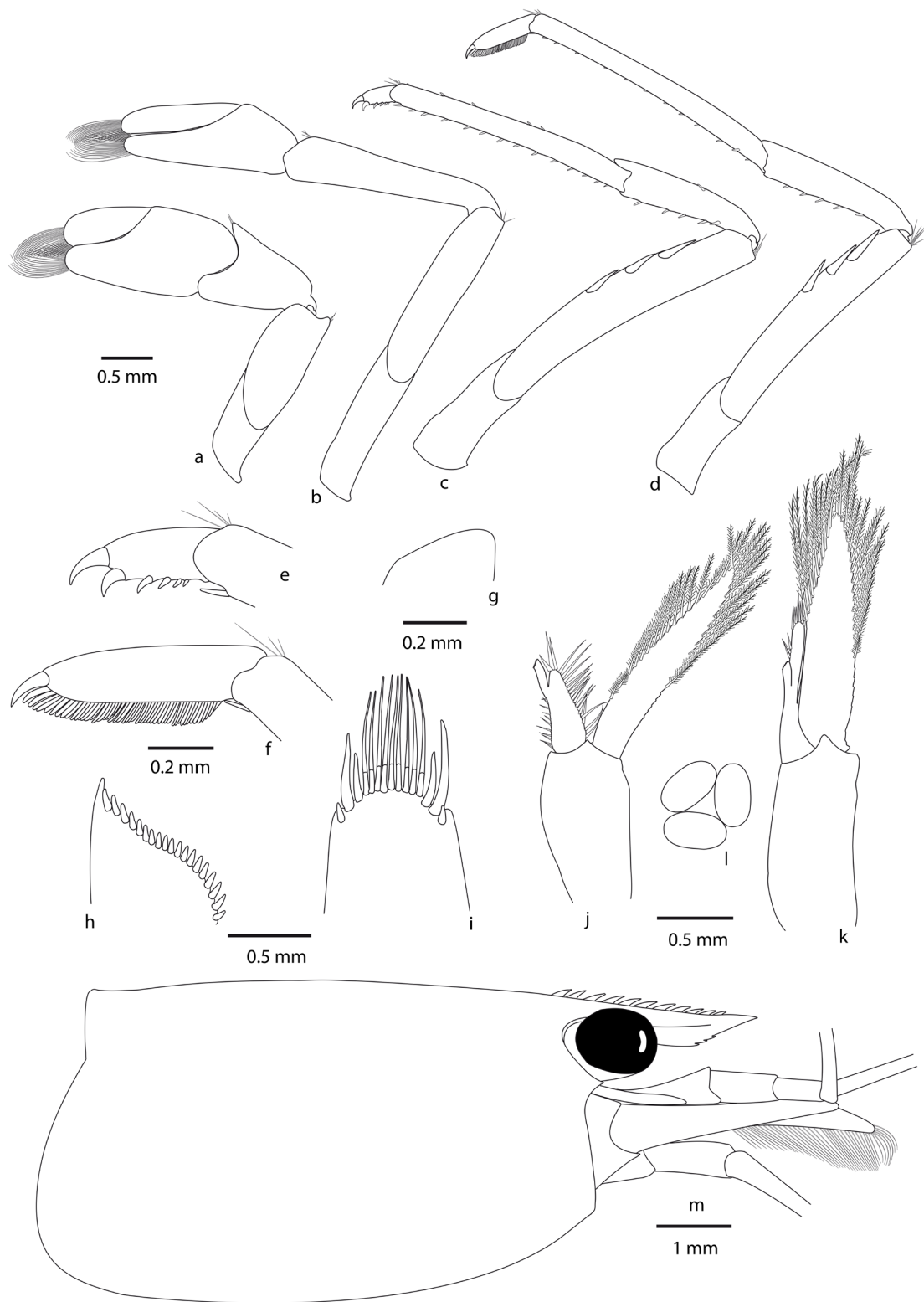


Fig. 15. *Caridina weberi* De Man, 1892. **a.** First pereopod. **b.** Second pereopod. **c.** Third pereopod. **d.** Fifth pereopod. **e.** Dactylus of third pereopod. **f.** Dactylus of fifth pereopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. MNHN-IU-2018-2867 (a–i, l–m) and MNHN-IU-2018-2870 (j–k).

Habitat

This species is largely rheophile and prefers fresh and well-oxygenated waters from the higher course of rivers (148–276 m a.s.l.).

Colour pattern (Fig. 26C)

Body covered in small dots, several red stripes, sometimes with a white dorsal band running from the rostrum to the telson.

Distribution

This species occurs in Indonesia (Sumba, Halmahera), Papua New Guinea (New Britain) and the Solomon Islands (Kolombangara and Malaita).

Remarks

Our specimens fit well with the types, described by De Man (1892) from Flores, by its P1 carpus 1.4–2.0 times as long as wide (vs 1.9–2.1 in type specimens); by its P2 carpus 4.8–5.5 times as long as wide (vs 4.9–5.4); by its P3 dactylus 2.8–3–7 times as long as wide (terminal spiniform seta included) (vs 3.2) with 6–8 spiniform setae on the flexor margin in addition to the terminal one (vs 6–7), propodus 9.5–12.7 times as long as wide (vs 9.0), 4.0–4.6 times as long as dactylus (vs 3.5–3.9); by its P5 dactylus 3.9–5.2 as long as wide (vs 4.6) with 47–66 spiniform setae on the flexor margin (vs 60–65), propodus 13.3–19.3 times as long as wide (vs 15.6) and 3.8–4.5 times as long as dactylus (vs 3.6); by its telson with one or two pairs of setae, lateral pair of setae distinctly longer than sublateral pair, both shorter than 6–11 intermediate setae (vs 8); by its eggs size 0.35–0.42 × 0.19–0.25 mm (vs 0.39–0.40 × 0.23–0.26 mm).

Our specimens are also similar to *C. weberi* as described by Cai & Ng (2001) from Halmahera (Indonesia) in the shape of the rostrum, which is straight, reaching to base or near middle of second segment of antennular peduncle (see Fig. 3A–B) with 0–2 teeth situated on carapace behind orbital, and also by its telson with two pairs of setae, lateral pair of setae distinctly longer than sublateral pair, both shorter than intermediate setae (see Fig. 3C–E), its P5 dactylus with 47–66 spiniform setae on flexor margin (vs 55 according to Cai & Ng (2001)), and by its eggs size 0.35–0.42 × 0.19–0.25 mm (vs 0.4–0.2 mm). However, the rostrum has more teeth (0–2) 11–23/2–5 (vs (1–2) 13–14/2–3), P1 carpus longer 1.4–2.0 (vs 1.3), P5 propodus 3.8–4.5 times as long as dactylus (vs 5.0). We consider the observed differences to be within an intra-specific range.

It is also similar to *C. weberi* as described by Roux (1928) from Sumba by its rostrum formula (0–2) 11–23/2–5 (vs (1–2) 12–19/2–6 according to Roux (1928)), by its P1 carpus 1.4–2.0 times as long as wide (vs 1.5–2.1), its chela about 2.0–2.3 times as long as wide (vs 2–2.1), its P2 carpus 4.8–5.5 times as long as wide (vs 5–5.7), its P2 chela about 2.5–2.9 times as long as wide (vs 2.8–3.1), its P3 dactylus 2.8–3.7 times as long as wide (terminal spiniform seta included) (vs 3.1–3.8), with 6–8 spiniform setae on flexor margin in addition to the terminal one (vs 6–7), its P3 propodus 4.0–4.6 times as long as dactylus (vs 4.5–5.4), P5 dactylus 3.9–5.2 as long as wide (vs 4.4–5), with 47–66 spiniform setae (vs 62–70) on flexor margin, and its eggs size 0.35–0.42 × 0.19–0.25 mm (vs 0.35–0.38 × 0.20–0.21 mm). However, its P5 propodus is longer 3.8–4.5 times as long as the dactylus (vs 3.4–3.6). We think that the observed differences are also within an intra-specific range.

Caridina tupaia de Mazancourt, Marquet & Keith, 2019

Figs 2S, 16

Material examined

SOLOMON ISLANDS – **Choiseul Island** • 1 ♂, cl 3.2 mm; Creek 2; 06°59.085' S, 156°47.454' E; 93 m a.s.l.; 14 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-2877 • 1 ♂, cl 3.4 mm; same collection data as for preceding; MNHN-IU-2018-2878 • 1 ♂, cl 3.6 mm; same

collection data as for preceding; MNHN-IU-2018-2879 • 1 ♂, cl 3.6 mm; same collection data as for preceding; MNHN-IU-2018-2880 • 1 ♂, cl 3.9 mm; same collection data as for preceding; MNHN-IU-2018-2881 • 1 ♀, cl 3.5 mm; same collection data as for preceding; DNA voucher: CA1927; MNHN-IU-2018-2882 • 1 ♀ ovig., cl 4.5 mm; same collection data as for preceding; MNHN-IU-2018-2884 • 1 ♀ ovig., cl 5.2 mm; Creek 1; 06°59.085' S, 156°47.454' E; 132 m a.s.l.; 14 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-2885. – **Malaita Island** • 1 ♂, cl 3.6 mm; Tanana River; 09°17.383' S, 167°07.012' E; 276 m a.s.l.; 16 Jun. 2015; D. Boseto leg.; DNA voucher: CA1508; MNHN-IU-2018-2886 • 1 ♂, cl 3.1 mm; small tributary close to Nunubala Camp; 09°00.056' S, 160°51.893' E; 23 Jun. 2015; 315 m a.s.l.; D. Boseto leg.; MNHN-IU-2018-2887.

Description

See de Mazancourt *et al.* (2019b).

Habitat

This species is largely rheophile and prefers fresh and well-oxygenated waters from the lower course to the higher course of rivers.

Colour pattern

The live general colour of the body is yellowish and slightly translucent. Numerous red spots are visible all over the body. Sometimes, a lighter longitudinal dorsal band is present stretching from the rostrum to the telson (see de Mazancourt *et al.* 2019b).

Distribution

This species seems to have a wide distribution: Solomon Islands (Malaita and Choiseul), Fiji, Samoa, Cook (Rarotonga) and French Polynesia (Society and Austral archipelagos).

Remarks

Recently de Mazancourt *et al.* (2019b) have revised the species of the *C. weberi* group from Polynesia. Contrary to what Edmondson (1935) wrote, *C. weberi* does not occur in Polynesia but four other species of the *C. weberi* complex. Among these species, one also occurs in the Solomon Islands: *C. tupaia*.

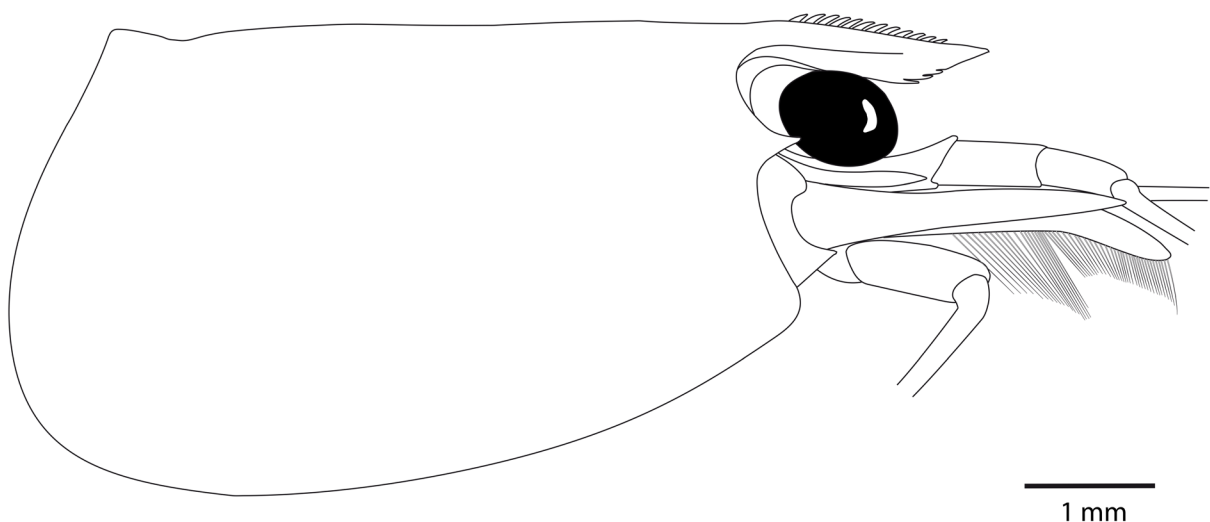


Fig. 16. *Caridina tupaia* de Mazancourt, Marquet & Keith, 2019. Cephalothorax. MNHN-IU-2018-2884.

Curiously, although the dorsal teeth of the rostrum are situated all along its length, with sometimes 1–3 of them situated on the carapace behind the orbital margin in French Polynesia, in Samoa (Upolu) and the Cook Islands, specimens from the Solomon Islands have dorsal teeth situated considerably anterior to the orbital margin with none of them situated on the carapace behind the orbital margin (see Fig. 16).

Caridina maeana sp. nov.

urn:lsid:zoobank.org:act:36785008-1E93-4AE5-8162-238D2560E30C

Figs 2O, 17, 26F–H

Caridina cf. *weberi* sp. 4 – de Mazancourt *et al.* 2019a: 166, 169–170.

Etymology

This new species is named after the local name of the type locality, River Maeana. The name is used as an apposition.

Material examined

Holotype

SOLOMON ISLANDS • ♂, cl 3.6 mm; Malaita Island, Maeana River; 09°00.056' S, 160°51.893' E; 315 m a.s.l.; 23 Jun. 2015; D. Boseto leg.; DNA voucher: CA1509; MNHN-IU-2018-2888.

Paratypes

SOLOMON ISLANDS – **Malaita Island** • 1 ♂, cl 3.1 mm; same collection data as for holotype; MNHN-IU-2018-2889 • 1 ♂, cl 3.3 mm; same collection data as for holotype; MNHN-IU-2018-2890 • 1 ♂, cl 3.4 mm; same collection data as for holotype; MNHN-IU-2018-2891 • 1 ♂, cl 3.5 mm; same collection data as for holotype; MNHN-IU-2018-2892 • 1 ♂, cl 3.5 mm; same collection data as for holotype; MNHN-IU-2018-2893 • 1 ♂, cl 4.0 mm; same collection data as for holotype; MNHN-IU-2018-2894. – **Choiseul Island** • 1 specimen; Sicata River; 07°22.477' S, 157°20.109' E; 46 m a.s.l.; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2495; MNHN • 1 specimen; same collection data as for preceding; DNA voucher: CA2496; MNHN.

Other material

VANUATU • 1 ♀ ovig., cl 5.3 mm; Santo Island, Pelouva River; 14°58.685' S, 166°38.757' E; 279 m a.s.l.; 15 Nov. 2006; P. Gerbeaux, P. Keith and C. Lord leg.; DNA voucher: CA1417; MNHN-IU-2018-2895.

Comparative material

Caridina weberi var. *keiensis* (Roux, 1911)

INDONESIA • lectotype (selected by Y. Cai, accepted here), ♀ ovig., cl 5.7 mm; Kei Besar, Warka; 5 June 1908; H. Merton leg.; NMB 6.IV.b • 2 paralectotypes, 2 ♂♂, cl 2.6 mm; same collection data as for lectotype; NMB 6.IV.a • 2 paralectotypes, 1 ♀, cl 5.5 mm, 1 ♂, cl 3.4 mm; same collection data as for lectotype; NMB 6.IV.b.

Caridina parvirostris (De Man, 1892)

INDONESIA • 2 syntypes, ♂♂, cl 3.1–3.2 mm; Flores Island, river near Bombang; Jan. 1889; M. Weber leg.; MNHN-IU-2015-1748 • 1 syntype, ♀, cl 4.2 mm; same collection data as for preceding; MNHN-IU-2015-1754.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Pterygostomian margin rounded. Rostrum (Fig. 17m): bent down, short, 0.3–0.5 of cl, reaching to base or middle of second

segment of antennular peduncle, armed with 8–13 teeth on dorsal margin, all on rostrum considerably anterior to orbital margin, ventral margin with 2–5 teeth. Eyes well developed, anterior end reaching to 0.75 length of basal segment of antennular peduncle. Antennular peduncle 0.70 times as long as carapace. Anterolateral angle reaching 0.20 length of second segment, second segment longer than third segment. Stylocerite reaching to 0.62 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 17a): chela about 2.0–2.2 times as long as wide, movable finger 3.1–3.93 times as long as wide, 1.0–1.3 times length of palm; carpus 1.4–1.8 times as long as wide. P2 (Fig. 17b) more slender and longer than first pereopod, with chela 2.3–2.6 times as long as wide: movable finger 4.6–4.9 times as long as wide, 1.6–2.0 times length of palm; carpus slender, 5.0–5.4 times as long as wide. P3 (Fig. 17c): stout, dactylus (Fig. 17e) 2.4–3.1 times as long as wide (terminal spiniform seta included), with 5–7 spiniform setae on flexor margin in addition to terminal one; propodus 8.6–9.2 times as long as wide, 3.9–5.2 times as long as dactylus. P5 (Fig. 17d): dactylus (Fig. 17e) 2.4–4.4 times as long as wide, ending in two large claws, with 35–47 spiniform setae on flexor margin; propodus 13.0–17.7 times as long as wide, 4.4–6.0 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.49 times as long as carapace, 1.6 times as long as fifth somite, slightly shorter than telson.

TELSON (Fig. 17i). 3 times as long as wide, with four or five pairs of dorsal spinules and one pair of dorsolateral spinules; posterior margin with median process, rounded, with 6 very long intermediate setae longer than lateral.

MALE PLEOPODS. P11 (Fig. 17j): endopod subrectangular, 2.5 times as long as wide, reaching 0.41 length of endopod, with appendix on subdistal outer margin which reaches beyond distal end of endopod on short length. P12 (Fig. 17k): appendix masculina reaching 0.70 times length of endopod; appendix interna reaching 0.64 times length of appendix masculina.

PRE-ANAL CARINA (Fig. 17g). High, unarmed.

UROPODAL DIAERESIS (Fig. 17h). With 16–19 spinules.

EGGS (Fig. 17l). Size: 0.49–0.50 × 0.29–0.30 mm.

Habitat

This new species is largely rheophile and prefers fresh and well-oxygenated waters in the higher course of rivers (279–315 m a.s.l.).

Colour pattern (Fig. 26F)

The general colour is blueish overall, reddish on the cephalothorax with many red dots all over the body.

Distribution

This species occurs in the Solomon Islands (Malaita and Choiseul) and Vanuatu (Santo Island).

Remarks

This species looks like *C. weberi keiensis* from Kei Besar Island (Indonesia) by its rostrum with 8–13 dorsal teeth (vs 2–13 in *C. w. keiensis*), all of them on the rostrum, considerably anterior to the orbital margin, and its P5 dactylus ending in two large claws. However, the P2 dactylus is longer, 4.6–4.9 times as long as wide (vs 3.2–4.1), as is the P2 carpus, 5.0–5.4 (vs 3.5–4.5).

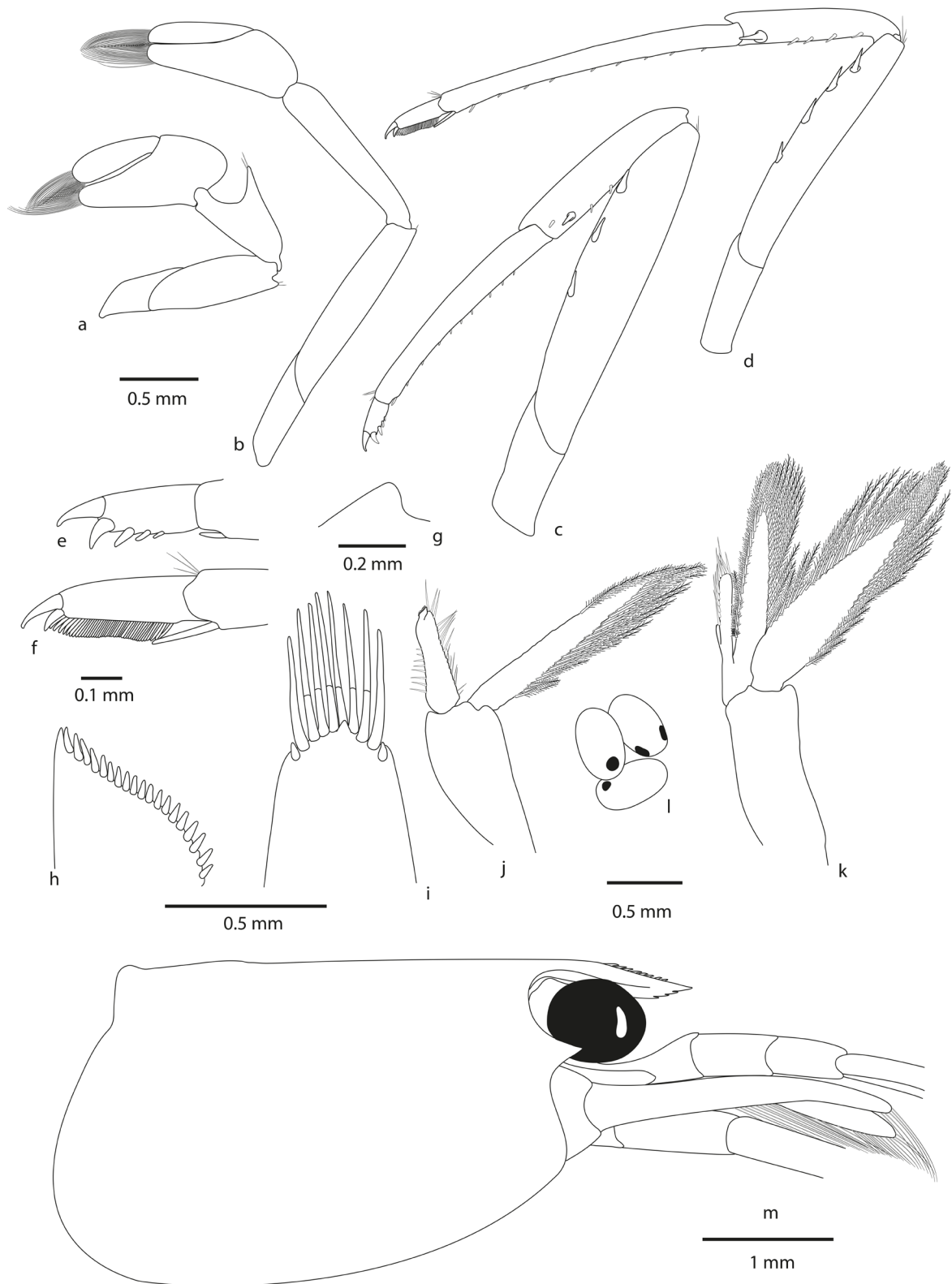


Fig. 17. *Caridina maeana* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. MNHN-IU-2018-2889: (a–i, m), MNHN-IU-2018-2891 (j–k) and MNHN-IU-2018-2895 (l).

This species also looks like *C. parvirostris* (De Man, 1892) from Flores (Indonesia) by its rostrum with 8–13 dorsal teeth (vs 8–10 in *C. parvirostris*), but the P2 carpus is shorter, 5.0–5.4 times as long as wide (vs 6.0–7.4), as is the P2 chela, 2.3–2.6 (vs 2.6–3.0), and its P5 ends in two large claws (vs one claw).

Caridina piokerai sp. nov.

[urn:lsid:zoobank.org:act:CF802FC0-547B-4E48-A7D5-9E99A4561F9D](https://zoobank.org/urn:lsid:zoobank.org:act:CF802FC0-547B-4E48-A7D5-9E99A4561F9D)

Figs 2U, 18

Caridina cf. *weberi* sp. 5 – de Mazancourt *et al.* 2019a: 166, 169–170.

Etymology

This species is dedicated to Piokera S. Holland (Ecological Solutions Solomon Islands team member) who helped with the sampling in Kolombangara Island.

Material examined

Holotype

SOLOMON ISLANDS • ♀, cl 3.5 mm; Kolombangara Island, Poitete River; 07°53.077' S, 157°07.776' E; 13 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; DNA voucher: CA1909; MNHN-IU-2018-2896.

Paratypes

SOLOMON ISLANDS – **Kolombangara Island** • 1 ♀ ovig., cl 2.9 mm; Vagé River; 08°06.640' S, 157°00.1674' E; 59 m a.s.l.; 10 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2897 • 1 ♀ ovig., cl 3.1 mm; same collection data as for preceding; MNHN-IU-2018-2898 • 1 ♀ ovig., cl 3.3 mm; same collection data as for preceding; MNHN-IU-2018-2899 • 1 ♀ ovig., cl 2.9 mm; Liva River; 08°03.881' S, 157°10.421' E; 11 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2900 • 1 ♀ ovig., cl 3.6 mm; Sulumuni River; 08°02.253' S, 157°09.257' E; 148 m a.s.l.; 12 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2901 • 1 ♀ ovig., cl 3.3 mm; Vanga 1 River; 07°55.088' S, 156°57.624' E; 18 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2902. – **Choiseul Island** • 1 ♀ ovig., cl 3.1 mm; Lopakare River; MNHN-IU-2018-2903 • 1 ♀, cl 3.9 mm; 07°01.613' S, 156°46.567' E; 50 m a.s.l.; 20 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; DNA voucher: CA1930; MNHN-IU-2018-2904. – **Vella Lavella Island** • 1 ♀ ovig., cl 2.6 mm; Vala Kadju River; MNHN-IU-2018-2905 • 1 ♀ ovig., cl 2.8 mm; 07°49.860' S, 156°42.644' E; 17 m a.s.l.; 28 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2019-125 • 1 ♀, cl 3.2 mm; Maravari River; 07°51.703' S, 156°41.768' E; 81 m a.s.l.; 31 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2018-2907 • 1 ♀ ovig., cl 2.8 mm; same collection data as for preceding; MNHN-IU-2018-2908 • 1 ♀ ovig., cl 3.2 mm; same collection data as for preceding; MNHN-IU-2018-2909 • 1 ♀ ovig., cl 3.2 mm; same collection data as for preceding; MNHN-IU-2018-2910 • 1 ♀ ovig., cl 2.1 mm; same collection data as for preceding; DNA voucher: CA1981; MNHN-IU-2018-2911.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Pterygostomian margin rounded. Rostrum (Fig. 18k): straight or bent down, short, 0.3–0.5 of cl, reaching to second segment of antennular peduncle, armed with 9–13 teeth on dorsal margin, 0–1 of them situated on carapace behind orbital margin, ventral margin with 1–4 teeth. Eyes well developed, anterior end reaching to 0.66 length of basal segment of antennular peduncle. Antennular peduncle 0.50 times as long as carapace. Anterolateral angle reaching 0.33 length of second segment, second segment shorter than third segment. Stylocerite reaching to 0.90 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 18a): chela about 1.9–2.3 times as long as wide, movable finger 2.5–3.6 times as long as wide, 0.9–1.5 times length of palm; carpus 1.4–1.8 times as long

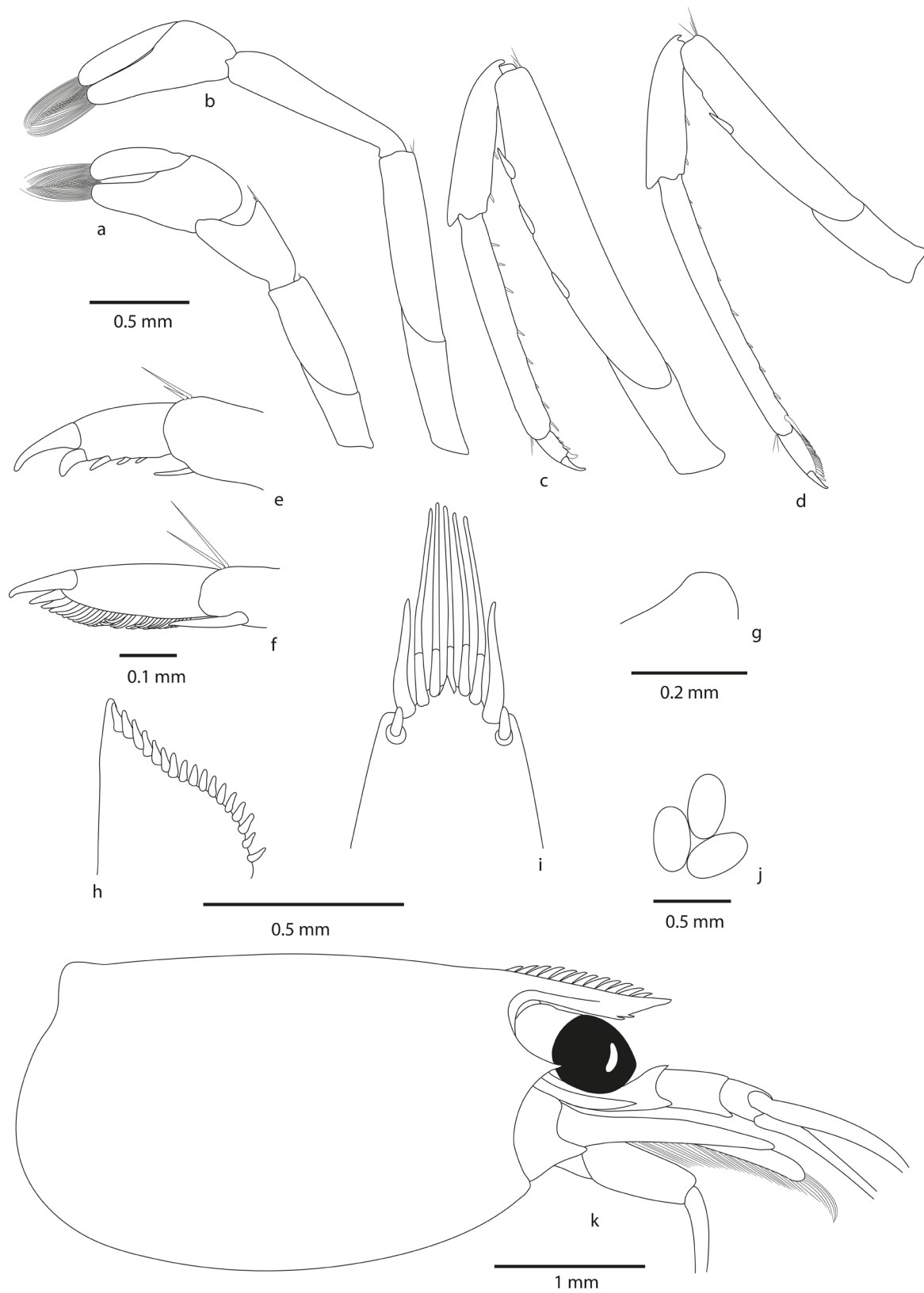


Fig. 18. *Caridina piokerai* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** Eggs. **k.** Cephalothorax. MNHN-IU-2018-2900 (a–k).

as wide. P2 (Fig. 18b) more slender and longer than first pereopod, with chela 2.4–3.0 times as long as wide: movable finger 3.9–5.2 times as long as wide, 1.4–2.1 times length of palm; carpus slender, 4.6–6.2 times as long as wide. P3 (Fig. 18c): stout, dactylus (Fig. 18e) 2.6–3.4 times as long as wide (terminal spiniform seta included), with 4–5 spiniform setae on flexor margin in addition to terminal one; propodus 8.1–10.4 times as long as wide, 3.9–5.3 times as long as dactylus. P5 (Fig. 18d): dactylus (Fig. 18f) 2.7–4.5 times as long as wide, with 21–33 spiniform setae on flexor margin; propodus 10.5–15.0 times as long as wide, 3.5–6.2 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.48 times as long as carapace, 1.4 times as long as fifth somite, 0.88 as long as telson.

TELSON (Fig. 18i). 3 times as long as wide, with five pairs of dorsal spinules and pair of dorsolateral spinules; posterior margin with median process, rounded, with 5–10 very long intermediate setae longer than lateral ones.

MALE PLEOPODS. No males.

PRE-ANAL CARINA (Fig. 18g). High, unarmed.

UROPODAL DIAERESIS (Fig. 18h). With 17–20 spinules.

EGGS. Size: 0.39–0.47 × 0.20–0.28 mm.

Habitat

This species is largely rheophile and prefers fresh and well-oxygenated waters from the lower course to the higher course of rivers (17–148m a.s.l.).

Colour pattern

Unknown.

Distribution

This new species occurs on several of the Solomon Islands (Choiseul, Kolombangara and Vella Lavella).

Remarks

These specimens from the Solomon Islands are very similar to *C. macrodentata* Cai & Shokita (2006a) because of the large teeth on the dorsal margin of the rostrum. However, the P1 and P2 carpus are slender, 1.4–1.8 times as long as wide (vs 1.2 in *C. macrodentata*) and 4.6–6.2 (vs 3.8), respectively, and the P5 dactylus is longer, 3.5–6.2 as long as wide (vs 2.4), not ending in two large claws (vs ending in two large claws).

Caridina nana sp. nov.

[urn:lsid:zoobank.org:act:312659E0-1F36-4BAB-9714-2FBC71B57C6A](https://zoobank.org/urn:lsid:zoobank.org:act:312659E0-1F36-4BAB-9714-2FBC71B57C6A)

Figs 2P, 19

Caridina cf. *weberi* sp. 6 – de Mazancourt *et al.* 2019a: 166, 169–170.

Etymology

This species is named after its small size.

Material examined

Holotype

SOLOMON ISLANDS • ♀, cl 3.0 mm; Vella Lavella Island, Maravari River; 07°51.703' S, 156°41.748' E; 31 Oct. 2016; P. Keith and C. Lord leg.; DNA voucher: CA1903; MNHN-IU-2018-2912.

Paratype

SOLOMON ISLANDS • 1 ♀, cl 2.7 mm; same collection data as for holotype; DNA voucher: CA1902; MNHN-IU-2018-2913.

Comparative material

Caridina parvirostris De Man, 1892

INDONESIA • 2 syntypes, ♂♂, cl 3.1–3.2 mm; Flores Island, river near Bombang; Jan. 1889; M. Weber leg.; MNHN-IU-2015-1748 • 1 syntype, ♀, cl 4.2 mm; same collection data as for preceding; MNHN-IU-2015-1754.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Pterygostomian margin rounded. Rostrum (Fig. 19k): bent down, very short, 0.2–0.3 of cl, not reaching to first segment of antennular peduncle, armed with 7 teeth on dorsal margin, 0 of them situated on carapace behind orbital margin, ventral margin with 1 tooth. Eyes well developed, anterior end reaching to 0.72 length of basal segment of antennular peduncle. Short antennular peduncle 0.36–0.49 times as long as carapace. Anterolateral angle reaching 0.37 length of second segment, second segment longer than third segment. Stylocerite reaching to 0.95 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 19a–b): chela about 1.9–2.0 times as long as wide, movable finger 2.5–2.8 times as long as wide, 0.7–0.9 times length of palm; carpus 1.6–1.7 times as long as wide. P2 (Fig. 19c) more slender and longer than first pereopod, with chela 2.8–2.9 times as long as wide: movable finger 5.1 times as long as wide, 1.6–1.8 times length of palm; carpus slender, 6.6–6.8 times as long as wide. P3 (Fig. 19d): stout, dactylus (Fig. 19f) 2.7–3.0 times as long as wide (terminal one spiniform seta included), with 4–5 spiniform setae on flexor margin in addition to terminal; propodus 8.1–9.6 times as long as wide, 4.0–4.8 times as long as dactylus. P5 (Fig. 19e): dactylus (Fig. 19g) 3.2–3.4 times as long as wide, with 26–28 spiniform setae on flexor margin; propodus 11.5–13.6 times as long as wide, 4.2–4.7 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.47 times as long as carapace, 1.5 times as long as fifth somite, 0.91 times as long as telson.

TELSON (Fig. 19i). slender, 4.3 times as long as wide, with four pairs of dorsal spinules and pair of dorsolateral spinules; posterior margin with median process, rounded, with 6–7 very long intermediate setae longer than lateral ones.

MALE PLEOPODS. No males.

PRE-ANAL CARINA (Fig. 19j). High, unarmed.

UROPODAL DIAERESIS (Fig. 19h). With 16–17 spinules.

EGGS. Size: 0.39–0.41 × 0.19–0.21.

Habitat

This species is largely rheophile and prefers fresh and well-oxygenated waters from the higher course of rivers.

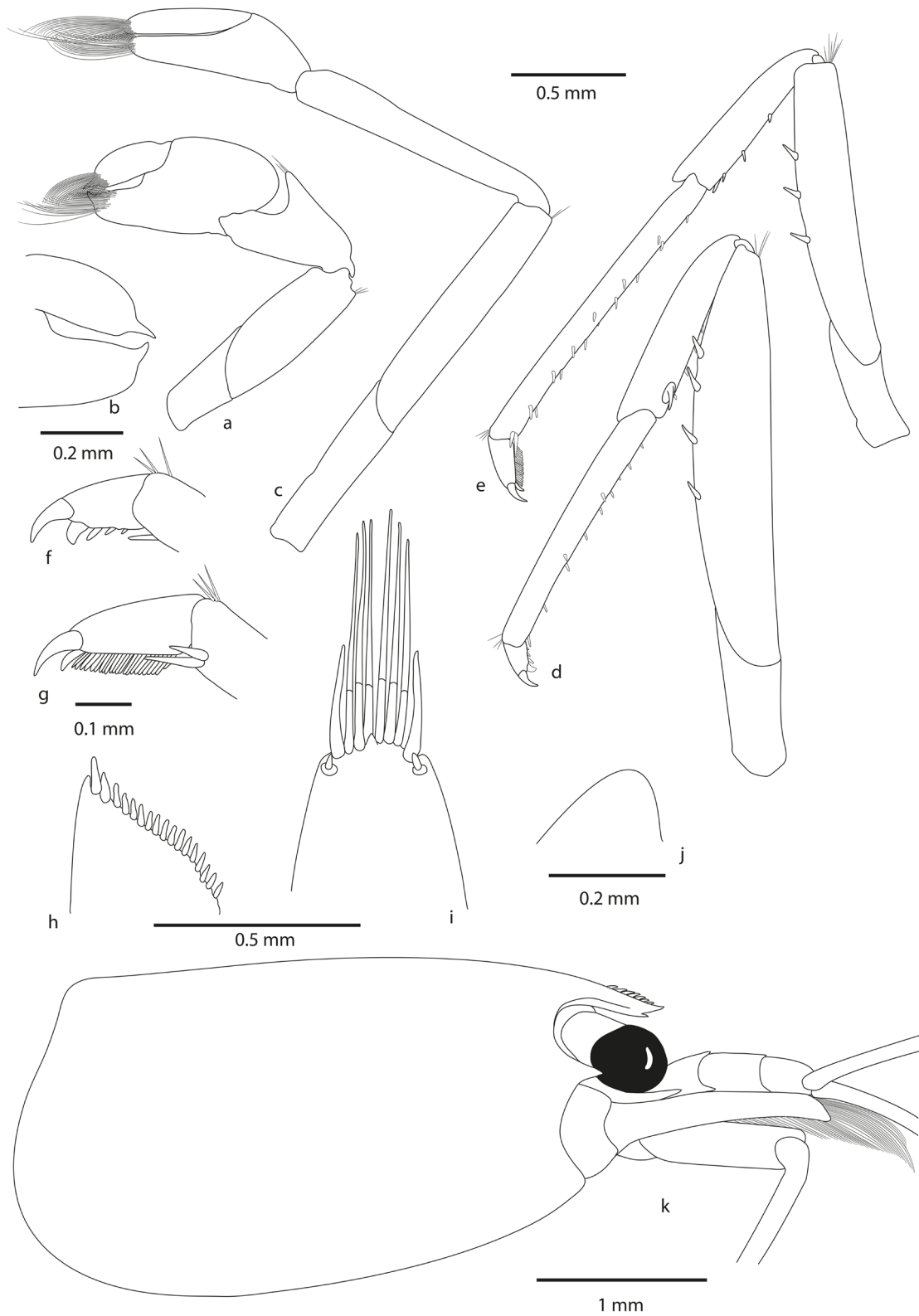


Fig. 19. *Caridina nana* sp. nov. **a.** First pereiopod. **b.** Details of the fingers of the first pereiopod. **c.** Second pereiopod. **d.** Third pereiopod. **e.** Fifth pereiopod. **f.** Dactylus of third pereiopod. **g.** Dactylus of fifth pereiopod. **h.** Uropodal diaeresis. **i.** Telson. **j.** Pre-anal carina. **k.** Cephalothorax. MNHN-IU-2018-2912 (a-k).

Colour pattern

Unknown.

Distribution

As far as we know, this new species occurs only in Vella Lavella (Solomon Islands).

Remarks

These specimens from the Solomon Islands are very similar to *C. parvirostris* by the long P2 carpus, 6.6–6.8 times as long as wide (vs 6.0–7.4 in *C. parvirostris*), but are different by the bent rostrum with fewer and smaller dorsal teeth 6–7 (vs 8–10), by the shorter P1 dactylus, 2.5–2.8 times as long as wide (vs 3.0–3.4), and also the shorter P1 chela, 1.9–2.0 times as long as wide (vs 2.0–2.3).

Caridina sikipozo sp. nov.

[urn:lsid:zoobank.org:act:6A7B9C82-DA70-47AA-81C4-21C351A7BD4F](https://doi.org/10.21203/rs.3.rs-1234567)

Figs 2V, 20

Etymology

This species is named after the Sikipozo tribe living around the type locality.

Material examined

Holotype

SOLOMON ISLANDS • ♂, cl 3.2 mm; Choiseul Island, Lokataveva Creek; 06°59.085' S, 156°47.454' E; 93 m a.s.l.; 14 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; DNA voucher: CA1928; MNHN-IU-2018-2914.

Paratype

SOLOMON ISLANDS • 1 ♂, cl 3.1 mm; same collection data as for holotype; DNA voucher: CA2310; MNHN-IU-2018-2915.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Rostrum (Fig. 20j): bent down, short, 0.3–0.4 of cl, reaching end of first segment of antennular peduncle, armed with 14–17 teeth on dorsal margin, 2–3 of them situated on carapace behind orbital margin, ventral margin with 4–5 teeth. Eyes well developed, anterior end reaching to 0.70 length of basal segment of antennular peduncle. Antennular peduncle 0.63 (♂) times as long as carapace. Pointed anterolateral angle reaching 0.31 length of second segment, second segment longer than third segment. Stylocerite reaching to 0.94 length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 20a): chela about 2.1–2.2 times as long as wide, movable finger 3.4–3.5 times as long as wide, 1.1–1.3 times length of palm; carpus 1.7–1.8 times as long as wide. P2 (Fig. 20b) more slender and longer than first pereopod, with chela 2.3–2.4 times as long as wide: movable finger 4.7–4.8 times as long as wide, 1.6–1.8 times length of palm; short carpus, 5.2–5.3 times as long as wide. P3 (Fig. 20c): stout, dactylus (Fig. 20d) 3.2 times as long as wide (terminal spiniform seta included), with 6 spiniform setae on flexor margin including terminal one; propodus 10.3–11.3 times as long as wide, 4.3–4.4 times as long as dactylus. P5: missing in all specimens.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.48 times as long as carapace, 1.7 times as long as fifth somite, 0.86 times as long as telson.

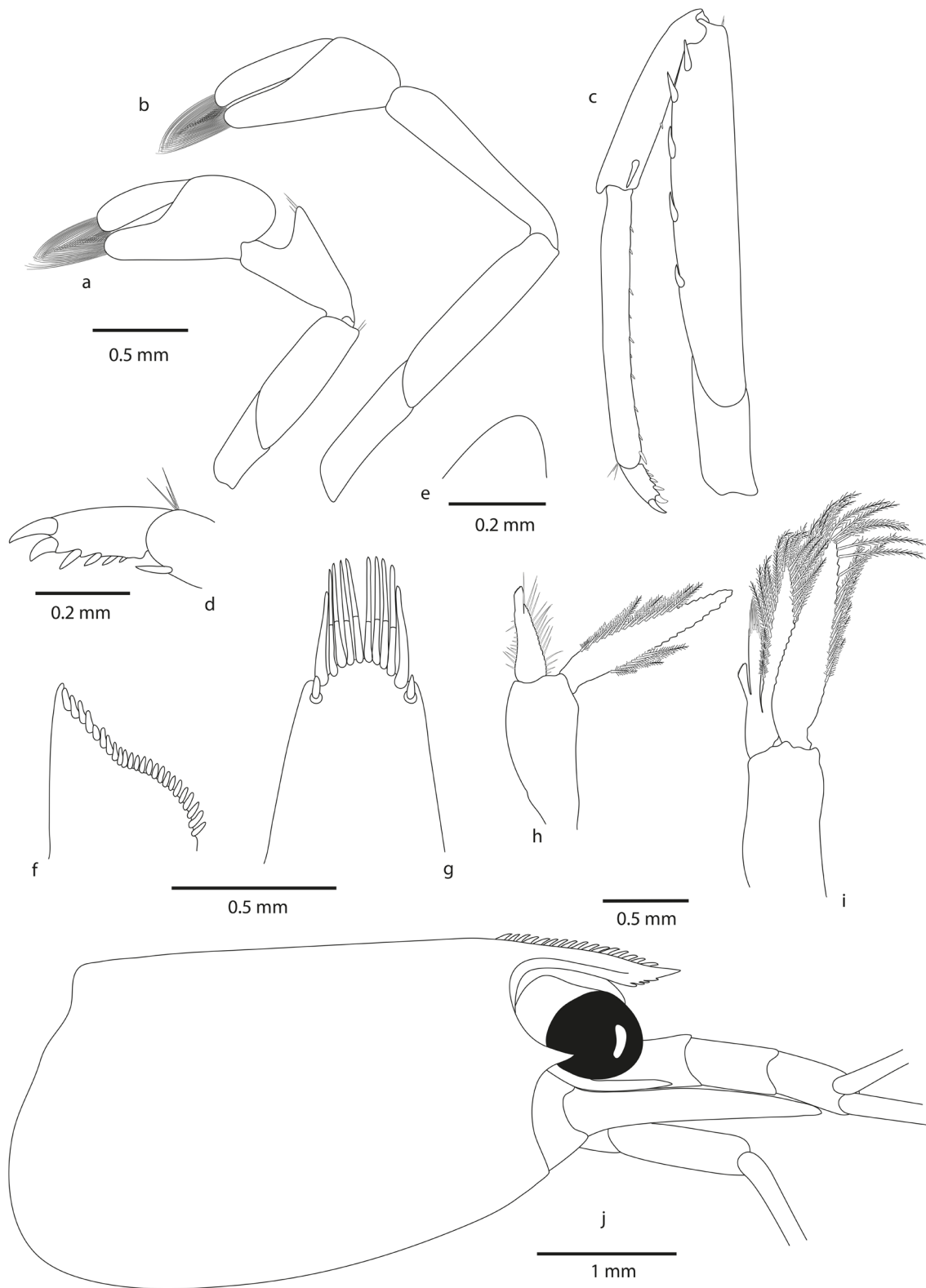


Fig. 20. *Caridina sikipozo* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Dactylus of third pereiopod. **e.** Pre-anal carina. **f.** Uropodal diaeresis. **g.** Telson. **h.** First male pleopod. **i.** Second male pleopod. **j.** Cephalothorax. MNHN-IU-2018-2914 (a–e, g, j) and MNHN-IU-2018-2915 (f, h–i).

TELSON (Fig. 20g). 2.3 times as long as wide, eight pairs of dorsal spinules and pair of dorsolateral spinules; posterior margin without median process, rounded, with 6–9 long intermediate setae longer than lateral ones.

MALE PLEOPODS. P11 (Fig. 20h): endopod subrectangular, 3 times as long as wide, reaching 0.53 length of endopod, with an appendix on subdistal outer margin which reaches beyond distal end of endopod on a short length. P12 (Fig. 20i): appendix masculina reaching 0.72 times length of endopod; appendix interna reaching 0.61 length of appendix masculina.

PRE-ANAL CARINA (Fig. 20e). High, unarmed.

UROPODAL DIAERESIS (Fig. 20f). With 23 spinules.

Habitat

This new species is largely rheophile and prefers fresh and well-oxygenated waters in the higher course of rivers.

Colour pattern

Unknown.

Distribution

As far as we know, this new species occurs only on Choiseul (Solomon Islands).

Remarks

These specimens from the Solomon Islands are very similar to *Caridina turipi* sp. nov. by the high number of postorbital teeth on the dorsal margin of the rostrum (2–3 vs 2–4 for *C. turipi* sp. nov.). However, this new species can be separated by its longer P1 dactylus (3.4–3.5 vs 2.8–3.0 mm), by its shorter P2 chela (2.3–2.4 vs 2.6–3.1 mm) and shorter P2 carpus (5.2–5.3 vs 5.5–6.6 mm).

Caridina poarae sp. nov.

[urn:lsid:zoobank.org:act:CF9FB7DB-335A-4A29-ABD4-68082519CEFF](https://zoobank.org/act:CF9FB7DB-335A-4A29-ABD4-68082519CEFF)

Figs 2R, 2I

Etymology

This new species is named after the local name of the type locality, river Poarae. The name is used as an apposition.

Material examined

Holotype

SOLOMON ISLANDS • ♀, cl 4.1 mm; Ranongga Island, Poarae River; 08°05.028' S, 156°35.979' E; 25 Oct. 2016; D. Boseto leg.; DNA voucher: CA2350; MNHN-IU-2018-2920.

Paratypes

SOLOMON ISLANDS • 1 juvenile, cl 2.9 mm; same collection data as for holotype; DNA voucher: CA2348; MNHN-IU-2018-2921 • 1 ♀ ovig., cl 3.4 mm; same collection data as for holotype; DNA voucher: CA2349; MNHN-IU-2018-2922.

Other material

VANUATU • 1 ♀ ovig., cl 5.3 mm; Santo Island; MNHN-IU-2018-2923 • 1 ♀, cl 5.3 mm; same collection data as for preceding; MNHN-IU-2018-2924.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Pterygostomian margin broadly subrectangular. Rostrum (Fig. 21k): straight, short, 0.3 of cl, reaching to near end of first segment of antennular peduncle, unarmed dorsally, ventral margin with 1–3 teeth. Eyes well developed. Antennular peduncle 0.54 times as long as carapace. Anterolateral angle reaching 0.33 length of second segment, second segment little longer than third segment. Stylocerite reaching to 0.83 times length of basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereio-pods. P1 (Fig. 21a): chela about 2.0–2.3 times as long as wide, movable finger 2.3–3.2 times as long as wide, 0.8–1.2 times length of palm; carpus 1.3–1.7 times as long as wide. P2 (Fig. 21b) more slender and longer than first pereio-pod, with chela 1.4–3.8 times as long as wide: movable finger 4.7–4.9 times as long as wide, 1.4–1.6 times length of palm; carpus slender, 4.5–5.7 times as long as wide. P3 (Fig. 21c): stout, dactylus (Fig. 21e) 2.9–3.0 times as long as wide (terminal spiniform seta included), with 5–6 spiniform setae on flexor margin including terminal; propodus 6.7–7.7 times as long as wide, 3.2–3.7 times as long as dactylus. P5 (Fig. 21d): dactylus (Fig. 21f) 3.9–4.5 times as long as wide, with 42–61 spiniform setae on flexor margin; propodus 9.6–13.8 times as long as wide, 2.9–3.5 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.48 times as long as carapace, 1.5 times as long as fifth somite, shorter than telson.

TELSON (Fig. 21i). 2.7 times as long as wide, with four or five pairs of dorsal spinules and pair of dorsolateral spinules, posterior margin with median process, rounded, with 5–8 plumose intermediate setae longer than lateral ones.

MALE PLEOPODS. No males.

PRE-ANAL CARINA (Fig. 21g). High, unarmed.

UROPODAL DIAERESIS (Fig. 21h). With 19–24 spinules.

EGGS. Ovigerous females with eggs size: 0.42–0.49 × 0.22–0.32 mm.

Habitat

This new species is rheophile and prefers fresh and well-oxygenated waters from the middle to upper course of rivers.

Colour pattern

Unknown.

Distribution

This species occurs in Solomon Islands (Ranongga) and Vanuatu (Santo).

Remarks

This new species looks like *C. typus* by its unarmed dorsal rostrum, but it is distinguished by its shorter P3 propodus, 6.7–7.7 times as long as wide (vs 7.9–10.0 in *C. typus*), and P3 propodus 3.2–3.7 times as long as dactylus, (vs 3.6–4.6). This new species also looks like *C. jeani*, by its unarmed dorsal rostrum but it is easily distinguish by its longer P3 dactylus, 4.4–4.6 times as long as wide (vs 1.6 in *C. jeani*) and its P5 dactylus, 3.9–4.5 times as long as wide (vs 2.7–3.2).

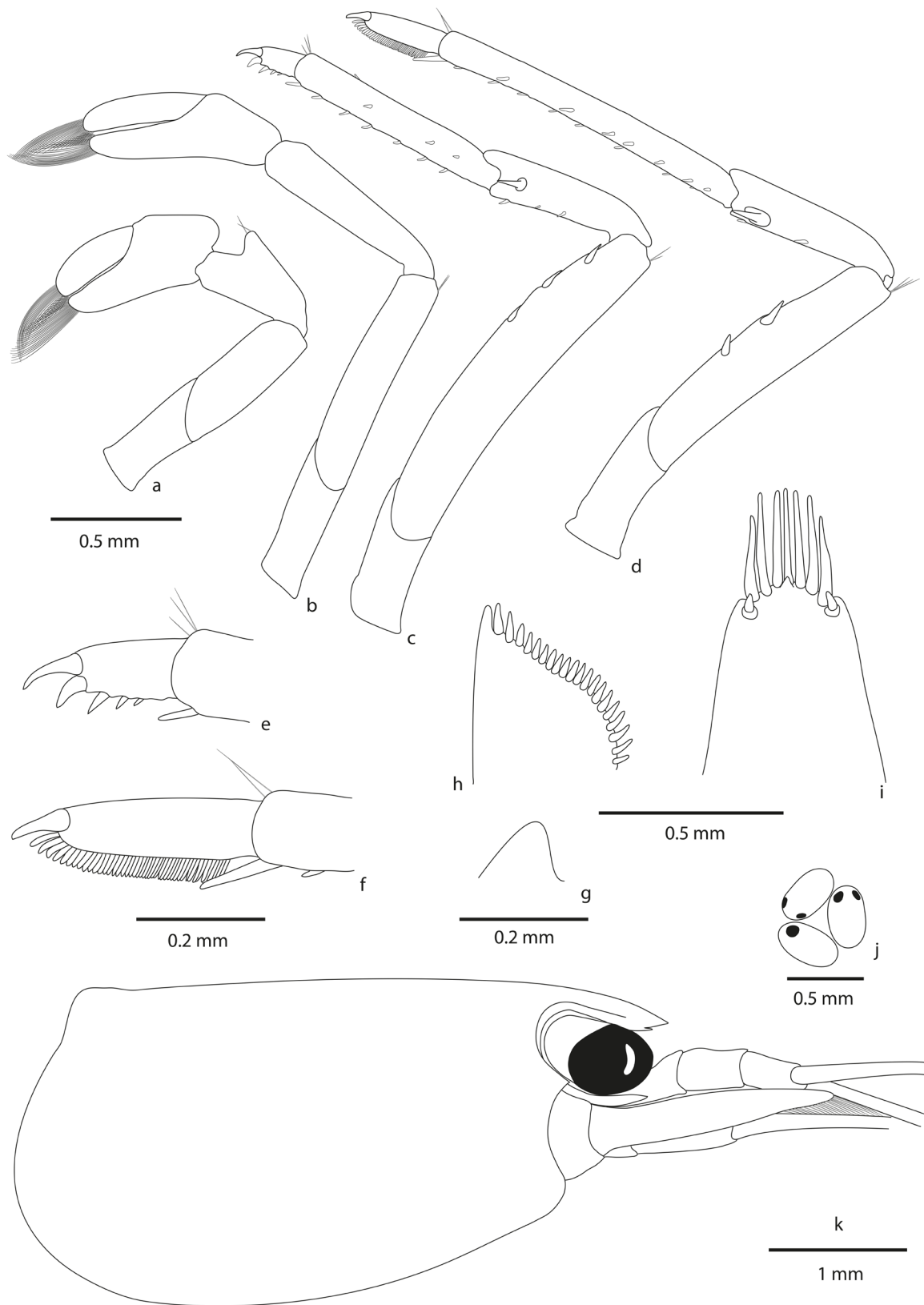


Fig. 21. *Caridina poarae* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** Eggs. **k.** Cephalothorax. MNHN-IU-2018-2922 (a–k).

Caridina paratypus sp. nov.

[urn:lsid:zoobank.org:act:5E893FC0-9914-4441-BBD4-7824C0D5747D](https://zoobank.org/urn:lsid:zoobank.org:act:5E893FC0-9914-4441-BBD4-7824C0D5747D)

Figs 2Q, 22

Caridina cf. *jeani* – de Mazancourt *et al.* 2019a: 166, 169–170.

Etymology

This new species is named after its resemblance to *C. typus*.

Material examined

Holotype

SOLOMON ISLANDS • ♂, cl 5.0 mm; Malaita Island, Wairahuta River; 09°16.960' S, 161°07.287' E; 250 m a.s.l.; 17 Jun. 2015; D. Boseto leg.; DNA voucher: CA1999; MNHN-IU-2018-2925.

Paratypes

VANUATU • 1 ♀ ovig., cl 6.2 mm; Epi Island, Buavinai River; 16°47.908' S, 168°11.3654' E; 28 Oct. 2014; 117 m a.s.l.; A. Acou, D. Kalfatak, G. Marquet and M. Mennesson leg.; DNA voucher: CA1371; MNHN-IU-2018-2926.

Description

CEPHALOTHORAX. Suborbital angle indistinguishably fused with antennal spine. Pterygostomian margin broadly subrectangular. Rostrum (Fig. 22m): straight, short, 0.4 of cl, reaching to near middle of second segment of antennular peduncle, unarmed dorsally, ventral margin with 0–5 teeth. Eyes well developed. Antennular peduncle 0.51 (♀) – 0.60 (♂) times as long as carapace. Anterolateral angle reaching 0.40 length of second segment, second segment shorter than third segment. Stylocerite reaching near basal segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 22a): chela about 1.9–2.1 times as long as wide, movable finger 2.1–2.2 times as long as wide, 0.7 times length of palm; carpus 1.5–1.6 times as long as wide. P2 (Fig. 22b) more slender and longer than first pereopod, with chela 2.5–2.8 times as long as wide: movable finger 4.8–4.9 times as long as wide, 1.7–1.8 times length of palm; carpus slender, 5.4–5.9 times as long as wide. P3 (Fig. 22c): stout, dactylus (Fig. 22e) 3.2–3.9 times as long as wide (terminal spiniform seta included), with 7 spiniform setae on flexor margin in addition to terminal one; propodus 11.1–11.3 times as long as wide, 4.4–4.6 times as long as dactylus, merus bearing long setae on ventral margin. P5 (Fig. 22d): dactylus (Fig. 22f) 5.6–6.6 times as long as wide, with 59–60 spiniform setae on flexor margin; propodus 16.2–18.1 times as long as wide, 3.7–4.4 times as long as dactylus, merus bearing long setae on ventral margin.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.46 times as long as carapace, 1.5 times as long as fifth somite, shorter than telson.

TELSON (Fig. 22i). 2.3 times as long as wide, with five or six pairs of dorsal spinules and pair of dorsolateral spinules; posterior margin with median process, rounded, with 10–11 plumose intermediate setae longer than lateral ones.

MALE PLEOPODS. P11 (Fig. 22j): endopod subrectangular, 3.2 times as long as wide, reaching 0.54 length of endopod, with appendix on subdistal outer margin which reaches slightly beyond distal end of endopod on short length. P12 (Fig. 22k): appendix masculina reaching 0.58 times length of endopod; appendix interna reaching 0.41 times length of appendix masculina.

HIGH PRE-ANAL CARINA (Fig. 22g). Unarmed.

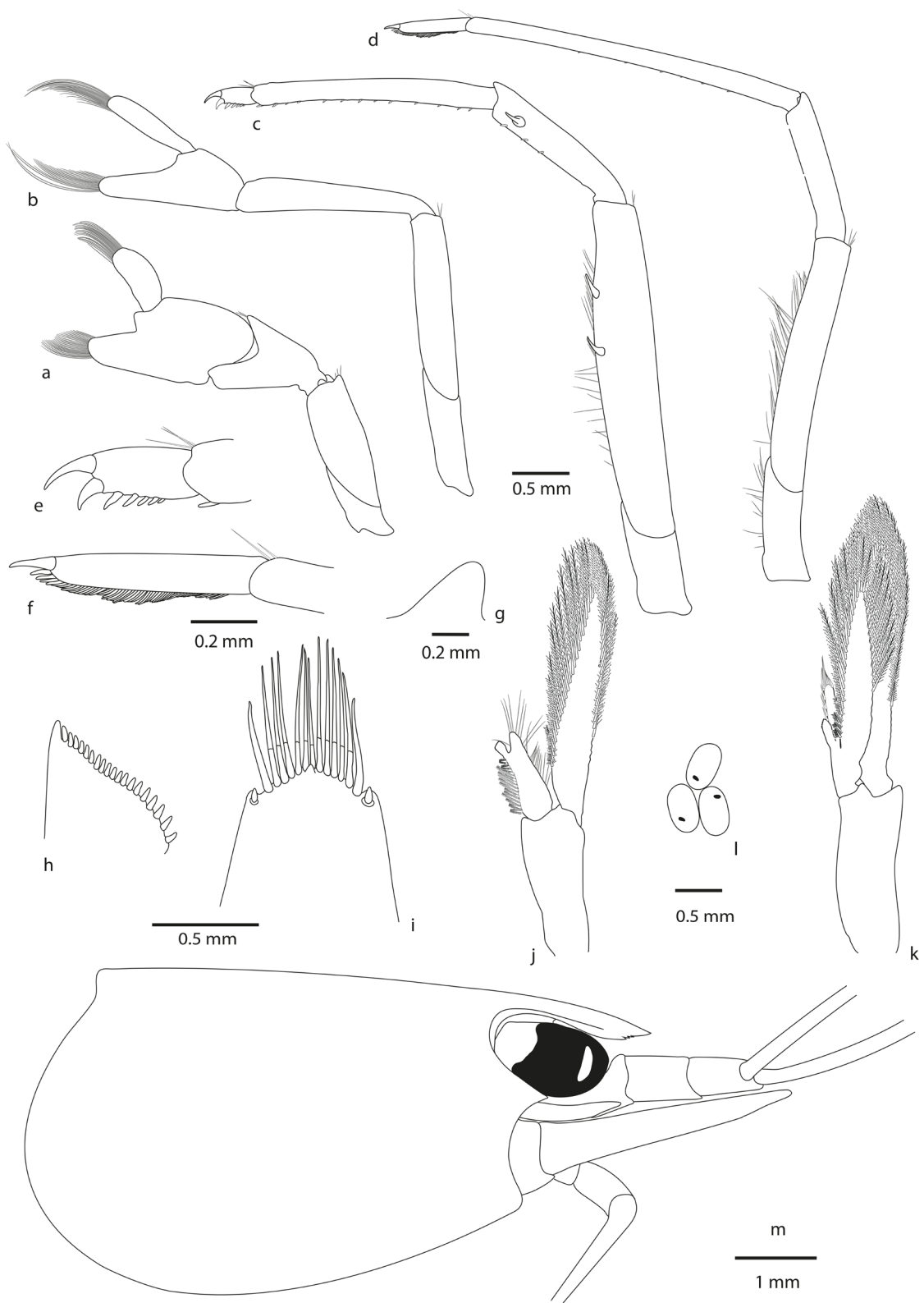


Fig. 22. *Caridina paratypus* sp. nov. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Cephalothorax. MNHN-IU-2018-2925 (a–h, j–k, m) and MNHN-IU-2018-2926 (i, l).

UROPODAL DIAERESIS (Fig. 22h). With 17–19 spinules.

EGGS (Fig. 22l). Size: 0.50–0.54 × 0.29–0.31mm.

Habitat

This species is largely rheophile and prefers fresh and well-oxygenated waters from the middle to upper course of rivers (117–250 m a.s.l.).

Colour pattern

Unknown.

Distribution

This species occurs in the Solomon Islands (Malaita) and Vanuatu (Epi).

Remarks

This new species looks like *C. typus* by its unarmed dorsal rostrum and its elongate P2 carpus, 5.4–5.9 times as long as wide (vs 5.0–6.5 in *C. typus*), but is easily distinguished by its longer P5 dactylus, 5.6–6.6 (vs 3.6–5.1), and its telson with 10–11 plumose intermediate setae longer than lateral ones (vs 5–8 smooth intermediate setae subequal to lateral ones).

This new species also looks like *C. jeani* by its unarmed dorsal rostrum and its telson with 10–11 plumose intermediate setae longer than lateral ones (vs 6–8 in *C. jeani*), but it is easily distinguished by its longer P3 dactylus, 4.4–4.6 times as long as wide (terminal spiniform seta included), with 7 spiniform setae on the flexor margin in addition to the terminal one (vs 1.6 with 5 spiniform setae), and by its shorter appendix masculine on the second male pleopod, 0.58 of the length of the endopod (vs 0.80).

In the same way as for the *C. typus* group, we include in the *C. weberi* group species with or without dorsal teeth on their rostrum. The length of setae on the telson (namely long and plumose terminal setae on the telson clearly longer than lateral ones) is a better criterion to characterize this group.

Caridina serratiostris species group

Diagnosis

Moderately robust morphology with a moderately short and straight rostrum (reaching end of antennular peduncle), armed with many dorsal teeth, at least 6 of them on the carapace, without apical teeth, the antennal spine ventral to the inferior orbital angle, a long antennular peduncle (about half the carapace length) with an usually long stylocerite (reaching end of first segment of antennular peduncle), pterygostomian margin rounded, segments of walking legs very slender, sixth abdominal somite about half of carapace length, a small pre-anal carina sometimes bearing an acute spine, a great number of spinules on the uropodal diaeresis (>15), numerous, long and plumose terminal setae on the telson and a rounded endopod of the first male pleopod, without appendix interna.

Caridina serratiostris De Man, 1892

Figs 2A, 23

Caridina serratiostris De Man, 1892: 382, pl. 23, figs 28a–e (type locality: “Bangkalan” and “Bonea” Rivers, Selayar, Indonesia).

Caridina serratiostris var. *typica* Bouvier, 1925: 218 (partim), 480–486.

Caridina serratiostris – Roux 1926: 248. — Page *et al.* 2007: 647 (GenBank: DQ478515).

Not *Caridina serratiostris* – Holthuis 1978: 38; fig. 13.

Material examined

Paralectotypes (lectotype designated in Cai & Shokita 2006b)

INDONESIA • 1 ♀ ovig., cl 4.0 mm, 1 ♂, cl 3.1 mm; Selayar Island, Bangkalan; 1889; M. Weber leg.; MNHN-IU-2015-1907 • 1 ♀ ovig., cl 4.1 mm; same collection data as for preceding; MNHN-IU-2015-1908.

Other material

SOLOMON ISLANDS – **Choiseul Island** • 1 ♀ ovig., cl 5.0 mm; Vorama River; 06°58.687' S, 156°46.746' E; 15 m a.s.l.; 11 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; DNA voucher: CA1351; MNHN-IU-2018-2927 • 1 ♀ ovig., cl 3.4 mm; Lopakare River, upstream; 07°01.613' S, 156°46.567' E; 50 m a.s.l.; 20 Oct. 2014; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-2928 • 1 ♀ ovig., cl 3.5 mm; Lopakare River, downstream; 07°01.834' S, 156°45.789' E; 21 Oct. 2014; 14 m a.s.l.; P. Gerbeaux, P. Keith and G. Marquet leg.; MNHN-IU-2018-2929 • 1 ♀ ovig., cl 3.6 mm; same collection data as for preceding; MNHN-IU-2018-2930. – **Kolombangara Island** • 1 ♀ ovig., cl 3.6 mm; Vanga 2 River; 07°54.825' S, 156°57.7624' E; 18 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; DNA voucher: CA1523; MNHN-IU-2018-2931. – **Vella Lavella Island** • 1 ♀ ovig., cl 3.8 mm; Vala Kadju; 07°49.860' S, 156°42.644' E; 28 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2018-2932 • 1 ♂, cl 2.5 mm; Maravari River; 07°51.703' S, 156°41.748' E; 31 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2018-2933 • 1 ♀ ovig., cl 3.6 mm; same collection data as for preceding; MNHN-IU-2018-2934. – **Isabel Island** • 1 specimen; Rapa River; 07°28.527' S, 158°17.105' E; 0–7 m a.s.l.; 23 Oct. 2019; P. Keith, C. Lord, R. Causse and D. Boseto leg.; DNA voucher: CA2530; MNHN.

AUSTRALIA – **Queensland** • 1 ♀ ovig., cl 4.1 mm; Captain Cook Highway; 16°22.266' S, 145°24.551' E; 64 m a.s.l.; 14 Jun. 2016; B. Mos leg.; MNHN-IU-2018-2935 • 1 ♀ ovig., cl 3.2 mm; same collection data as for preceding; MNHN-IU-2018-2936 • 1 ♀ ovig., cl 3.8 mm; Johnstone River; 17°30.933' S, 145°59.437' E; 8 m a.s.l.; 11 Jun. 2016; B. Mos leg.; MNHN-IU-2018-2937 • 1 ♀ ovig., cl 3.2 mm; Barron River; 16°52.443' S, 145°40.830' E; 5 m a.s.l.; 8 Jun. 2016; B. Mos leg.; MNHN-IU-2018-2938 • 1 ♀ ovig., cl 3.6 mm; Mowbray River; 16°33.859' S, 145°27.844' E; 15 m a.s.l.; 14 Jun. 2016; B. Mos leg.; MNHN-IU-2018-2939.

PAPUA NEW GUINEA • 1 ♀ ovig., cl 5.4 mm; New Britain, Rangih swamp; 05°34.549' S, 149°28.943' E; 24 Oct. 2018; R. Causse, P. Keith and C. Lord leg.; MNHN-IU-2018-2940.

Description

CEPHALOTHORAX. Antennal spine ventral to inferior orbital angle. Pterygostomian margin rounded. Rostrum (Fig. 23m–n): straight, short, 0.6–0.9 of cl, reaching beyond end of antennular peduncle, armed with 22–26 teeth on dorsal margin, 7–10 of them situated on carapace behind orbital margin, ventral margin with 6–7 teeth. Eyes developed, anterior end reaching to 0.54 times length of basal segment of antennular peduncle. Long antennular peduncle, 0.78 (♀) – 0.95 (♂) times as long as carapace; second segment distinctly longer than third segment. Stylocerite reaching to middle of second segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 23a): chela about 2.3–2.9 times as long as wide, movable finger 4.1–5.1 times as long as wide, 1.1–1.8 times length of palm; carpus 3.3–4.5 times as long as wide. P2 (Fig. 23b) more slender and longer than first pereopod, with chela 3.7–5.1 times as long as wide: movable finger 6.0–8.3 times as long as wide, 1.7–1.9 times length of palm; carpus slender, 8.3–10.9 times as long as wide. P3 (Fig. 23c): slender, dactylus (Fig. 23e) 3.7–4.4 times as long as wide (terminal spiniform seta included), with 6–7 spiniform setae on flexor margin including terminal one; propodus 14.2–17.1 times as long as wide, 4.1–5.3 times as long as dactylus, distinctive very long seta on distal end of carpus and merus. P5 (Fig. 23d): dactylus (Fig. 23f) 4.5–5.5 as long as wide, with 10–15

spiniiform setae on flexor margin; propodus 18.7–24.0 times as long as wide, 4.5–5.5 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.56 times as long as carapace, 1.7 times as long as fifth somite, shorter than telson.

TELSON (Fig. 23i). 2.5–3.5 times as long as wide, with five pairs of dorsal spinules and pair of dorsolateral spinules; posterior margin with small median process, rounded, with 8–10 very long intermediate plumose setae longer than lateral ones.

MALE PLEOPODS. P11 (Fig. 23j): endopod rounded, 1.4 times as long as wide, reaching 0.22 times length of endopod, no appendix. P12 (Fig. 23k): appendix masculina reaching 0.77 times length of endopod; appendix interna reaching 0.75 times length of appendix masculina.

PRE-ANAL CARINA (Fig. 23g). High, with a spine.

UROPODAL DIAERESIS (Fig. 23h). With 15–17 spinules.

EGGS. Ovigerous females with small eggs, size: 0.30–0.38 × 0.18–0.23mm.

Habitat

Caridina serratirostris lives from the estuarine brackish water to the fresh water in the lower course of the rivers.

Colour pattern (Fig. 26D)

The body is yellowish to reddish with many red dots.

Distribution

This species occurs in Indonesia (Selajar), the Solomon Islands, Australia and Papua New Guinea (New Britain).

Remarks

Our specimens fit well with the types from Selayar: straight rostrum, 0.6–0.9 of cl (vs 0.6–0.9 in the type specimens), sometimes reaching the end of the antennular peduncle, armed with 22–26 teeth on dorsal margin (vs 20–27), 7–10 of them situated on carapace behind orbital margin (vs 8–9), ventral margin with 6–7 teeth (vs 4–7); P1 carpus 3.3–4.5 times as long as wide (vs 3.1–4.9); P2 carpus 8.3–10.9 times as long as wide (vs 7.0–9.0); P3 dactylus with 6–7 spiniiform setae (vs 6–7) propodus 4.1–5.3 times as long as dactylus (vs 3.8–4.2); uropodal diaeresis with 15–17 spinules (vs 14–19); small eggs, 0.30–0.38 × 0.18–0.23 mm (vs 0.28–0.31 × 0.13–0.15); no appendix interna on the endopod of the male first pleopod.

Caridina celebensis De Man, 1892

Figs 2B, 24

Caridina serratirostris var. *celebensis* De Man, 1892: 385, pl. 23, figs 28f–h (type locality: river at Palopo, Luwu, Sulawesi (Celebes), Indonesia).

Caridina serratirostris var. *celebensis* – Bouvier 1925: 220.

Caridina celebensis – Holthuis 1978: 39, fig. 14. — Cai & Shokita 2006b: 247. — von Rintelen *et al.* 2012 (GenBank: FN995356).

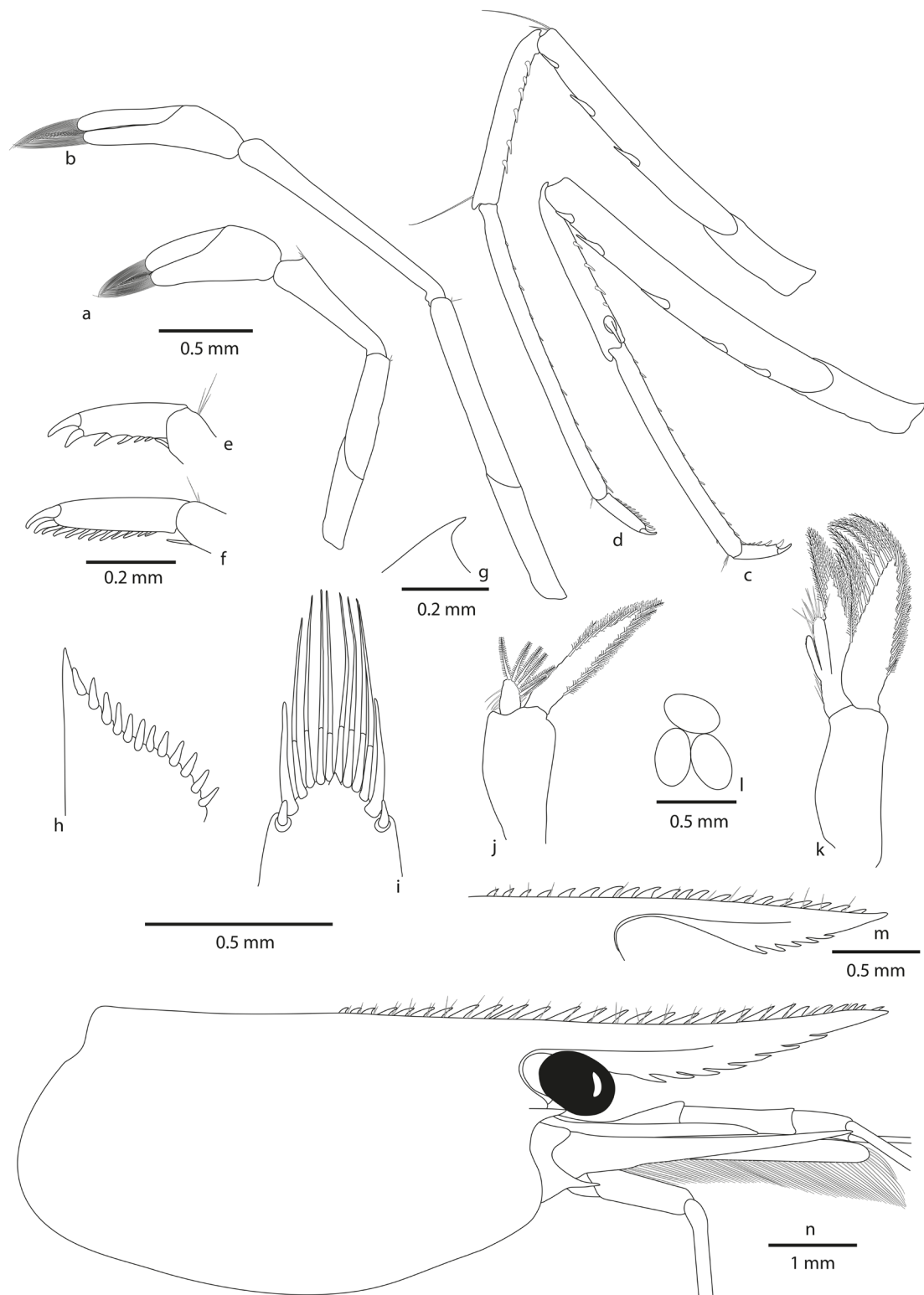


Fig. 23. *Caridina serratiostris* De Man, 1892. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** First male pleopod. **k.** Second male pleopod. **l.** Eggs. **m.** Rostrum variation. **n.** Cephalothorax. MNHN-IU-2018-2928 (a–i, l), MNHN-IU-2018-2933 (j–k, m) and MNHN-IU-2018-2927 (n).

Material examined

Paralectotype (lectotype designated in Cai & Shokita 2006b)

INDONESIA • 1 ♀ ovig., cl 3.5 mm; Sulawesi, Luwu, river near Palopo; Feb. 1889; M. Weber leg.; MNHN-IU-2015-1926.

Other material

SOLOMON ISLANDS – **Kolombangara Island** • 1 ♀ ovig., cl 3.1 mm; Lodumoe River; 07°50.961' S, 157°04.320' E; 16 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2941 • 1 ♀ ovig., cl 3.2 mm; same collection data as for preceding; MNHN-IU-2018-2942 • 1 ♀, cl 3.5 mm; Munga River; 07°54.420' S, 156°57.932' E; 5 m a.s.l.; 19 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; DNA voucher: CA1518; MNHN-IU-2018-2943 • 1 ♀ ovig., cl 3.4 mm; Liva River; 08°03.863' S, 157°10.633' E; 14 m a.s.l.; 11 Nov. 2015; P. Keith, C. Lord and G. Marquet leg.; MNHN-IU-2018-2944. – **Vella Lavella Island** • 1 ♀ ovig., cl 3.5 mm; Wariassi River; 29 Oct. 2016; P. Keith and C. Lord leg.; MNHN-IU-2018-2945.

VANUATU – **Efate Island** • 1 ♀, cl 3.0 mm; Marona River; 17°33'51.860" S, 168°17'08.140" E; 5 m a.s.l.; 9 Nov. 2014; A. Accou, G. Marquet and M. Mennesson leg.; DNA voucher: CA1381; MNHN-IU-2018-2946 • 1 ♀ ovig., cl 3.4 mm; Mele River; 17°40.578' S, 168°15.462' E; 9 Nov. 2014; 32 m a.s.l.; A. Acou, G. Marquet and M. Mennesson leg.; MNHN-IU-2018-2947.

Description

CEPHALOTHORAX. Antennal spine ventral to inferior orbital angle. Pterygostomian margin rounded. Rostrum (Fig. 24k): straight, 0.6–0.7 of cl, reaching to base of third segment of antennular peduncle, armed with 17–22 teeth on dorsal margin, 6–8 of them situated on carapace behind orbital margin, ventral margin with 4–7 teeth. Eyes developed, anterior end reaching to 0.66 times length of basal segment of antennular peduncle. Long antennular peduncle, 0.57–0.75 (♀) times as long as carapace. Anterolateral angle reaching 0.22 times length of second segment, second segment distinctly longer than third segment. Stylocerite reaching just beyond beginning of second segment of antennular peduncle.

PEREIOPODS. Epipods on first four pereopods. P1 (Fig. 24a): chela about 2.7–2.8 times as long as wide, movable finger 3.6–4.5 times as long as wide, 1.0–1.7 times length of palm; carpus 4.0–5.0 times as long as wide. P2 (Fig. 24b) more slender and longer than first pereopod, with chela 5.5–6.6 times as long as wide: movable finger 6.4–8.1 times as long as wide, 1.2–1.3 times length of palm; carpus slender, 11.9–12.0 times as long as wide. P3 (Fig. 24c): slender, dactylus (Fig. 24e) 3.7–4.6 times as long as wide (terminal spiniform seta included), with 7–10 spiniform setae on flexor margin including terminal one; propodus 12.4–13.2 times as long as wide, 3.5–4.0 times as long as dactylus. P5 (Fig. 24d): dactylus (Fig. 24f) 4.7–5.1 as long as wide, with 10–15 spiniform setae on flexor margin; propodus 15.0–16.2 times as long as wide, 3.7–3.9 times as long as dactylus.

ABDOMEN. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.58 times as long as carapace, 1.7 times as long as fifth somite, shorter than telson.

TELSON (Fig. 24i). 2.4 times as long as wide, with four or five pairs of dorsal spinules and pair of dorsolateral spinules; posterior margin with median process, rounded, with 9–11 very long intermediate setae longer than lateral ones.

MALE PLEOPODS. No males.

PRE-ANAL CARINA (Fig. 24g). High, with a spine.

UROPODAL DIAERESIS (Fig. 24h). With 13–17 spinules.

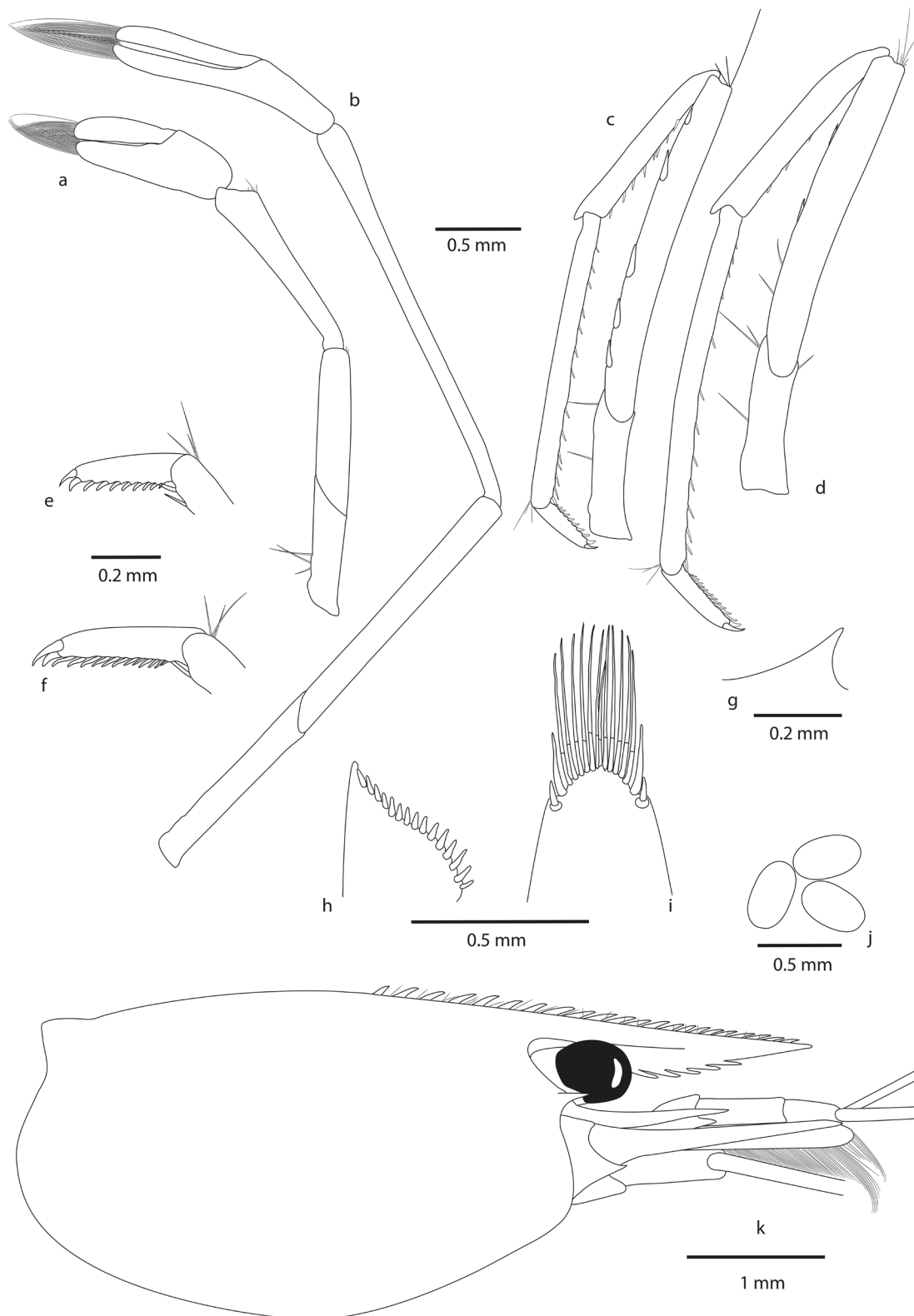


Fig. 24. *Caridina celebensis* De Man, 1892. **a.** First pereiopod. **b.** Second pereiopod. **c.** Third pereiopod. **d.** Fifth pereiopod. **e.** Dactylus of third pereiopod. **f.** Dactylus of fifth pereiopod. **g.** Pre-anal carina. **h.** Uropodal diaeresis. **i.** Telson. **j.** Eggs. **k.** Cephalothorax. MNHN-IU-2018-2944 (a–f, j), MNHN-IU-2018-2946 (g) and MNHN-IU-2018-2943 (h–i, k).

EGGS. Size: 0.30–0.38 × 0.18–0.23mm.

Habitat

Caridina celebensis lives essentially in the estuarine brackish waters in the lower course of rivers.

Colour pattern

Unknown.

Distribution

This species occurs in Indonesia (Sulawesi), the Solomon Islands, Vanuatu and the Philippines (Palawan).

Remarks

According to Holthuis (1978), *C. celebensis* can be separated from *C. serratiostris* by its shorter rostrum reaching to the base of the third segment of the antennular peduncle (vs reaching beyond the end of the antennular peduncle), with less dorsal teeth 17–22 (vs 22–26). Its P2 carpus is longer, 11.9–12.0 as long as wide (vs 8.3–10.9), and also its P2 chela is 5.5–6.6 times as long as wide (vs 3.7–5.1), but its movable finger is 1.2–1.3 times the length of the palm (vs 1.7–1.9), its P3 dactylus has more spiniform setae on the flexor margin in addition to the terminal one, 7–10 (vs 6–7), and its P5 propodus is 15.0–16.2 times as long as wide (vs 18.7–24.0) and 3.7–3.9 times as long as the dactylus (vs 4.5–5.5).

According to Cai & Shokita (2006b), the characters used by Holthuis are not always reliable. On the contrary, the size of the arthrobranch on the base of P1 in *C. serratiostris* is highly variable, from very distinct to almost indiscernible, but is totally absent in *C. celebensis*.

Nevertheless, our study allowed us to find other morphological characters that separate these two species well, such as the number of teeth on the dorsal margin of the rostrum or the length of the P2 carpus.

Identification key

1. More than 6 dorsal rostrum teeth situated on carapace behind orbital margin. A long stylocerite, reaching at least the beginning of the second segment of antennular peduncle: *C. serratiostris* group 2
– Fewer than 6 dorsal rostrum teeth situated on carapace behind orbital margin. A long or short stylocerite 3
2. Rostrum with 22–26 dorsal teeth and P2 carpus 8.2–10.9 times as long as wide *C. serratiostris* De Man, 1892
– Rostrum with 17–22 dorsal teeth and P2 carpus 11.9–12.0 times as long as wide *C. celebensis* De Man, 1892
3. Number of spiniform setae on uropodal diaeresis 6–10 and a very long and upcurved rostrum with 5–9 dorsal teeth, widely spaced: *C. gracilirostris* group 4
– Number of spiniform setae on uropodal diaeresis 8–22 and a long or short rostrum with 8–28 dorsal teeth, closely set 5
4. No appendix interna on the endopod of the male first pleopod. P1 and P2 carpus 1.5–1.9 and 3.2–5.1 times as long as wide, respectively *C. gracilirostris* De Man, 1892
– With an appendix interna on the endopod of the male first pleopod. P1 and P2 carpus 2.3–3.1 and 5.2–6.4 times as long as wide, respectively *C. neglecta* Cai & Ng, 2007
5. Uropodal diaeresis with 14–22 spinules and short rostrum, armed or not 6
– Uropodal diaeresis with 8–17 spinules and rostrum variable in shape and length, always unarmed 18

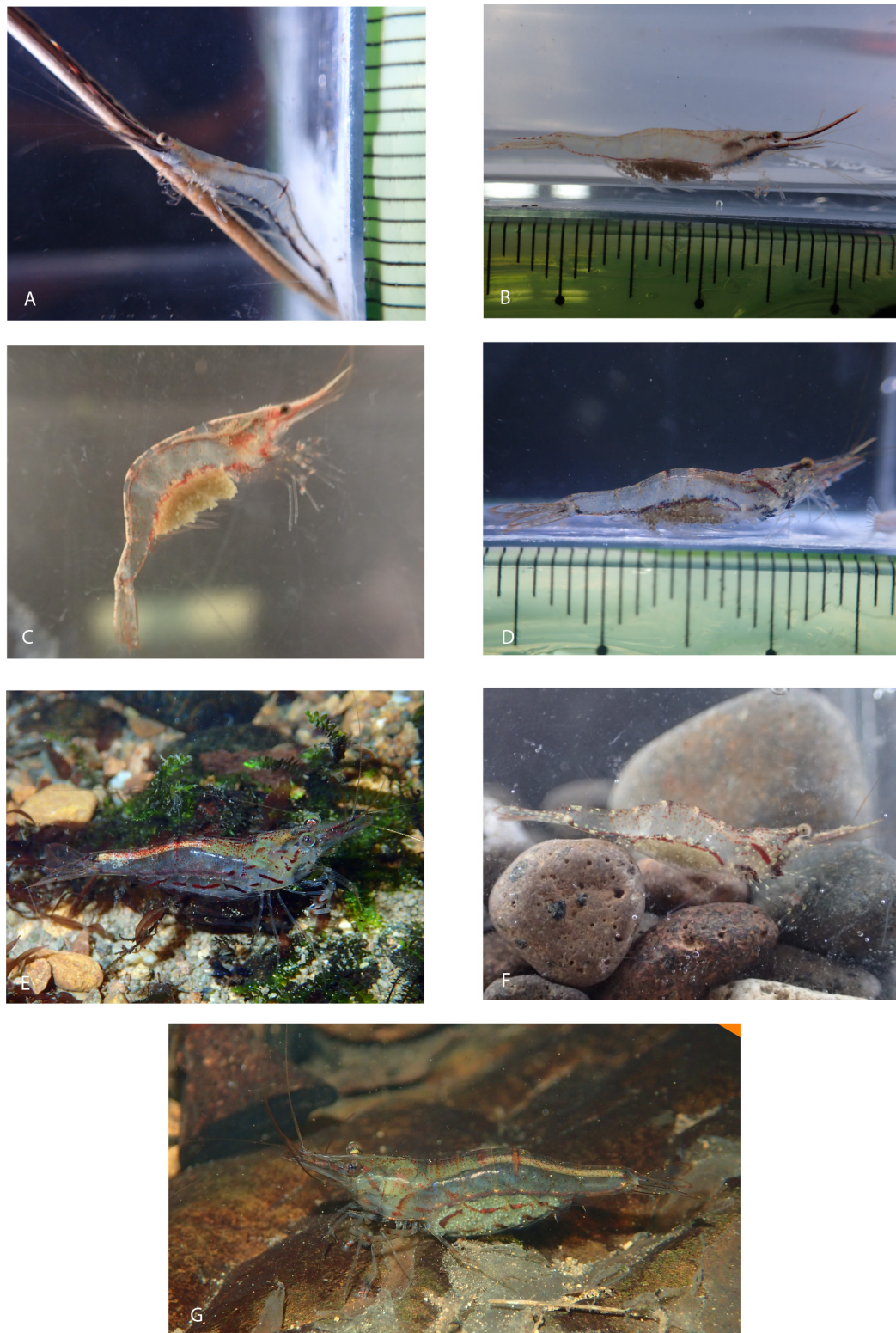


Fig. 25. Live colourations. **A.** *Caridina gracilirostris* De Man, 1892 (MNHN-IU-2018-2804). **B.** *Caridina neglecta* Cai & Ng, 2007 (MNHN-IU-2018-2811). **C.** *Caridina appendiculata* Jalihal & Shenoy, 1998 (MNHN-IU-2018-135). **D.** *Caridina brevidactyla* Roux, 1919 (CA1503). **E.** *Caridina choiseul* sp. nov. (Choiseul Island). **F.** *Caridina intermedia* sp. nov. (MNHN-IU-2014-20847). **G.** *Caridina mertoni* Roux, 1911 (Kolombangara Island). Photographs by P. Keith (A–G).



Fig. 26. Live colourations. **A.** *Caridina buehleri* Roux, 1934 (MNHN-IU-2015-20). **B.** *Caridina gueryi* Marquet, Keith & Kalfatak, 2009 (MNHN-IU-2015-19). **C.** *Caridina weberi* De Man, 1892 (Kolombangara Island). **D.** *Caridina serratiostris* De Man, 1892 (MNHN-IU-2018-2931). **E.** *Caridina papuana* Nobili, 1905 (Choiseul Island). Habitats in the Solomon Islands. **F.** *Caridina maeana* sp. nov. (Choiseul Island). **G.** Lentic mode, Lodumoe river, Kolombangara Island. **H.** Lotic mode, Sulumuni river, Kolombangara Island. Photographs by P. Keith (A, D–F, H) and C. Lord (B–C, G).

6. Telson with numerous and very long plumose intermediate setae	7 (<i>C. weberi</i> complex)
– Telson with few long intermediate setae	17 (<i>C. typus</i> complex)
7. Long stylocerite reaching to about halfway along second segment of peduncle	8
– Short stylocerite not reaching second segment of peduncle	9
8. P5 propodus 3.8–4.4 times as long as dactylus	<i>C. buehleri</i> Roux, 1934
– P5 propodus 4.4–6.2 times as long as dactylus	<i>C. gueryi</i> Marquet, Keith & Kalfatak, 2009
9. No dorsal teeth on the rostrum	10
– 8–22 dorsal teeth on the rostrum	11
10. P5 dactylus 4.9–6.6 times as long as wide and P3 propodus 8.6–11.3 times as long as wide	<i>C. paratypus</i> sp. nov.
– P5 dactylus 3.9–4.5 times as long as wide and P3 propodus 6.7–7.7 times as long as wide	<i>C. poarae</i> sp. nov.
11. Dorsal teeth of rostrum situated considerably anterior to orbital margin	12
– Dorsal teeth of rostrum situated all along its length	14
12. 8–7 large teeth on dorsal margin of rostrum	<i>C. nana</i> sp. nov.
– 8–15 small teeth on dorsal margin of rostrum	13
13. P5 dactylus biunguiculate	<i>C. maeana</i> sp. nov.
– P5 dactylus unguiculate	<i>C. tupaia</i> de Mazancourt, Marquet & Keith, 2019
14. Telson with one or two lateral pairs of setae, with 11–22 dorsal teeth	<i>C. weberi</i> De Man, 1892
– Telson always with one pair of lateral setae, with 9–13 dorsal teeth	15
15. 0–1 post-orbital teeth on the dorsal margin of the rostrum	16
– 2 or more post-orbital teeth on the dorsal margin of the rostrum	<i>C. sikipozo</i> sp. nov.
16. P3 dactylus 2.8–3.0 times as long as wide.....	<i>C. piokerai</i> sp. nov.
– P3 dactylus 3.0–3.3 times as long as wide.....	<i>C. papuana</i> Nobili, 1905
17. Rostrum with no dorsal teeth	<i>C. typus</i> H. Milne Edwards, 1837
– Rostrum with dorsal teeth	<i>C. turipi</i> sp. nov.
18. P1 carpus shaped as a half crescent; no apical tooth on the rostrum	<i>C. barakoma</i> sp. nov.
– P1 carpus more or less long; 1–5 apical teeth on the rostrum	19 (<i>C. nilotica</i> complex)
19. Very long rostrum, 1.1–2.1 times as long as carapace	20
– Moderately long rostrum, variable, 0.5–1.2 times as long as carapace	22
20. Pre-anal carina without a spine	<i>C. brevidactyla</i> Roux, 1919
– Pre-anal carina with a spine	21
21. Rostrum with 12–18 dorsal teeth, somewhat irregularly spaced, 8–12 dorsal teeth before the first ventral teeth	<i>C. appendiculata</i> Jalihal & Shenoy, 1998
– Rostrum with 16–26 dorsal teeth, closely set, 11–16 dorsal teeth before the first ventral teeth	<i>C. intermedia</i> sp. nov.

22. Pre-anal carina always without a spine; rostrum with 4–9 ventral teeth *C. mertoni* Roux, 1911
– Pre-anal carina with or without a spine; rostrum with 6–18 ventral teeth 23
23. Pre-anal carina always with a spine, pterygostomial margin rounded *C. pisuku* sp. nov.
– Pre-anal carina with or without a spine, pterygostomial margin subrectangular
..... *C. choiseul* sp. nov.

Conclusion

By visiting only five major islands of the Solomon Archipelago, we identified 24 *Caridina* species including 11 of which are new. As expected for such a wide-ranging genus, regional differences in diversity of *Caridina* exist in the Indo-Pacific. When focusing on endemic species of *Caridina*, the maximum diversity occurs around the Coral Triangle (Veron *et al.* 2009), between the Philippines, Indonesia, and Papua-New Guinea. According to our study, the Solomon Archipelago belongs to this maximum diversity area. Indeed, among our 24 Solomon *Caridina* species, 5 appear to be endemic to this archipelago.

Regional patterns appear in the diversity of *Caridina* in the Indo-Pacific, which are explained by the age, size, and latitude of the islands. Geologically old islands have had more opportunity to be colonized by shrimps, and had time for colonizers to adapt and specialize to the different habitats and form new species (Chen & He 2009). Indeed, the complex geological history of the Solomon Islands may explain the richness of its fauna: the extension of the archipelago, stretching over 1300 km, with many large, high elevation and old islands (2700 m high, 10 049 km² and formation in Early Miocene for Bougainville) promoted its great diversity.

The patterns in the diversity of endemic species vary considerably from those of amphidromous *Caridina* species (de Mazancourt *et al.* in press). The greatest diversity of amphidromous species is found in Indonesia, in the Solomon Islands and Vanuatu. Indeed, among our 24 species of the Solomon Islands, 12 are shared with Indonesia, 10 with Vanuatu and 6 with Papua New Guinea. On the other hand, only 4 species are shared with Australia and 3 with New Caledonia.

This may also include the Coral Triangle, as the diversity of *Caridina* from the area remains poorly known. The lowest diversity of amphidromous species is found in Polynesia and at the borders of the distribution area in general. Important areas of endemism, such as Madagascar, are not hotspots of diversity for amphidromous species. Localities with low endemism, like the Polynesian or Micronesian islands, often have a higher proportion of amphidromous species. Patterns in the diversity of amphidromous species may be explained by the recent colonization of the islands by amphidromous shrimps with great dispersal abilities, allowing them to colonize these isolated habitats without becoming reproductively isolated. Furthermore, small islands exhibit unstable conditions in which endemic landlocked populations could not maintain themselves in rivers, in contrast to amphidromous species that maintain a stock of larvae in the ocean, ready to recolonize depopulated habitats (McDowall 2007).

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