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Revision of the species of *Caridina* (Decapoda: Atyidae) from the Western Indian Ocean islands with description of a new species

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Abstract. We provide an updated checklist and an identification key of the species of *Caridina* living in freshwater habitats of the Western Indian Ocean islands, including the Seychelles, the Comoros, Mayotte, La Réunion and Mauritius. We list six species including one new for science: *Caridina mauritii*, *Caridina spathulirostris*, *Caridina similis*, *Caridina natalensis*, *Caridina typus* and *Caridina henriettae* sp. nov. Molecular and morphological evidence led us to consider *Caridina richtersii* as a junior synonym of *C. spathulirostris*. Due to different life histories, some species are endemic to their island or archipelago, like *C. mauritii* and *C. spathulirostris*, endemic to Mauritius, or *C. similis* endemic to the Seychelles, whereas others have a wider distribution in the Western Indian Ocean like *C. natalensis* or *C. henriettae* sp. nov. or have an Indo-West Pacific distribution like *C. typus*.

Keywords. Integrative taxonomy, morphology, 16S, amphidromy, endemic.

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Introduction

Comoros, Seychelles and Mascarenes are three archipelagos in the Southwest of the Indian Ocean (Fig. 1). The Comoros archipelago, equidistant from the African continent and Madagascar (around 300 km), includes the islands of Grande Comore, Anjouan, Mohéli and Mayotte. The Mascarene archipelago includes three main islands: La Réunion, Mauritius and Rodrigues. The Seychelles archipelago, comprising 115 islets, includes four main islands with small rivers or swamps: La Digue, Mahé, Praslin and Silhouette.

Between 1996 and 2013, rivers of several South West Indian Ocean (SWIO) islands were surveyed for atyid freshwater shrimps (Crustacea: Decapoda: Caridea) during field trips conducted by the Muséum national d'Histoire naturelle (MNHN) in the Mascarene archipelago (La Réunion, Mauritius and Rodrigues; see Keith *et al.* 1999, 2006), in Comoros (Anjouan, Mohéli) and Mayotte (see Keith *et al.* 2006) and in Seychelles (La Digue, Mahé, Praslin and Silhouette; see Keith *et al.* 2006). Keith *et al*. 2006 reported seven species of *Caridina* in the SWIO islands, namely *Caridina longirostris* H. Milne-Edward, 1837, *C. mauritii* Bouvier, 1912, *C. richtersi* Thallwitz, 1891, *C. serratirostris* De Man 1892, *C. similis* Bouvier, 1904, *C. spathulirostris* Richters, 1880 and *C. typus* H. Milne-Edwards, 1837. More recently, in La Réunion and Mayotte, 'Ocea Consult' conducted yearly inventories to monitor the aquatic communities. In Seychelles, since 2020, the MNHN and the NGO Gaea conduct baseline surveys and annual biodiversity inventories of fish, micro- and macro-invertebrates in 15 rivers including the collection of genetic materials. These studies led to the discoveries of new occurrences of species at several sites and have improved our knowledge on the freshwater shrimps in the SWIO.

The purpose of this study is to provide an updated checklist of the species of *Caridina* from the SWIO by using an integrative taxonomic approach to assess the validity of the species listed previously and check their geographical distributions in our study area.

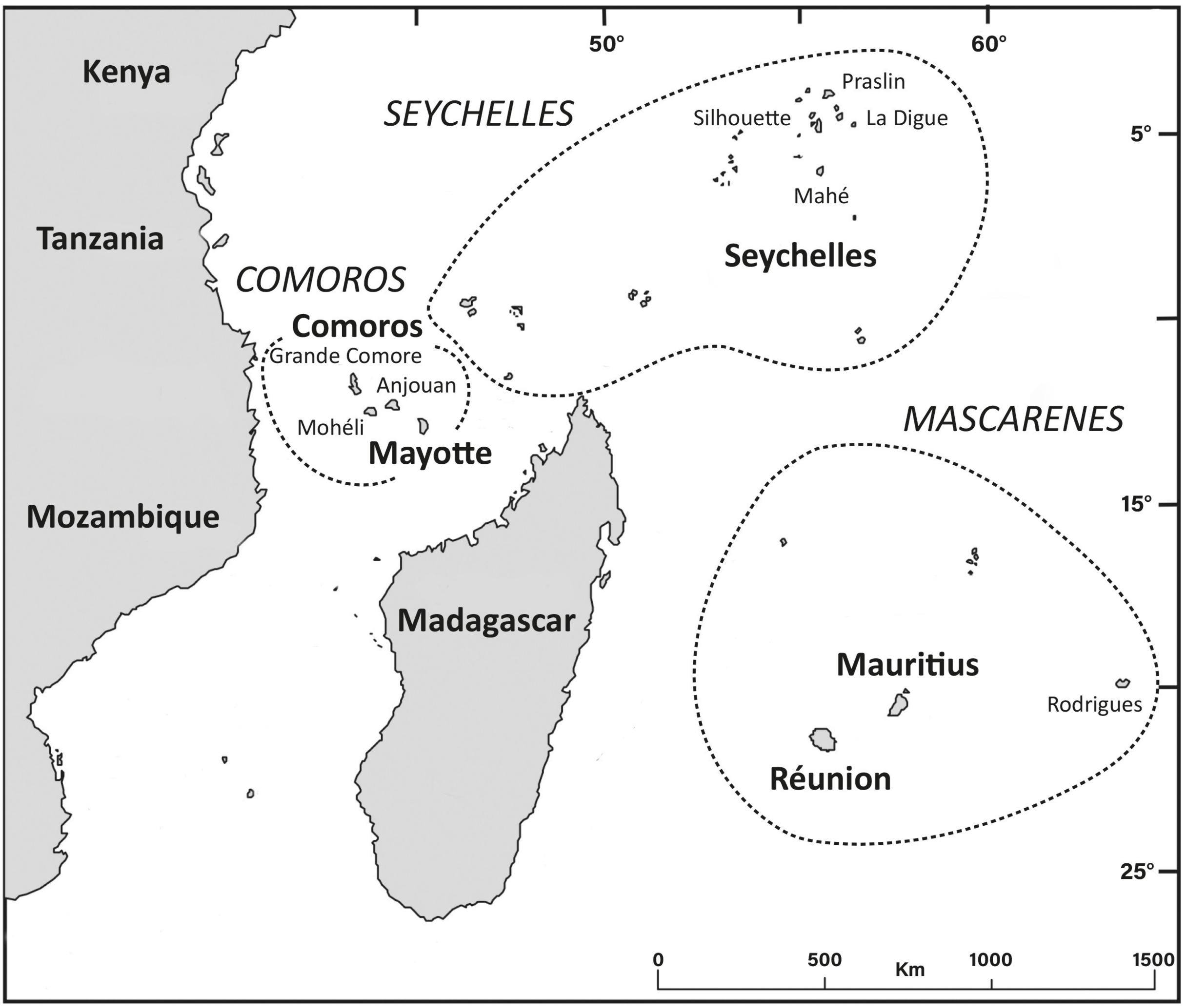

Fig. 1. Map of the South West Indian Ocean with its main archipelagos (dashed lines) and islands where *Caridina* H. Milne Edwards, 1837 were found (modified from Mulochau *et al.* 2014).

Material and methods

Sampling

Specimens from SWIO were collected by electrofishing (portable Dekka 3000 electric device, Germany or SAMUS 1000, Poland: http://www.electro-fisher.net/) or by hand. All material preserved in 75–95% ethanol has been deposited in the collections of the Muséum national d'Histoire naturelle in Paris (MNHN). Specimens were measured electronically under a stereo microscope using LAS X software (Leica).

DNA extraction, amplification and sequencing

DNA was isolated from abdominal tissues using the semi-automatic Eppendorf ep-Motion 5075 robot following the NucleoSpin 96 Tissue Core (Macherey-Nagel) protocol. Fragments of the mitochondrial marker 16S rRNA (~ 510 bp) were amplified using the pair of primers 16Sar-Lmod (TAC TTC TGC CTG TTT ATC AAAAA)/16Sbmod (GGT CTG AAC TCA AAT CAT GTAAA) (de Mazancourt *et al.* 2019a). DNA amplification was performed in 20 µl PCR reactions, containing approximately 3 ng of template DNA, 2.5 mM $MgCl_2$, 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 (MP Biomedicals). 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 (16S) 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 insure the accuracy of base calls. Chromatograms were viewed and edited using Geneious ver. 8 software (http://www.geneious.com/ (Kearse *et al.* 2012). All sequences are deposited in GenBank (Numbers PQ963381 to PQ963410, see Table 1).

Molecular analyses

DNA sequences were aligned using MEGA11 software (Tamura *et al.* 2021) with Muscle algorithm (Edgar 2004). Using Bayesian information criterion in jModelTest (Guindon & Gascuel 2003; Darriba *et al.* 2012) we retained the GTR + G + I model. Best-scoring ML trees were estimated using RAxML HPC2 ver. 8.2.10 (Stamatakis 2006) and best-scoring Bayesian Inference (BI) trees were estimated using MrBayes ver. 3.2.7 (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 MrBayes implemented in the Cyber Infrastructure for Phylogenetic Research (CIPRES) portal ver. 3.1. (https://www.phylo.org; Miller *et al.* 2010). 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. For the analysis, we generated 30 new 16S sequences from specimens collected during the authors' field trips, to which were added 24 sequences retrieved from GenBank for species occurring in the SWIO and/or closely related species to support the morphological comparisons (Table 1).

Morphological study

The rostrum, the cephalothorax, the pereiopods 1–3 and 5 and the abdomen were observed using a stereo microscope. The proportions of the various joints of the appendages were measured using microphotographs and the LAS X software (Leica). Drawings were made using the "Digital Inking" method (Coleman 2003, 2006) by tracing vectorial paths on high-resolution photographs using a vector graphics software.

Table 1 (continued on next page). List of specimens included in the molecular analysis.

Species	Locality	Collection number	DNA voucher	Type status	16S sequence	Reference
Atyoida serrata Bate, 1888	La Réunion		CA2948		PQ963394	this study
			CA3042		PQ963401	this study
			CA3043		PQ963402	this study
			CA3064		PQ963409	this study
Caridina spathulirostris Richters, 1880	Mauritius	MNHN-2025-125	CA2165		PQ963389	this study
		MNHN-2025-126	CA2166		PQ963390	this study
		MNHN-2025-127	CA2167		PQ963391	this study
Caridina similis Bouvier, 1904	Seychelles	MNHN-2025-130	CA1854		PQ963384	this study
		MNHN-2025-131	CA1855		PQ963385	this study
		MNHN-2025-132	CA1856		PQ963386	this study
		MNHN-2025-133	CA1857		PQ963387	this study
Caridina natalensis De Man, 1908	South Africa	MNHN-IU-2018-63	CA2080		OR088398	de Mazancourt *et al.* 2023
		MNHN-IU-2018-61	CA2079		MH644428	de Mazancourt *et al.* 2019a
	Madagascar		CA1074		OR088348	de Mazancourt *et al.* 2023
			CA1075		OR088349	de Mazancourt *et al.* 2023
	Mayotte		CA1077		OR088350	de Mazancourt *et al.* 2023
			CA1079		OR088351	de Mazancourt *et al.* 2023
	Comoros	MNHN-IU-2018-78	CA1343		MH644416	de Mazancourt *et al.* 2019a
		MNHN-IU-2018-77	CA1344		MH644417	de Mazancourt *et al.* 2019a
	Seychelles		CA1116		OR088365	de Mazancourt *et al.* 2023
			CA1117		OR088366	de Mazancourt *et al.*,2023
	Mauritius	MNHN-IU-2017-1451	CA2157		OR088418	de Mazancourt *et al.* 2023
		MNHN-IU-2017-1452	CA2158		OR088419	de Mazancourt *et al.*,2023
		MNHN-IU-2017-1453	CA2159		OR088420	de Mazancourt *et al.* 2023
		MNHN-IU-2017-1454	CA2160		OR088421	de Mazancourt *et al.* 2023
Caridina serratirostris De Man, 1892	Solomon	MNHN-IU-2018-2927	CA1351		MT303939	de Mazancourt *et al.* 2020
		MNHN-IU-2018-2931	CA1523		MT303940	de Mazancourt *et al.* 2020
Caridina henriettae sp. nov.	Seychelles	MNHN-2025-156	CA1491	paratype	PQ963382	this study
		MNHN-2025-157	CA1492	paratype	PQ963383	this study
		MNHN-IU-2015-1932	CA2026	paratype	PQ963388	this study

Table 1 (continued).

Species	Locality	Collection number	DNA voucher	Type status	16S sequence	Reference
		MNHN-2025-154	CA2998	paratype	PQ963396	this study
		MNHN-2025-155	CA2999	paratype	PQ963397	this study
		MNHN-2025-151	CA3000	paratype	PQ963398	this study
		MNHN-2025-143	CA2417	paratype	PQ963392	this study
		MNHN-2025-144	CA2418	paratype	PQ963393	this study
	La Réunion	MNHN-2025-145	CA2949	paratype	PQ963395	this study
		MNHN-2025-148	CA3065	paratype	PQ963410	this study
		MNHN-2025-146	CA3038	paratype	PQ963400	this study
		MNHN-2025-147	CA3061	paratype	PQ963407	this study
Caridina typus H. Milne Edwards, 1837	Mauritius	OUMNH.ZC-2010-22-0001			KY069380	Bernardes *et al.* 2017
		OUMNH.ZC-2010-22-0003			KY069381	Bernardes *et al.* 2017
		OUMNH.ZC-2010-22-0007			KY069382	Bernardes *et al.* 2017
	La Réunion	MNHN-2025-135	CA3054		PQ963403	this study
		MNHN-2025-136	CA3058		PQ963404	this study
		MNHN-2025-137	CA3059		PQ963405	this study
		MNHN-2025-138	CA3060		PQ963406	this study
		MNHN-2025-139	CA3063		PQ963408	this study
		ZMBunid1252			KY069434	Bernardes *et al.*, 2017
	Australia	AM-P21882			DQ478562	Page *et al.* 2007
	Vanuatu	GU-721			DQ478563	Page *et al.* 2007
	Madagascar	MNHN-IU-2018-2829	CA1038		MT303907	de Mazancourt *et al.* 2020
		MNHN-IU-2018-2831	CA1039		PQ963381	this study
	South Africa	MNHN-IU-2018-2844	CA2090		MT303906	de Mazancourt *et al.* 2020
	Mayotte	MNHN-IU-2025-134	CA3027		PQ963399	this study

Results

Molecular analyses

Phylogenetic analyses of the 16S marker (Fig. 2) allowed to recognize 7 different clades including 6 from the SWIO, all of them being strongly supported in both analyses (Bayesian PP > 0.95 and ML bootstraps > 92). Three species complexes can be identified, all with very strong statistical support values (PP = 1; B = 100).

Morphological study

Measures and observations made on the specimens allowed us to confirm the molecular results in recognizing the clades as five different species of *Caridina* in the SWIO, including one new for science (see hereafter). We couldn't get any sequence for *C. mauritii* due to the lack of fresh material, but its morphology is different enough to still be considered distinct from the other species. A key is provided at the end of the paper.

Taxonomy

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

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 mauritii Bouvier, 1912

Caridina Mauritii Bouvier, 1912a: 298.

Caridina Mauritii – Bouvier 1913a: 464 (key); 1914: 699; 1925: 210, figs 464–469.
Caridina mauritii – Costa 1980: 690. — Keith *et al.* 2006: 52.

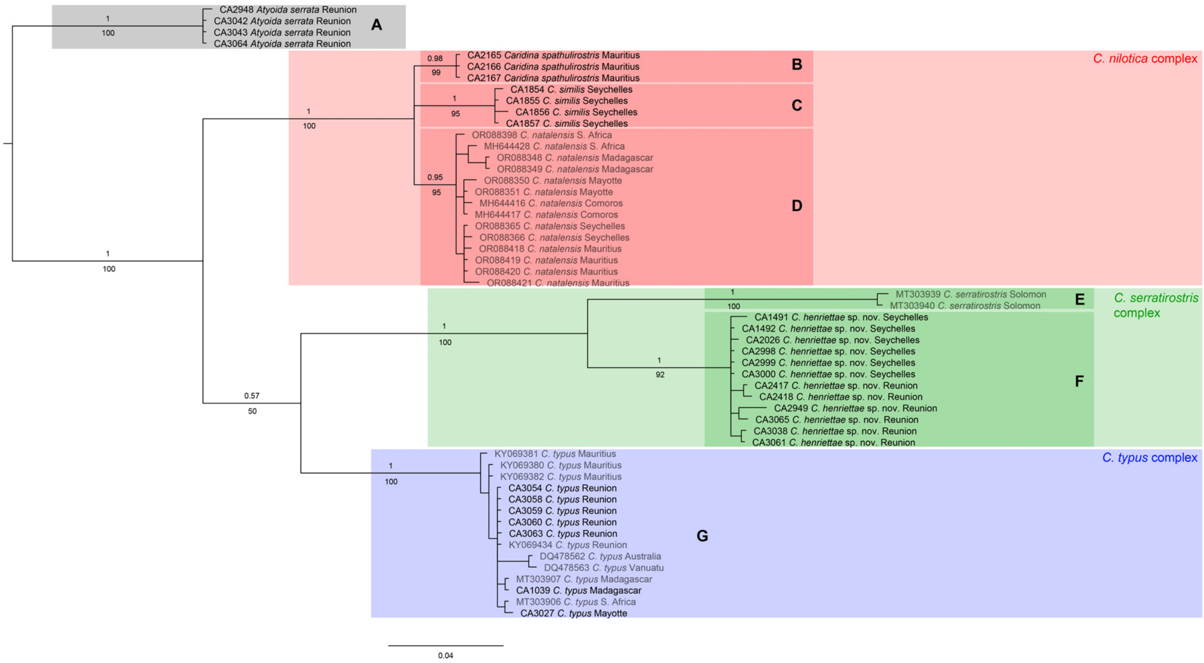

Fig. 2. Bayesian inference phylogenetic tree obtained from the 16S marker. Numbers above branches represent Bayesian posterior probabilities, numbers under branches are Maximum Likelihood bootstraps. Letters indicate clades recognized as valid species and colored boxes are species complexes.

Type locality

Near Port-Louis, Mauritius.

Material examined

No material examined.

Distribution

Endemic to Mauritius.

Habitat

Freshwater.

Remarks

This small species seems rare and a DNA barcode sequence would be needed to complete our sampling.

Caridina natalensis De Man, 1908

Figs 2D, 5B

Caridina nilotica var. *natalensis* De Man, 1908: 262, pl. 20 fig. 3.

C*aridina longirostris* – Richters 1880: 162–163. — Holthuis 1965: 20–23, fig. 6. — Keith *et al.* 2006: 50. — Bouchard *et al.* 2013: 9.
Caridina wycki – Ortmann 1894a: 11.1894b: 405 (part: specimens from East Africa and Dar-es-Salaam) (incorrect spelling).
Caridina wyckii – Weber 1897: 168 (part). — Richters 1880: 386 (part). — Lenz 1905: 385.
Caridina nilotica var. *brachydactyla* – Lenz 1910: 568. — Bouvier 1925: 155, figs 321–322. — Roux 1929: 303.
Caridina nilotica var. *gracilipes* – Lenz 1910: 568.
Caridina nilotica var. *natalensis* – Lenz 1912: 5. — Bouvier 1925: 154, fig. 320. — Barnard 1950: 655 (key). — Richard & Clark 2010: 317. — Klotz & De Grave 2015: 12.
Caridina brachydactyla brachydactyla – Costa 1980: 673.
Caridina brachydactyla – Bouchard *et al.* 2013: 9.
Caridina natalensis – de Mazancourt *et al.* 2019a: 379, figs 1–2, 3a–d; 2019b: 166, figs 2–5.
Caridina umtatensis – Wood *et al.* 2019: 205, fig. 3.

Not *Caridina africana* f. *natalensis* Bouvier, 1925: 214 (= *Elephantis jaggeri*).
Not *Caridina natalensis* – Richard & Clark 2009: 22, figs 7–8. — Castelin *et al.* 2013: 577 (= *Elephantis jaggeri*).

Type locality

Umgeni River, Durban, Natal, South Africa.

Material examined

See de Mazancourt *et al.* 2019a.

Distribution

Comoros (Anjouan, Mohéli), Mayotte, Seychelles (La Digue, Mahé, Praslin and Silhouette), Mauritius, La Réunion(?), Madagascar, South Africa, Tanzania and Kenya.

Habitat

Freshwater in the lower course of rivers.

Remarks

This species is easily identified by its rostrum rather constantly long, reaching well beyond scaphocerite.

Caridina spathulirostris Richters, 1880
Figs 2B, 5C

Caridina serrata Richters, 1880: 163, pl. 17 figs 24–27 (junior homonym of *Caridina serrata* Stimpson, 1860).
Caridina spathulirostris Richters, 1880: 163, pl. 17 fig. 28.
Caridina spatulirostris f. *rectirostris* Bouvier, 1925: 197.
Caridina spatulirostris f. *curvirostris* Bouvier, 1925: 197.
Caridina richtersii Thallwitz, 1891: 27 (nomen novum for *Caridina serrata* Richters, 1880).
Caridina Richtersi f. *typica* Bouvier, 1912c: 165; 1925: 203.
Caridina apiocheles Bouvier, 1904: 134.
Caridina apiocheles mutation *Edwardsi* Bouvier, 1904: 134.

Caridina spathulirostris – Ortmann 1894b: 406 (key). — Bouvier 1905: 93 (key); 1912a: 291; 1913a: 464 (key); 1925: 197, figs 416–422. — Costa 1980: 691. — Keith *et al.* 2006: 60.
Caridina richtersi – Ortmann 1894b: 402 (key), 404. — Edmondson 1929: 28. — Holthuis 1954: 3. — Carpenter 1978: 350. — Costa 1980: 690. — Keith *et al.* 2006: 54 (incorrect spelling).
Caridina Richtersi – Bouvier 1904: 134; 1905: 86; 1912a 293; 1912b: 919; 1912c: 163; 1913a: 464 (key); 1913b: 184; 1914: 699; 1925: 201, figs 432–457. — Bouvier & d'Emmerez de Charmoy 1919: 317. — Woltereck 1937a: 246 (incorrect spelling).
Caridina apiocheles – Bouvier 1905: 69, 86, fig. 3. — Bordage 1909: 108, fig. 6.
Caridina apiocheles mutation *Edwardsi* – Bouvier 1905: 69, 87, 103, fig. 3; 1912c: 166. — Bordage 1909: 108, fig. 6.
Caridina Richtersi f. *apiocheles* – Bouvier 1912a: 295; 1912c: 165; 1925: 203.
Ortmannia Edwardsi – Bouvier 1912 a: 296; 1912c: 166; 1912d: 691, fig. 3; 1913a: 459 (key); 1914: 700; 1925: 265, figs 445–447, 449, 452–453, 598–605. — Bouvier & d'Emmerez de Charmoy 1919: 317. — Woltereck 1937b: 322.
Caridina richtersi var. *apiocheles* – Bouvier 1925: 205. — Costa 1980: 690.
Ortmannia edwardsi – Edmondson 1929: 28. — Holthuis 1954: 3. — Costa 1980: 699.
Caridina richtersi var. *typica* – Costa 1980: 690.

Type locality

Pamplemousses Botanical Garden, Mauritius.

Material examined

Caridina spathulirostris Richters, 1880

MAURITIUS • 1 ♀ ovig. (cl 3.9 mm), 1 ♀ (cl 5.3 mm); quartier militaire, rivière importante; 20°17.260′ S, 57°35.948′ E; 390 m a.s.l.; 10 Dec. 2005; C.R. Turner leg.; MNHN-Na 772; MNHN • 1 ♀ (cl 5.8 mm); same data as for preceding; DNA voucher: CA2165; MNHN-2025-125; MNHN.

Caridina richtersii Thallwitz, 1891
MAURITIUS • 1 ♀ ovig. (cl 5.8 mm); quartier militaire, rivière importante; 20°17.260′ S, 57°35.948′ E; 390 m a.s.l.; 10 Dec. 2005; C.R. Turner leg.; DNA voucher: CA2166; MNHN-2025-126; MNHN • 1 ♂ (cl 6.5 mm); same data as for preceding; DNA voucher: CA2167; MNHN-2025-127; MNHN.

Distribution

Endemic to Mauritius.

Habitat

Freshwater in rivers and ponds.

Remarks

Our genetic study shows that *Caridina richtersi* Thallwitz, 1891 and *C. spathulirostris* Richters, 1880 are conspecific and we consider the former to be a junior synonym of *C. spathulirostris*. The specimens of this species are polymorphic in the shape of the rostrum and the chelipeds, which led to the description of numerous forms like *C. spathulirostris* f. *rectirostris*, *C. spathulirostris* f. *curvirostris, C. richtersi* f. *typica, C. richertsi* f. *apiocheles*. This kind of variability was also described in another endemic species of *Caridina* from the SWIO, *C. similis* (see Marquet & Keith, 2008).

Caridina similis Bouvier, 1904
Figs 2C, 5E

Caridina similis Bouvier, 1904: 135.
Caridina brevirostris f. *typica* Bouvier, 1912b: 916.
Caridina brevirostris f. *Gardineri* Bouvier, 1912b: 916.

Caridina similis – Bouvier 1905: 88, fig. 10. – Keith *et al.* 2006: 58. – Marquet & Keith 2008: 980, figs 1–3.
Caridina brevirostris f. *similis* – Bouvier 1925: 228, figs 507–508.
Caridina brevirostris f. *typica* – Bouvier 1925: 228, figs 509–510, 514–523.
Caridina brevirostris f. *Gardineri* – Bouvier 1925: 228, figs 505–506, 511–513.
Caridina brevirostris – Bouvier 1904: 136; 1912b: 915; 1913a: 447, pls. 27–29. — Costa 1980: 673–700.
Caridina singhalensis – Borradaile 1907: 67.

Type locality

Mahé, Seychelles.

Material examined

SEYCHELLES – **Mahé** • 8 ♀♀ ovig. (cl 4.7–6.3 mm), 1 ♀ (cl 5.9 mm), 1 ♂ (cl 4.1 mm); mare aux cochons; 4°39.029′ S, 55°24.152′ E; 17 Feb. 2020; P. Keith and M. Mennesson leg.; MNHN-2025-128; MNHN • 3 juv. (cl 2.4–2.9 mm); Baume Ellie; 14 Feb. 2020; P. Keith and M. Mennesson leg.; MNHN-2025-129; MNHN. – **Silhouette** • 1 ♀ ovig. (cl 4.4 mm); Anse Mandon; 4°28′1″ S, 55°13′30″ E; 28 Nov. 2012; P. Keith leg.; DNA voucher: CA1854; MNHN-2025-130; MNHN • 1 ♂ (cl 3.9 mm); same data as for preceding; DNA voucher: CA1855; MNHN-2025-131; MNHN • 1 ♀ ovig. (cl 5.5 mm); same data as for preceding; DNA voucher: CA1856; MNHN-2025-132; MNHN • 1 ♀ ovig. (cl 5.6 mm); same data as for preceding; DNA voucher: CA1857; MNHN-2025-133; MNHN.

See also “other material” in Marquet & Keith (2008).

Distribution

Endemic to the Seychelles (La Digue, Mahé, Praslin, Silhouette).

Habitat

Freshwater in permanent rivers.

Remarks

As for the previous species, *C. similis* shows a very variable form of the rostrum indicating numerous forms like *Caridina brevirostris* f. *similis, Caridina brevirostris* f. *typica, Caridina brevirostris* f. *Gardineri* now all junior synonyms of *C. similis* (see Marquet & Keith 2008).

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, pterygostomian 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 2G, 5F

Caridina typus H. Milne Edwards, 1837 (in H. Milne Edwards, 1834–1840): 363, pl. 25bis figs 4–5.
Caridina exilirostris Stimpson, 1860: 29.
Caridina typus f. *typica* Bouvier, 1925: 250, figs 272–295.
Caridina typus f. *caledonica* Bouvier, 1925: 253, figs 296–297.

Caridina typus – Miers 1879: 492. — Richters 1880: 162, pl. 17 fig. 23. — Pfeffer 1889: 35. — De Man 1892: 367, pl. 21 fig. 22; 1893: 300. — Sharp 1893: 111. — Ortmann 1894a: 8; 1894b: 403. — Weber 1897: 167 (part). — Hilgendorf 1898: 34. — Nobili 1899: 232. — Doflein 1900: 127. — Roux 1904: 552. — Bouvier 1904: 133. — Lenz 1905: 385; 1910: 570. — Borradaile 1907: 67. — Miyake 1938: 111, fig. 1. — Edmondson 1935: 10, fig. 3g–l. — Kubo 1938: 83, fig. 13; 1941: 307. — Kamita 1959: 21; 1961: 45, figs 15–18; 1963: 5, fig. 5; 1967: 3, fig. 4, pl. Ib. — Johnson 1960: 180; 1963: 27; 1967: 418; 1969: 110. — Holthuis 1965: 9; 1969: 93; 1978: 30; 1986: 590. — Ooishi 1970: 87. — Tiwari & Pillai 1971: 186. — Suzuki 1972: 10, figs 8–10; 2001: 138, fig. 2. — Fujino 1972: 7, fig. 8. — Kensley 1972: 36 (key), fig. 16c–d; 1981: 4. — Shokita 1975: 119; 1979: 204, pl. 1e; 1981: 15; 2002: 164; 2003: 249, figs 18g, 19c, 20l. — Shokita & Nishijima 1977: 187. — Costa 1980: 693; 1984: 205. — Hart 1983: 67. — de Silva 1983: 209. — Benzie & de Silva 1984: 623. — Gurney 1984: 568 (key). — Ng 1985: 161; 1995: 189, fig. 7. — Maciolek & Ford 1987: 628. — Coetzee 1988: 62. — Hayashi 1989: 310, fig. 168. — Bright 1989: 34. — Choy 1991: 356. — Hung *et al.* 1993: 486, figs 1c, 4a–f. — Suzuki *et al.* 1993: 56. — Suzuki & Sato 1994: 60. — Hamano & Honke 1997: 162. — Chace 1997: 21. — Shy & Yu 1998: 61. — Yeo *et al.* 1999: 225. — Ebenezer & Richard 1999: 427. — Keith *et al.* 1999: 46; 2006: 62; 2010: 46. — Ideguchi *et al.* 2000: 5. — Short 2000: 61. 2009: 36 (key), fig. 22. — Buden *et al.* 2001: 261. — Leberer & Nelson 2001: 393. — Day *et al.* 2001: 96 (key), fig. 6.3. — Keith 2002: 100. — Choy & Marquet 2002: 219. — Marquet *et al.* 2002: 222; 2003: 68. — Shokita *et al.* 2002: 76; 2003a: 101; 2003b: 117. — Davie 2002: 226.

— Leberer & Cai 2003: 354. — Cai & Anker 2004: 236. — Liang 2004: 139, fig. 65. — Wowor *et al.* 2004: 341, fig. 5f. — Bossuyt *et al.* 2004: 480, fig. 2e. — Nakahara *et al.* 2005: 305. — Cai *et al.* 2006: 412, figs 13–15; 2007: 279; 2009: 66. — Cai & Shokita 2006a: 2134. — Page *et al.* 2007: 647, figs 2–3. — Fujita 2007: 93. — Ragunathan & Valarmathi 2007: 94 (key), 96. — Karge & Klotz 2007: 92. — Nakahara *et al.* 2007: 387, figs 1c, 2a–e. — Cai & Ng 2009: 1094. — Benstead *et al.* 2009: 459. — Cai & Husana 2009: 62. — Richard & Clark 2010: 639. — Soomro *et al.* 2010: 721; 2011: 41; 2016: 569; 2020: 1333. — Saito *et al.* 2012: 27. — Cook *et al.* 2012: 289, fig. 3. — Bouchard *et al.* 2013: 9. — Emmerson 2016: 162, 173. — Fujita *et al.* 2016: 105. — Bernardes *et al.* 2017: 1 (part, ARC clade). — de Mazancourt *et al.* 2017: 226, fig. 4; 2019b: 167, figs 2–5; 2020: 34, figs 2d, 10. — Chow *et al.* 2018: fig. 1. — Choy *et al.* 2019: 115. — Short *et al.* 2019: 4, 20 (key), figs 8, 10j. — Wood *et al.* 2019: 200. — Jugovic *et al.* 2019: fig. 1. — Rahayu & Annawaty, 2019: 64. — Klotz *et al.* 2019: 164, fig. 18. — Hernawati *et al.* 2020: fig. 3. — Imai *et al.* 2020: 63, fig. 3a. — Vijayamma *et al.* 2021: 404 (key).
Caridina typa – Bouvier 1905: 88; 1913a: 465; 1914: 699; 1925: 249, figs 271–297. — Roux 1926a: 246; 1926b: 201. — Riek 1953: 117. — Choy & Horwitz 1995: 52 (key) (incorrect spelling).
Caridina typus var. *acuminata* – Bouvier 1925: 126, fig. 271 (part).
Caridina typa acuminata – Roux 1934: 222.
Caridina acuminata – Shokita 1979: 205. — Hayashi 1989: 311, fig. 169b–c, 170f.

? *Caridina* aff. *typus* – Ng 1994: 78.

Not *Caridina typus* – Spence Bate 1888: 704, pl. 119 fig. 3 (= *Caridina Spencebatei* De Man, 1892: 371 = *Atya scabra*).
Not *Caridina typus* – Weber 1897: 167 (part) (= *Caridina africana*).
Not *Caridina typus* – de Silva 1982: 135, fig. 4a–h (= *Caridina villadolidi*).
Not *Caridina typus* – von Rintelen *et al.* 2007: 1037, fig. 2; 2008: 2248, fig. 4; 2012: figs 2–5.
Not *Caridina typus* – Bernardes *et al.* 2017: 1 (part, SUL clade) (= *Caridina jeani*).
Not *Caridina typus* – Bernardes *et al.* 2017: 1 (part, TAL clade) (= *Caridina zhujiangensis*).

Type locality

Unknown, probably Mauritius according to Bouvier (1925).

Material examined

AUSTRALIA • 2 specs from GenBank: DQ478562 and DQ478563 (Page *et al.* 2007).

MADAGASCAR • 1 ♀ (cl 4.5 mm); Antsatoko River; 13°36.660′ S, 50°00.341′ E; 29 m a.s.l.; 6 Jul. 2008; DIAMSOI leg.; DNA voucher: CA1038; MNHN-IU-2018-2829; MNHN • 1 ♀ ovig. (cl 6.9 mm); same data as for preceding; DNA voucher: CA1040; MNHN-IU-2018-2830; MNHN • 1 ♀ ovig. (cl 7.1 mm); same data as for preceding; DNA voucher: CA1039; MNHN-IU-2018-2831; MNHN.

MAYOTTE • 1 ♀ (cl 6.1 mm); M'Tsangachei River; 12°53.066′ S, 45°07.899′ E; 30 Mar. 2024; P. Valade leg.; DNA voucher: CA3027; MNHN-IU-2025-134; MNHN.

MAURITIUS • 3 specs from GenBank: KY069380, KY069381 and KY069382 (Bernardes *et al.* 2017).

SEYCHELLES • 1 ♀ (cl 9.2 mm); Praslin Island, Nouvelle Découverte River; 4°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; MNHN.

SOUTH AFRICA • 1 ♀ ovig. (cl 10.1 mm); 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.; DNA voucher: CA2089; MNHN-

2018-2843; MNHN • 1 ♂ (cl 5.7 mm); Mpenjati River; 30°56.645′ S, 30°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; MNHN.

LA RÉUNION • 1 juv. (cl 2.4 mm); Rivière du Mât; 20°58.801′ S, 55°41.989′ E; 19 May 2023; P. Valade leg.; DNA voucher: CA3054; MNHN-IU-2025-135; MNHN • 1 ♂ (cl 4.6 mm); same data as for preceding; DNA voucher: CA3058; MNHN-IU-2025-136; MNHN • 1 juv. (cl 2.4 mm); same data as for preceding; DNA voucher: CA3059; MNHN-IU-2025-137; MNHN • 1 juv. (cl 1.9 mm); Rivière des Marsouins; 21°01. 970′ S, 55°42.943′ E; 6 Aug. 2023; P. Valade leg.; DNA voucher: CA3060; MNHN-IU-2025-138; MNHN • 1 ♂ (cl 4.5 mm); same data as for preceding; DNA voucher: CA3063; MNHN-IU-2025-139; MNHN • 1 spec. from GenBank: KY069434 (Bernardes *et al.* 2017).

Distribution

Widespread from South Africa to Fiji and Australia to Japan and India.

Habitat

Freshwater in rivers.

Remarks

Caridina typus revealed to be a species complex, all characterized by the lack of teeth on the dorsal margin of the rostrum. Three clades were recognized by Bernardes *et al.* (2017), named SUL, TAL and ARC. The latter one corresponds to the true *C. typus*, while SUL is *C. jeani* and TAL is *C. zhujiangensis* (publication in prep.).

Caridina serratirostris 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 henriettae sp. nov.

urn:lsid:zoobank.org:act:F229A5EF-5D4B-412D-B6F8-285C1B0B1C27

Figs 2F, 3–4, 5D, G–H

Caridina serratirostris – Holthuis 1965: 25, fig. 8. — Costa 1980: 691. — Gurney 1984: 568 (key). – Keith *et al.* 1999: 44; 2006: 56. — Keith 2002: 100. — Richard & Clark 2010: 310 (part), figs 3, 4a–n, p–q. — Bouchard *et al.* 2013: 9. — Emmerson 2016: 170. — Hoarau 2018: 1.
Caridina wyckii – Weber 1897: 168 (part).

Diagnosis

Typical morphology of the *C. serratirostris* species group: rostrum armed with many dorsal teeth, at least 6 of them on the carapace, a usually long stylocerite and a rounded endopod of the first male pleopod, without appendix interna. Well-developed arthrobranch at the base of P1. Telson with a pair of plain long lateral spines and 1 pair of shorter, plain lateral spines. P3 propodus 11.2–12.8 as long as wide.

Etymology

The new species is dedicated to our friend Elvina Henriette, Research Scientist and Director of the NGO “Gaea Conservation Network Seychelles”, in recognition of her work and passion for the freshwater fauna of Seychelles islands.

Type material

Holotype

MAURITIUS • ♂ (cl 2.9 mm); Rivière des Anguilles; 20°28.802′ S, 57°33.378′ E; 13 Nov. 2002; P. Keith, G. Marquet and ARDA leg.; DNA voucher: CA2304; MNHN-IU-2015-1914; MNHN.

Paratypes

MAURITIUS • 1 ♀ (cl 4.1 mm); same data as for for holotype; DNA voucher: CA2305; MNHN-2025-140; MNHN.

MADAGASCAR • 1 ♀ ovig. (cl 4.9 mm); Fanambana River (Station 37); 14°33.193′ S, 50°10.393′ E; 11 m a.s.l.; 7 Jul. 2008; DIAMSOI leg.; DNA voucher: CA1178; MNHN-2025-141; MNHN • 1 ♂ (cl 3.2 mm); same collection data as for preceding; DNA voucher: CA1431; MNHN-2025-142; MNHN.

MAURITIUS • 1 ♀ ovig. (cl 4.8 mm); Rivière de la Chaux; 20°24.350′ S, 57°42.269′ E; 12 Nov. 2002; ARDA leg.; DNA voucher: CA2042; MNHN-IU-2015-1933; MNHN • 1 ♂ (cl 3.0 mm); Beau Vallon; 1913; P. Carié leg.; MNHN-IU-2015-1909; MNHN.

LA RÉUNION • 1 ♀ ovig. (cl 4.4 mm); Rivière des Embouchures; 21°2.093′ S, 55°42.899′ E; 13 Oct. 2015; P. Valade leg.; DNA voucher: CA2417; MNHN-2025-143; MNHN • 1 ♀ ovig. (cl 3.8 mm); same data as for preceding; DNA voucher: CA2418; MNHN-2025-144; MNHN • 1 ♀ ovig. (cl 3.6 mm); Rivière des Marsouins; 2 May 2022; Ocea Consult leg.; DNA voucher: CA2949; MNHN-2025-145; MNHN • 1 ♀ ovig. (cl 3.6 mm); Rivière des Marsouins; 21°1.970′ S, 55°42.949′ E; 8 Apr. 2024; P. Valade leg.; DNA voucher: CA3038; MNHN-2025-146; MNHN • 1 juv. (cl 2.4 mm); Rivière des Marsouins; 21°1.970′ S, 55°42.949′ E; 6 Aug. 2023; P. Valade leg.; DNA voucher: CA3061; MNHN-2025-147; MNHN • 1 juv. (cl 2.3 mm); Rivière des Roches; 21°0.398′ S, 55°41.661′ E; 13 Nov. 2023; P. Valade leg.; DNA voucher: CA3065; MNHN-2025-148; MNHN.

SEYCHELLES – **Mahé** • 2 ♀♀ ovig. (cl 4.1–4.7 mm), 1 ♀ (cl 4.0 mm); Bel Ombre; 4°36.966′ S, 55°25.063′ E; 2 Feb. 2020; P. Keith and M. Mennesson leg.; MNHN-2025-149; MNHN • 1 ♀ ovig. (cl 2.7 mm); Grand Anse; 4°40.502′ S, 55°26.728′ E; 20 Feb. 2020; P. Keith and M. Mennesson leg.; MNHN-2025-150; MNHN • 1 ♀ ovig. (cl 2.7 mm); same data as for preceding; DNA voucher: CA3000; MNHN-2025-151; MNHN. – **Praslin** • 1 ♀ ovig. (cl 4.1 mm); 10 Oct. 2003; no locality data; ARDA leg.; DNA voucher: CA2026; MNHN-IU-2015-1932; MNHN • 1 ♀ ovig. (cl 3.4 mm); Nouvelle Découverte; 4°20.179′ S, 55°43.349′ E; 19 Feb. 2024; P. Keith and M. Mennesson leg.; MNHN-2025-152; MNHN • 2 ♀♀ ovig. (cl 3.2–3.6 mm); Nouvelle Découverte; 4°20.179′ S, 55°43.349′ E; 21 Feb. 2020; P. Keith and M. Mennesson leg.; MNHN-2025-153; MNHN • 1 ♀ ovig. (cl 3.6 mm); same data as for preceding; DNA voucher: CA2998; MNHN-2025-154; MNHN • 1 ♀ ovig. (cl 3.4 mm); same data as for preceding; DNA voucher: CA2999; MNHN-2025-155; MNHN. – **Silhouette** • 1 ♀ (cl 3.4 mm); Anse Mandon; 4°28.014′ S, 53°13.500′ E; 28 Nov. 2012; P. Keith leg.; DNA voucher: CA1491; MNHN-2025-156; MNHN • 1 ♀ ovig. (cl.4.5 mm); same data as for preceding; DNA voucher: CA1492; MNHN-2025-157; MNHN • 4 ♀♀ ovig. (cl 3.3–3.7 mm), 1 ♀ (cl 3.3 mm); St Gore River; 4°30.115′ S, 55°13.521′ E; 18 Feb. 2020; P. Keith and M. Mennesson leg.; MNHN-2025-158; MNHN.

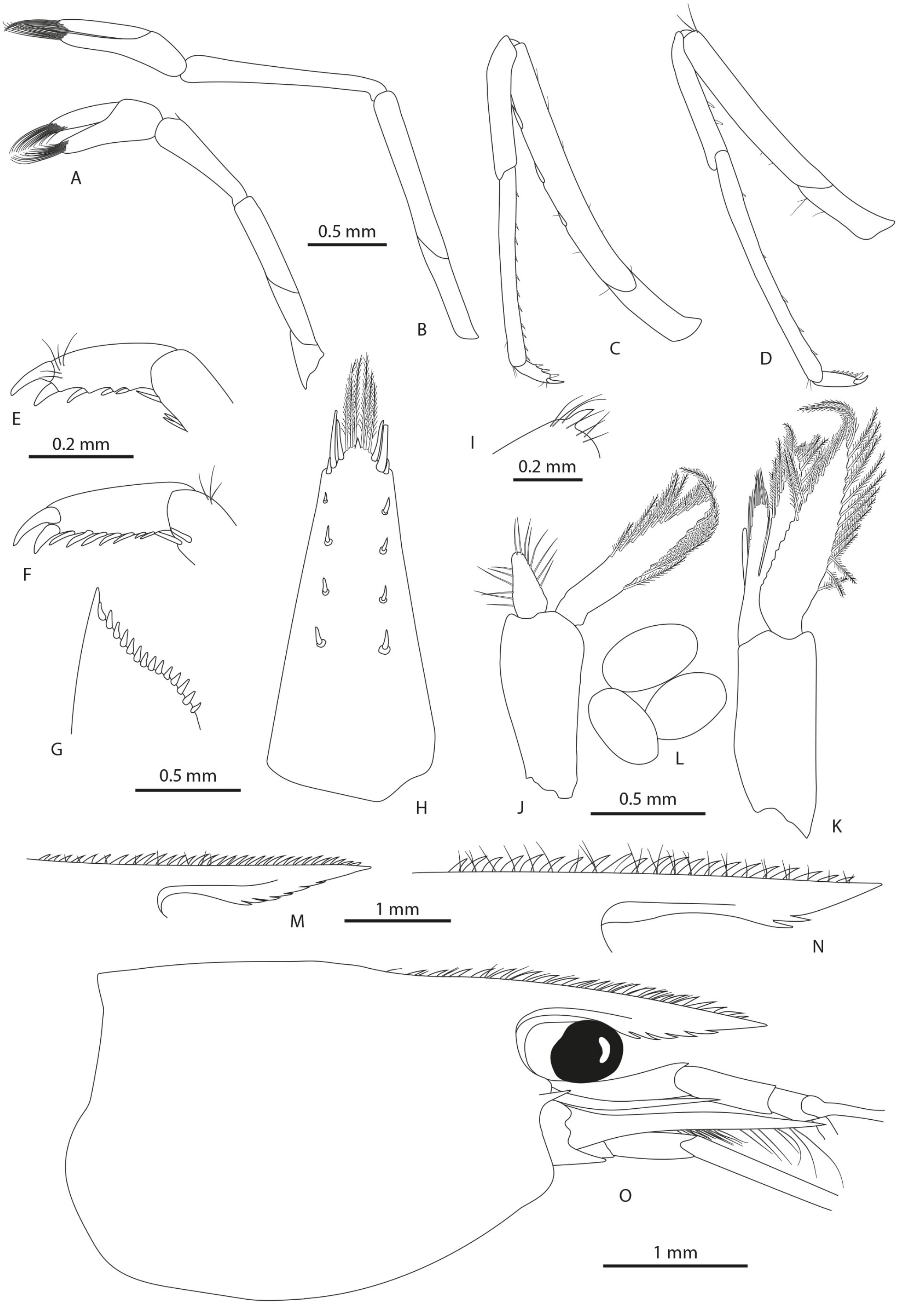

Fig. 3. *Caridina henriettae* sp. nov. **A–F, H, O**. ♂, holotype (MNHN-IU-2015-1914). **G, J–K**. ♂, paratype (MNHN-IU-2015-1909). **I, L**. Ovigerous, ♀, paratype (MNHN-IU-2015-1933). **M**. Ovigerous female, paratype (MNHN-IU-2025-143). **N**. Ovigerous female, paratype (MNHN-IU-2025-152). **A**. First pereiopod. **B**. Second pereiopod. **C**. Third pereiopod. **D**. Fifth pereiopod. **E**. Dactylus of third pereiopod. **F**. Dactylus of fifth pereiopod. **G**. Uropodal diaeresis. **H**. Telson. **I**. pre-anal carina. **J**. First male pleopod. **K**. Second male pleopod. **L**. Undeveloped eggs. **M–N**. Rostrum variation. **O**. Cephalothorax.

Description

Cephalothorax. Antennal spine ventral to inferior orbital angle. Pterygostomian margin rounded. Rostrum (Fig. 3M–O): straight, short, 0.6–0.7 of cl, reaching beyond end of antennular peduncle, armed with 19–31 teeth on dorsal margin, 6–10 of them situated on carapace behind orbital margin, ventral margin with 5–7 teeth. Eyes developed, anterior end reaching to 0.59 × length of basal segment of antennular peduncle. Long antennular peduncle, 0.67 (♀) – 0.78 (♂) × 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 pereiopods. P1 (Fig. 3A): chela about 2.4–3.3 × as long as wide, movable finger 3.7–5.8 as long as wide, 1.4–1.9 × length of palm; carpus 3.6–4.6 × as long as wide, well developed arthrobranch (Fig. 4). P2 (Fig. 3B) more slender and longer than first pereiopod, with chela 3.7–5.2 × as long as wide: movable finger 5.2–11.0 × as long as wide, 1.4–2.4 × as long as palm; carpus slender, 7.7–9.6 × as long as wide. P3 (Fig. 3C): slender, dactylus (Fig. 3E) 3.2–4.0 × as long as wide (terminal spiniform seta included), with 5–8 spiniform setae on flexor margin including terminal one; propodus 11.2–12.8 × as long as wide, 3.2–4.4 × as long as dactylus. P5 (Fig. 3D): dactylus (Fig. 3F) 3.9–4.4 as long as wide, with 7–13 spiniform setae on flexor margin; propodus 15.8–23.9 × as long as wide, 4.4–50 × as long as dactylus.

Abdomen. Third abdominal somite with moderately convex dorsal profile. Sixth abdominal somite 0.49 × as long as carapace, 1.3 × as long as fifth somite, shorter than telson.

Fig. 4. Dissected branchial chamber of a specimen of *Caridina henriettae* sp. nov., paratype (MNHN-2025-149) showing the developed arthrobranch at the base of the first pereiopod (black arrow).

Fig. 5. Live coloration of the species of Atyidae from the South West Indian Ocean. **A**. *Atyoida serrata* Bate, 1888 from La Réunion (credit E. Vigneux). **B**. *Caridina natalensis* De Man, 1908 from the Seychelles (credit P. Keith). **C**. *Caridina spathulirostris* Richters, 1880 from Mauritius (credit Hoareau). **D**. *Caridina henriettae* sp. nov. from the Seychelles (credit P. Keith). **E**. *Caridina similis* Bouvier, 1904 from the Seychelles (credit Y. Zitte). **F**. *C. typus* H. Milne Edwards, 1837 from La Réunion (credit E. Vigneux). **G–H**. *C. henriettae* sp. nov. from La Réunion (credit E. Vigneux).

Telson (Fig. 3H). 3.0 × as long as wide, with 6 pairs dorsal spines including subterminal spines, 1 pair of plain long lateral spines, 1 pair of shorter plain lateral spines and 6–11 long, stalked, plumose processes present at rounded posterior margin.

Male pleopods. Pl1 (Fig. 3J): endopod rounded, 2.0 × as long as wide, reaching 0.35 × as long as endopod, no appendix. Pl2 (Fig. 3K): appendix masculina reaching 0.74 × as long as endopod; appendix interna reaching 0.82 × as long as appendix masculina.

Pre-anal carina (Fig. 3I). High, with a spine.

Uropodal diaeresis (Fig. 3G). With 13–15 spinules.

Eggs. Ovigerous females with small eggs (Fig. 3L), size: 0.37–0.46 × 0.24–0.27 mm.

Distribution

South Africa, Mozambique, Madagascar, Seychelles, Comoros, La Réunion, Mauritius.

Habitat

Fresh or brackish water in the lower course and estuary of rivers.

Remarks

This new species belongs to the *Caridina serratirostris* species group based on the presence of a rostrum armed with many dorsal teeth, at least 6 of them on the carapace, with a usually long stylocerite and with a rounded endopod of the first male pleopod, without appendix interna. But it is easy to distinguish this new species from type specimens of congeners by its telson with a pair of plain long lateral spines and 1 pair of shorter, plain lateral spines (vs only a pair of plain lateral spines) and by its P3 propodus shorter 11.2–12.8 × as long as wide (vs 14.2–17.1). Among this group, our new species is closer to *C. serratirostris* than *C. celebensis* due to the presence of a well-developed arthrobranch at the base of the P1 (vs reduced or absent, see Cai & Shokita 2006b)

Richard & Clark (2010) reported this species under the name *C. serratirostris* from Mozambique and South Africa noting the presence of shorter inner lateral spines on the telson which the syntypes of *C. serratirostris* do not possess. Recent sampling trips to the localities where the species was collected in South Africa – the iLovu or the Umbilo rivers near Durban – by two of the authors (VM and GM) failed to retrieve this species, suggesting either that this area is the southern limit of its range and its presence may be occasional, or that the species does not occur there anymore due to the heavy urbanization around these rivers (pers. obs.).

Identification key for the species of Caridina H. Milne Edwards, 1837 from the South-Western Indian Ocean

1. Stylocerite reaching distinctly beyond the base of the second segment of the antennular peduncle .... ***C. henriettae*** sp. nov.
– Stylocerite at most attaining the end of the first segment of the antennular peduncle 2

2. Rostrum rather constantly long, reaching well beyond scaphocerite .... ***C. natalensis*** De Man, 1908
– Rostrum short or reaching at most to or slightly beyond the end of the antennular peduncle 3

3. Uropodal diaeresis with 16–23 spinules 4
– Uropodal diaeresis with 8–15 spinules 5

4. Dactylus of P5 with 26–37 spiniform setae; ovigerous female with few and large eggs .... ***C. similis*** Bouvier, 1904 (Seychelles)
– Dactylus of P5 with 33–81 spiniform setae; ovigerous female with numerous and small eggs .... ***C. typus*** H. Milne Edwards, 1837

5. Dorsal margin of telson unarmed; dactylus of P5 with 28–30 spiniform setae .... ***C. mauritii*** Bouvier, 1912 (Mauritius)
– Dorsal margin of telson armed; dactylus of P5 with 31–60 spiniform setae .... ***C. spathulirostris*** Richters, 1880 (Mauritius)

Discussion

This updated checklist of the species of *Caridina* from the SWIO gives new insights in the biogeography of the region. Some of the species listed have a wide distribution range due to their amphidromous life cycle: *C. typus* is one of the most widely distributed species of the genus being able to cross the Indo-Pacific barrier. *Caridina natalensis* and *C. henriettae* sp. nov. have a smaller range, being restricted to the SWIO, probably because of a shorter planktonic larval phase (de Mazancourt *et al.* 2023). Endemic land-locked species can be found in the Seychelles with *C. similis* and Mauritius with *C. mauritii* and *C. spathulirostris*, without mentioning the large endemic species flocks from Madagascar that were intentionally left aside from the present study due to the lack of data. The absence of such species in La Réunion Island while two co-exist in the neighboring island of Mauritius can be explained by the older age of the latter (about 10 My vs 3 My) which gave enough time for endemic species to evolve. Similarly, the granitic islands of the Seychelles were formed very early from a microcontinent separated from India in the late Cretaceous (66 My), which also explains the presence of endemic species like *C. similis* or the primary freshwater crab genus *Seychellum* (Ng *et al.* 1995).

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References

Barnard K.H. 1950. Descriptive Catalogue of South African Decapod Crustacea. *Annals of the South African Museum* 38: 1–837.

Bate C.S. 1888. Report on the Crustacea Macrura collected by the Challenger during the years 1873–76. *Report on the Scientific Results of the Voyage of H.M.S. Challenger During the Years 1873–76. Zoology* 24 (52): 1–942.

Bernardes S.C., Pepato A.R., von Rintelen T., von Rintelen K., Page T.J., Freitag H. & de Bruyn M. 2017. The complex evolutionary history and phylogeography of *Caridina typus* (Crustacea: Decapoda): long-distance dispersal and cryptic allopatric species. *Scientific Reports* 7: 9044. https://doi.org/10.1038/s41598-017-08494-w

Benstead J.P., March J.G., Pringle C.M., Ewel K.C. & Short J.W. 2009. Biodiversity and ecosystem function in species-poor communities: community structure and leaf litter breakdown in a Pacific island stream. *Journal of the Natural History Museum and Institute, Chiba* 28 (2): 454–465.

Benzie J.A.H. & de Silva P.K. 1984. The taxonomic relations of the Atyidae (Decapoda: Caridea) of Sri Lanka determined by electrophoretically detectable protein variation. *Journal of Crustacean Biology* 4 (4): 632–644. https://doi.org/10.2307/1548077

Bordage E. 1909. Mutation et régénération hypotypique chez certains Atyidés. *Bulletin scientifique de France et de Belgique* 43: 93–112.

Borradaile L.A. 1907. The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the Leadership of Mr. J. Stanley Gardiner. No. III. — Land and freshwater decapoda. *Transactions of the Linnean Society of London. 2nd Series. Zoology* 12 (1): 63–68. https://doi.org/https://doi.org/10.1111/j.1096-3642.1907.tb00509.x

Bossuyt F., Meegaskumbura M., Beenaerts N., Gower D.J., Pethiyagoda R., Roelants K., Mannaert A., Wilkinson M., Bahir M.M., Manamendra-Arachchi K., Ng P.K.L., Schneider C.J., Oommen O. V & Milinkovitch M.C. 2004. Local endemism within the Western Ghats-Sri Lanka biodiversity hotspot. *Science* 306 (5695): 479–481. https://doi.org/10.1126/science.1100167

Bouchard J.-M., Poupin J., Clevin R., Dumas J. & Dinhut V. 2013. Land, mangrove and freshwater decapod crustaceans of Mayotte region (Crustacea Decapoda). *Atoll Research Bulletin* 592.

Bouvier E.-L. 1904. Crevettes de la famille des Atyidés: espèces qui font partie des collections du Muséum d'Histoire Naturelle. *Bulletin du Muséum national d'Histoire naturelle* 10: 129–138.

Bouvier E.-L. 1905. Observations nouvelles sur les crevettes de la famille des Atyidés. *Bulletin Scientifique de la France et de la Belgique* 39: 57–134.

Bouvier E.-L. 1912a. Les Caridines de l'île Maurice, d'après les envois faits au Muséum par M. le Dr. L.-G. Barbeau. *Bulletin du Muséum national d'Histoire naturelle* 18 (1): 291–300.

Bouvier E.L. 1912b. Sur la classification du genre *Caridina* et les variations extraordinaires d'une espèce de ce genre, la *Caridina brevirostris* Stimpson. *Comptes Rendus Hebdomadaires des Séances de L'Académie des Sciences* 154: 915–922.

Bouvier E.-L. 1912c. Sur les caractères et les variations d'une Caridine de l'île Maurice, la *Caridina Richtersi* Thallwitz. *Bulletin de la Societe entomologique de France* 17 (8): 163–168.

Bouvier E.-L. 1912d. La variabilité des êtres et l'évolution. II. Mutations et évolution des Atyidés. *Revue générale des Sciences pures et appliquées* 1912: 690–695.

Bouvier E.-L. 1913a. Les Caridines des Seychelles. *Transactions of the Linnean Society of London* 15: 447–472.

Bouvier E.L. 1913b. Sur la classification des crevettes de la famille des Atyidés [Crust.]. *Bulletin de la Société entomologique de France* 1913: 177–182.

Bouvier E.-L. 1914. Sur la faune carcinologique de l'île Maurice. *Comptes Rendus de l'Académie des Sciences* 159: 698–704.

Bouvier E.L. 1925. *Recherches sur la Morphologie, les Variations, la Distribution géographique des Crevettes de la Famille des Atyidés*. Encyclopédie entomologique de Roret, Paris.

Bouvier E.-L. & d'Emmerez de Charmoy D. 1919. Mutation d'une Caridine en Ortmannie et observations générales sur les mutations évolutives des Crevettes d'eau douce de la famille des Atyidés. *Comptes Rendus de l'Académie des Sciences* 169: 317–321.

Bright G.R. 1989. The freshwater decapod crustaceans of Yap, Caroline Islands. *In*: Nelson S.G. (ed.) *The Inland Aquatic Habitats of Yap*: 33–36. University of Guam Marine Laboratory, Mangilao, Guam.

Buden D.W., Lynch D.B., Short J.W. & Leberer T. 2001. Decapod crustaceans of the headwater streams of Pohnpei, Eastern Caroline Islands, Federated States of Micronesia. *Pacific Science* 55 (3): 257–265. https://doi.org/10.1353/psc.2001.0019

Cai Y. & Anker A. 2004. On a collection of freshwater shrimps (Crustacea Decapoda Caridea) from the Philippines, with descriptions of five new species. *Tropical Zoology* 17: 233–266. https://doi.org/10.1080/03946975.2004.10531207

Cai Y. & Husana D.E.M. 2009. Cave shrimps of the genus *Edoneus* Holthuis, 1978, from Luzon, the Philippines, with descriptions of three new species (Crustacea: Decapoda: Atyidae). *Raffles Bulletin of Zoology* 57: 51–63. https://doi.org/10.5281/zenodo.5341533

Cai Y. & Ng P.K.L. 2009. The freshwater shrimps of the genera *Caridina* and *Parisia* from karst caves of Sulawesi Selatan, Indonesia, with descriptions of three new species (Crustacea: Decapoda: Caridea: Atyidae). *Journal of Natural History* 43 (17–18): 1093–1114. https://doi.org/10.1080/00222930902767482

Cai Y. & Shokita S. 2006a. Atyid shrimps (Crustacea: Decapoda: Caridea) of the Ryukyu Islands, southern Japan, with descriptions of two new species. *Journal of Natural History* 40 (38–40): 2123–2172. https://doi.org/10.1080/00222930601084049

Cai Y. & Shokita S. 2006b. Report on a collection of freshwater shrimps (Crustacea: Decapoda: Caridea) from the Philippines, with descriptions of four new species. *Raffles Bulletin of Zoology* 54 (2): 245–270.

Cai Y., Ng P.K.L., Shokita S. & Satake K. 2006. On the species of Japanese atyid shrimps (Decapoda: Caridea) described by William Stimpson (1860). *Journal of Crustacean Biology* 26: 392–419. https://doi.org/10.1651/C-2572.1

Cai Y., Ng P.K.L. & Choy S. 2007. Freshwater shrimps of the family Atyidae (Crustacea: Decapoda: Caridea) from Peninsular Malaysia and Singapore. *Raffles Bulletin of Zoology* 55 (2): 277–309. https://doi.org/10.5281/zenodo.5333541

Cai Y., Choy S. & Ng P.K.L. 2009. Epigean and hypogean freshwater shrimps of Bohol Island, central Philippines (Crustacea: Decapoda: Caridea). *Raffles Bulletin of Zoology* 57 (1): 65–89. https://doi.org/10.5281/zenodo.5341574

Carpenter A. 1983. Population biology of the freshwater shrimp *Paratya curvirostris* (Heller, 1862) (Decapoda: Atyidae). *New Zealand Journal of Marine and Freshwater Research* 17 (2): 147–158. https://doi.org/10.1080/00288330.1983.9515992

Castelin M., Marquet G. & Klotz W. 2013. *Elephantis*, a new genus for *Caridina natalensis* Bouvier, 1925 from eastern rivers of Madagascar. *Zootaxa* 3702 (6): 573–586. https://doi.org/10.11646/zootaxa.3702.6.5

Choy S.C. 1991. The atyid shrimps of Fiji with description of a new species. *Zoologische Mededelingen* 65 (27): 343–362.

Choy S. & Horwitz P. 1995. Preliminary key to the species of Australian shrimps (Atyidae) found in inland waters. *In*: *A Preliminary Key to the Species of Decapoda (Crustacea: Malacostraca) found in Australian Inland Waters (Identification Guide No. 5)*: 51–59.

Choy S.C. & Marquet G. 2002. Biodiversity and zoogeography of atyid shrimps (Crustacea: Decapoda: Natantia) of New Caledonia. *Mémoires du Muséum national d'Histoire naturelle* 187 (1): 207–222.

Choy S., Page T.J., de Mazancourt V. & Mos B. 2019. *Caridina malanda*, a new species of freshwater shrimp (Crustacea: Decapoda: Atyidae) from the Wet Tropics World Heritage area, north-eastern Queensland, Australia. *Zootaxa* 4652 (1): 113–125. https://doi.org/10.11646/zootaxa.4652.1.5

Chow L.H., Ma K.Y., Hui J.H.L. & Chu K.H. 2018. Isolation and characterization of polymorphic microsatellite loci for *Caridina cantonensis* and transferability across eight confamilial species (Atyidae, Decapoda). *Zoological Studies* 57 (19): 1–10. https://doi.org/10.6620/ZS.2018.57-19

Coetzee D.J. 1988. Collections of freshwater shrimps along the southern coast of South Africa. *South African Journal of Zoology* 23 (1): 59–63. https://doi.org/10.1080/02541858.1988.11448078

Cook B., Page T. & Hughes J. 2012. Molecular and conservation biogeography of freshwater caridean shrimps in north-western Australia. *In*: Dolan J.R., Montagnes D.J.S., Agatha S., Coats D.W. & Stoecker D.K. (eds) *Crustacean Issues 19: Phylogeography and Population Genetics in Crustacea*: 273–289. John Wiley & Sons, Chichester, UK.

Coleman C.O. 2003. 'Digital inking': How to make perfect line drawings on computers. *Organisms, Diversity & Evolution 3 (Electr. Suppl. 14)*: 1–14. https://doi.org/10.1078/1439-6092-00081

Coleman C.O. 2006. Substituting time-consuming pencil drawings in arthropod taxonomy using stacks of digital photographs. *Zootaxa* 1360: 61–68. https://doi.org/10.11646/zootaxa.1360.1.4

Costa H.H. 1980. Results of the Austrian hydrobiological mission, 1974, to the Seychelles-, Comores-, and Mascarene-Archipelagos: Part III: The ecology and the distribution of Decapoda Caridea in the Indian Ocean Islands of Seychelles, Mauritius, Comores & Réunion. *Annalen des Naturhistorischen Museums in Wien* 83: 673–700.

Costa H.H. 1984. Results of the Austrian-Indian Hydrobiological Mission 1976 to the Andaman-Islands: Part V: Taxonomy and Ecology of the Decapoda-Caridea. *Annalen des Naturhistorischen Museums in Wien* 86 (B): 205–211.

Davie P.J.F. 2002. Crustacea: Malacostraca: Phyllocarida, Hoplocarida, Eucarida (Part 1). *In*: Wells A. & Houston W.W.K. (eds) *Zoological Catalogue of Australia*: 1–551. CSIRO Publishing, Australia, Melbourne.

Day J.A., Stewart B.A., de Moor I.J. & Louw A.E. 2001. *Guide to the Freshwater Invertebrates of Southern Africa. Volume 4: Crustacea III – Bathynellacea, Amphipoda, Isopoda, Spelaeogriphacea, Tanaidacea and Decapoda*. Water Research Commission. Available from https://www.wrc.org.za/wp-content/uploads/mdocs/TT-141-01.pdf [accessed 28 Jun. 2025].

De Man J.G. 1892. Decapoden des Indischen Archipels. *In*: Weber M. (ed.) *Zoologische Ergebnisse einer Reise in Niederländisch Ost-Indien*: 265–527.

De Man J.G. 1908. On *Caridina nilotica* (Roux) and its varieties. *Records of the Indian Museum* 2: 255–283.

Doflein F. 1900. Weitere Mitteilungen über dekapode Crustaceen der k. bayerischen Staatssammlungen. *Sitzungsberichte der Mathematisch-Physikalischen Classe der K.B. Akademie der Wissenschaften zu München* 30: 125–145.

Ebenezer D. & Richard J. 1999. *Caridina typus* H. Milne Edwards 1837 from the Indian mainland – a report. *Journal, Bombay Natural History Society* 96 (3): 427–432.

Edmondson C.H. 1929. Hawaiian Atyidae. *Bulletin of the Bernice P. Bishop Museum* 66: 1–36.

Edmondson C.H. 1935. Atyidae of southern Polynesia. *Occasional Papers of Bernice P. Bishop Museum* 11 (3): 1–19.

Emmerson W.D. 2016. *A Guide to, and Checklist for, the Decapoda of Namibia, South Africa and Mozambique (Volume 1)*. Cambridge Scholars, Newcastle upon Tyne.

Fujino T. 1972. Taxonomy of freshwater shrimps from Japan, with a key to all species. *Nature Study* 18 (5): 5–10.

Fujita J., Zenimoto K., Iguchi A., Kai Y., Ueno M. & Yamashita Y. 2016. Comparative phylogeography to test for predictions of marine larval dispersal in three amphidromous shrimps. *Marine Ecology Progress Series* 560: 105–120. https://doi.org/10.3354/meps11911

Fujita Y. 2007. Decapod crustaceans inhabiting springs on Miyako Islands, the Ryukyus, Japan. *Bulletin of the Miyakojima City Museum* 11: 89–110.

Giebel C.G. 1863. *Caridina siamensis* n. sp. *Zeitschrift für die gesammten Naturwissenschaften* 21: 329–330.

Gurney A.R. 1984. Freshwater shrimp genera *Caridina* and *Parisia* (Decapoda: Caridea: Atyidae) of Madagascar, with descriptions of four new species. *Journal of Natural History* 18 (4): 567–590. https://doi.org/10.1080/00222938400770481

Hamano T. & Honke K. 1997. Control of the migrating course of freshwater amphidromous shrimps by lighting. *Crustacean Research* 26: 162–171. https://doi.org/10.18353/crustacea.26.0_162

Hamasaki K., Nishimoto S., Okada M., Kimura A., Otsubo K. & Dan S. 2020. Dietary effects of phytoplankton and zooplankton on larval survival, duration and growth of four *Caridina* species (Decapoda: Caridea: Atyidae) under laboratory conditions. *Crustacean Research* 49: 225–236. https://doi.org/10.18353/crustacea.49.0_225

Hart R.C. 1983. Temperature tolerances and southern African distribution of a tropical freshwater shrimp *Caridina nilotica* (Decapoda: Atyidae). *South African Journal of Zoology* 18 (2): 67–70. https://doi.org/10.1080/02541858.1983.11447817

Hayashi K.-I. 1989. Prawns, shrimps and lobsters from Japan (48). Family Atyidae – Genus *Caridina* (2). *Aquabiology* 63: 310–314.

Hernawati R., Nurhaman U., Busson F., Suryobroto B., Hanner R., Keith P., Wowor D. & Hubert N. 2020. Exploring community assembly among Javanese and Balinese freshwater shrimps (Atyidae, Palaemonidae) through DNA barcodes. *Hydrobiologia* 847 (2): 647–663. https://doi.org/10.1007/s10750-019-04127-7

Hilgendorf F. 1898. Die Land- und Süsswasser-Dekapoden Ostafrikas. Deutsch-Ost-Afrika. Wissenschaftliche Forschungsresultate über Land und Leute unseres ostafrikanischen Schutzgebietes und der angrenzenden Länder. Band IV. *Die Thierwelt Ost-Afrikas und der Nachbargebiete* 7 (7): 1–37.

Hoarau P.E. 2018. Size at maturity, reproduction and recruitment in an amphidromous shrimp *Caridina serratirostris* De Man, 1892 in Reunion Island (Decapoda: Atyidae). *Cahiers scientifiques de l'océan Indien occidental* 9: 1–10.

Holthuis L.B. 1954. On a collection of decapod Crustacea from the Republic of El Salvador (central America). *Zoologische Verhandelingen* 23: 1–43.

Holthuis L.B. 1965. The Atyidae of Madagascar. *Mémoires du Muséum national d'Histoire naturelle, Série A, Zoologie* 33 (1): 1–48.

Holthuis L.B. 1969. Études hydrobiologiques en Nouvelle-Calédonie (Mission 1965 du Premier Institut de Zoologie de l'Université de Vienne) (suite) IX. The freshwater shrimps (Crustacea Decapoda, Natantia) of New Caledonia. *Cahiers de l'O.R.S.T.O.M., série Hydrobiologie* 3 (2): 87–108.

Holthuis L.B. 1978. A collection of Decapod Crustacea from Sumba, Lesser Sunda Islands, Indonesia. *Zoologische Verhandelingen* 162: 1–55.

Holthuis L.B. 1986. Decapoda. *In*: Botosaneanu L. (ed.) *Stygofauna Mundi. A Faunistic, Distributional, and Ecological Synthesis of the World Fauna inhabiting Subterranean Waters (including the Marine Interstitial)*: 589–615. E.J. Brill / Dr W.Backhuys, Leiden.

Hung M.-S., Chan T.-Y. & Yu H.-P. 1993. Atyid Shrimps (Decapoda: Caridea) of Taiwan, with descriptions of three new species. *Journal of Crustacean Biology* 13 (3): 481–503. https://doi.org/10.2307/1548789

Ideguchi K., Shibata Y. & Kikkawa T. 2000. Larval distribution of amphidromous atyid shrimps (Decapoda: Caridea: Atyidae) in the estuary of the Yukinoura River, Japan. *Transactions of the Nagasaki Biological Society* 51: 5–13.

Imai T., Oonuki T. & Suzuki H. 2020. Records of freshwater decapods and a goby in Kuro-shima Island, Kagoshima Prefecture, southern Japan. *Nature of Kagoshima* 46: 63–71. http://hdl.handle.net/10232/00031389

Johnson D.S. 1960. Some aspects of the distribution of freshwater organisms in the Indo-Pacific area, and their relevance to the validity of the concept of an oriental region in zoogeography. *Proceedings of the Centennial and Bicentennial Congress of Biology, Singapore, 1958*: 170–181.

Johnson D.S. 1963. Distributional and other notes on some fresh-water prawns (Atyidae and Palaemonidae) mainly from the Indo-West Pacific region. *Bulletin of the National Museum of Singapore* 32: 5–30.

Johnson D.S. 1967. Some factors influencing the distribution of freshwater prawns in Malaya. *Proceedings of the Symposium on Crustacea, Held at Ernakulam from January 12 to 15, 1965*: 418–433.

Johnson D.S. 1969. Non-Penaeid prawns of inland waters, including brackish waters, in western Malaysia and Singapore. *In*: Stone B. (ed.) *Proceedings of the Second Symposium on Scientific and Technological Research in Malaysia and Singapore, (1967), STREMS II*: 109–113. University of Malaya.

Jugovic J., Zakšek V., Petković M. & Sket B. 2019. A shrimp out of place. New genus of Atyidae (Crustacea: Decapoda) in subterranean waters of southeastern Europe, with some remarks on Atyidae taxonomy. *Zoologischer Anzeiger* 283: 111–123. https://doi.org/10.1016/j.jcz.2019.08.007

Kamita T. 1959. Ecological notes on the freshwater shrimps and prawns of Japan. On the shrimp *Caridina typus* H. Milne Edwards. *Zoological Magazine* 68: 21–24.

Kamita T. 1961. *Studies of the Freshwater Shrimps, Prawns and Crawfishs from Japan*. Sonoyama-shoten, Matsue.

Kamita T. 1963. Freshwater shrimps and prawns of Amami-oshima, Yaku-shima and Tanega-shima (Further studies on the freshwater shrimps, prawns and crawfishes of Japan 1961, Pt.1). *Bulletin of the Shimane University (Natural Sciences)* 13: 1–28.

Kamita T. 1967. Some shrimps and prawns from New Caledonia. *Bulletin of The Osaka Museum of Natural History* 20: 1–10.

Karge A. & Klotz W. 2007. *Süßwassergarnelen aus aller Welt*. Dähne Verlag, Ettlingen.

Kearse M., Moir R., Wilson A., Stones-Havas S., Cheung M., Sturrock S., Buxton S., Cooper A., Markowitz S., Duran C., Thierer T., Ashton B., Meintjes P. & Drummond A. 2012. Geneious Basic: An integrated and extendable desktop software platform for the organization and analysis of sequence data. *Bioinformatics* 28 (12): 1647–1649. https://doi.org/10.1093/bioinformatics/bts199

Keith P. 2002. Freshwater fish and decapod crustacean populations on Reunion Island, with an assessment of species introductions. *Bulletin français de la Pêche et de la Pisciculture* 364: 97–107. https://doi.org/10.1051/kmae:2002005

Keith P., Vigneux E. & Bosc P. 1999. *Atlas des Poissons et des Crustacés d'Eau Douce de la Réunion*. Muséum national d'Histoire naturelle, Paris.

Keith P., Marquet G., Valade P., Bosc P. & Vigneux E. 2006. *Atlas des Poissons et des Crustacés d'Eau Douce des Comores, Mascareignes et Seychelles.* Muséum national d'Histoire naturelle, Paris.

Keith P., Marquet G., Lord C., Kalfatak D. & Vigneux E. 2010. *Poissons et Crustacés d'Eau Douce du Vanuatu*. Société française d'Ichthyologie, Paris.

Kensley B. 1972. *Shrimps & Prawns of Southern Africa*. Trustees of the South African Museum, Cape Town.

Kensley B. 1981. On the zoogeography of Southern African decapod Crustacea, with a distributional checklist of the species. *Smithsonian Contributions to Zoology* 338: 1–64. https://doi.org/10.5479/si.00810282.338

Klotz W. & De Grave S. 2015. *Elephantis jaggeri*, a replacement name for *Elephantis natalensis* (Bouvier, 1925), a junior primary homonym of *Caridina nilotica* var. *natalensis* De Man, 1908. *Crustaceana* 88 (12–14): 1463–1465. https://doi.org/10.1163/15685403-00003490

Klotz W., von Rintelen T. & Christodoulou M. 2019. Middle East *Caridina* (Decapoda: Atyidae): redescription of *C. fossarum* Heller, 1862, description of three new species, and remarks on the status of *C. syriaca* Bouvier, 1904 and *C. babaulti basrensis* Al-Adhub & Hamzah, 1987. *Zoologischer Anzeiger* 283: 161–185. https://doi.org/10.1016/j.jcz.2019.08.008

Kubo I. 1938. On the Japanese atyid shrimps. *Journal of the Imperial Fisheries Institute* 33 (1): 67–100.

Leberer T. & Cai Y. 2003. Shrimps of the family Atyidae from Guam, Mariana Islands. *Micronesica* 35–36: 353–358.

Leberer T. & Nelson S.G. 2001. Factors affecting the distribution of atyid shrimps in two tropical insular rivers. *Pacific Science* 55 (4): 389–398. https://doi.org/10.1353/psc.2001.0035

Lenz H. 1905. Ostafrikanische Dekapoden und Stomatopoden. *Abhandlungen herausgegeben von der Senckenbergischen Naturforschenden Gesellschaft* 27: 341–392.

Lenz H. 1910. Crustaceen von Madagascar, Ostafrika und Ceylon. *In*: Voeltzkow A. (ed.) *Reise in Ostafrika in den Jahren 1903–1905 mit Mitteln der Hermann und Elis geb. Heckmann Wentzel-Stiftung ausgeführt von Professor Dr. Alfred Voeltzkow. Wissenschaftliche Ergebnisse. Zweiter Band. Systematische Arbeiten*: 539–576. E. Schweizerbart'sche Verlagsbuchhandlung Nägele & Dr Sproesser, Stuttgart.

Lenz H. 1912. Afrikanische Crustaceen aus schwedischen Sammlungen. *Arkiv för Zoologi* 7 (29): 1–10.

Liang X.-Q. 2004. *Fauna Sinica. Invertebrata Vol. 36. Crustacea Decapoda Atyidae*. Science Press, Bejing.

Maciolek J.A. & Ford J.I. 1987. Macrofauna and environment of the Nanpil-Kiepw River, Ponape, Eastern Caroline Islands. *Bulletin of Marine Science* 41 (2): 623–632.

Marquet G. & Keith P. 2008. Taxonomy and distribution of *Caridina similis* Bouvier, 1904 (Decapoda, Atyidae) from the Seychelles Islands. *Crustaceana* 81 (8): 979–987. https://doi.org/10.1163/156854008X354920

Marquet G., Taiki N., Chadderton L. & Gerbeaux P. 2002. Biodiversity and biogeography of freshwater crustaceans (Decapoda: Natantia) from Vanuatu, a comparison with Fiji and New Caledonia. *Bulletin Français de la Pêche et de la Pisciculture* 364: 217–232. https://doi.org/10.1051/kmae:2002012

Marquet G., Keith P. & Vigneux E. 2003. *Atlas des Poissons et des Ccrustacés d'Eau Douce de Nouvelle-Calédonie*. Muséum national d'Histoire naturelle, Paris.

de Mazancourt V., Marquet G., Klotz W., Keith P. & Castelin M. 2017. When molecules and morphology work together: Lines of evidence for the validity of *Caridina buehleri* Roux (Crustacea: Decapoda: Atyidae) and for *C. gueryi* Marquet, Keith & Kalfatak as its junior synonym. *Invertebrate Systematics* 31 (2): 220–230. https://doi.org/10.1071/IS16044

de Mazancourt V., Castelin M., Renneville C., Mlambo M.C., Marquet G. & Keith P. 2019a. Revalidation of *Caridina natalensis* De Man, 1908 (Crustacea: Decapoda: Atyidae) in the South western Indian Ocean. *Zootaxa* 4543 (3): 375–387. https://doi.org/10.11646/zootaxa.4543.3.3

de Mazancourt V., Klotz W., Marquet G., Mos B., Rogers D.C. & Keith P. 2019b. The complex study of complexes: The first well-supported phylogeny of two species complexes within genus *Caridina* (Decapoda: Caridea: Atyidae) sheds light on evolution, biogeography, and habitat. *Molecular Phylogenetics and Evolution* 131: 164–180. https://doi.org/10.1016/j.ympev.2018.11.002

de Mazancourt V., Boseto D., Marquet G. & Keith P. 2020. 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. *European Journal of Taxonomy* 696: 1–86. https://doi.org/10.5852/ejt.2020.696

de Mazancourt V., Abdou A., Castelin M., Ellien C., Lord C., Mennesson M., Renneville C., Marquet G. & Keith P. 2023. Molecular ecology of the freshwater shrimp *Caridina natalensis* and comparative analysis with other amphidromous species (Decapoda, Teleostei, and Gastropoda). *Hydrobiologia* 850: 3997–4014. https://doi.org/10.1007/S10750-023-05283-7

Milne Edwards H. 1837. *Histoire Naturelle des Crustacés, Comprenant l'Anatomie, la Physiologie et la Classification de ces Animaux*. Librairie encyclopédique de Roret. https://doi.org/10.5962/bhl.title.39738

Miers E.J. 1879. Crustacea. *In*: An account of the petrological, botanical, and zoological collections made in Kerguelen's Land and Rodriguez during the transit of Venus Expeditions, carried out by order of her Majesty's Government in the years 1874–75. *Philosophical Transactions of the Royal Society of London* 168: 485–496.

Miyake S. 1938. Notes on decapod crustaceans collected by Prof. Teiso Esaki from Micronesia. *Annotationes Zoologicae Japonenses* 17 (1): 107–112.

Mulochau T., Conand C., Stöhr S., Eleaume M. & Chabanet P. 2014. A first inventory of Echinodermata at Juan de Nova (Iles Eparses, France) in the Mozambique Channel. *Western Indian Ocean Journal of Marine Sciences* 13 (1): 23–30.

Nakahara Y., Hagiwara A., Miya Y. & Hirayama K. 2005. Larval rearing of three amphidromous shrimp species (Atyidae) under different feeding and salinity conditions. *Aquaculture Science* 53 (3): 305–310. https://doi.org/10.11233/aquaculturesci1953.53.305

Nakahara Y., Hagiwara K. & Hirayama Y. 2007. Species identification of later larval stages in three amphidromous shrimp species (Atyidae). *Aquaculture Science* 55 (3): 387–394. https://doi.org/10.11233/aquaculturesci1953.55.387

Ng P.K.L. 1985. Freshwater decapod crustaceans from Pulau Tioman, West Malaysia. *Zoologische Mededelingen* 59 (14): 149–162.

Ng P.K.L. 1994. On a collection of freshwater decapod crustaceans from the Kinabatangan River, Sabah, Malayasia, with descriptions of three new species. *Sabah Museum Journal* 1 (2): 73–91.

Ng P.K.L. 1995. The freshwater crabs and prawns (Crustacea: Decapoda) of Bako National Park, Sarawak, Malaysia, with descriptions of one new genus and three new species. *The Raffles Bulletin of Zoology* 43 (1): 181–205.

Ng P.K.L., Števčić Z. & Pretzmann G. 1995. A revision of the family Deckeniidae Ortmann, 1897 (Crustacea: Decapoda: Brachyura: Potamoidea), with description of a new genus (Gecarcinucidae: Gecarcinucoidea) from the Seychelles, Indian Ocean. *Journal of Natural History* 29 (3): 581–600. https://doi.org/10.1080/00222939500770201

Nobili G. 1899. Contribuzioni alla conoscenza della fauna carcinologica della Papuasia, delle Molluche e dell' Australia. *Annali del Museo Civico di Storia Naturale di Genova ser. 2* 40: 230–282.

Ooishi S. 1970. Marine invertebrate fauna of the Ogasawara and Volcano Islands collected by S. Ooishi, Y. Tomida, K. Izawa and S. Manabe. *In*: *Report on the Marine Biological Expedition to the Ogasawara (Bonin) Islands, 1968*: 75–89.

Ortmann A.E. 1894a. Crustaceen. *In*: R. Semon (ed.) *Zoologische Forschungsreisen in Australien und dem Malayischen Archipel. Mit Unterstützung des Herrn Dr. Paul von Ritter ausgeführt in den Jahren 1891–1893*. V. Denkschriften der medizinisch-naturwissenschaftlichen Gesellschaft zu Jena 8: 3–80.

Ortmann A.E. 1894b. A study of the systematic and geographical distribution of the decapod family Atyidæ Kingsley. *Proceedings of the Academy of Natural Sciences of Philadelphia* 46: 397–416. https://www.jstor.org/stable/4062131

Page T.J., von Rintelen K. & Hughes J.M. 2007. An island in the stream: Australia's place in the cosmopolitan world of Indo-West Pacific freshwater shrimp (Decapoda: Atyidae: Caridina). *Molecular Phylogenetics and Evolution* 43 (2): 645–659. https://doi.org/10.1016/j.ympev.2006.08.007

Pfeffer G. 1889. Übersicht der von Herrn Dr. Franz Stuhlmann in Ägypten, auf Sansibar und dem gegenüberliegenden Festlande gesammelten Reptilien, Amphibien, Fische, Mollusken und Krebse. *Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten* 6 (2): 1–36.

Rahayu P. & Annawaty A. 2019. Diversity of freshwater shrimps (Decapoda: Caridea) in Labobo Island, Sulawesi. *Zoo Indonesia* 28 (2): 64–75. https://doi.org/10.13057/biodiv/d260348

Richard J. & Clark P.F. 2009. African *Caridina* (Crustacea: Decapoda: Caridea: Atyidae): redescriptions of *C. africana* Kingsley, 1882, *C. togoensis* Hilgendorf, 1893, *C. natalensis* Bouvier, 1925 and *C. roubaudi* Bouvier, 1925 with descriptions of 14 new species. *Zootaxa* 1995: 1–75. https://doi.org/10.11646/zootaxa.1995.1

Richard J. & Clark P.F. 2010. *Caridina* H. Milne Edwards, 1837 (Crustacea: Decapoda: Caridea: Atyoidea: Atyidae) – Freshwater shrimps from eastern and Southern Africa. *Zootaxa* 337 (2372): 305–337. https://doi.org/10.11646/zootaxa.2372.1.24

Richters F. 1880. *Beiträge zur Meeresfauna der Insel Mauritius und der Seychellen bearbeitet von K. Möbius, F. Richters und E. von Martens nach Sammlungen, angelegt auf einer Reise nach Mauritius*. Verlag der Gutmann'schen Buchhandlung, Berlin.

Riek E.F. 1953. The Australian freshwater prawns of the family Atyidae. *Records of the Australian Museum* 23 (3): 111–121. https://doi.org/10.3853/j.0067-1975.23.1953.625

Roux J. 1904. Décapodes d'eau douce de Célèbes (Genres Caridina et Potamon). *Revue suisse de Zoologie* 12 (3): 539–572. https://doi.org/10.5962/bhl.part.10150

Roux J. 1926a. An account of australian Atyidae. *Records of the Australian Museum* 15 (3): 237–254. https://doi.org/10.3853/j.0067-1975.15.1926.812

Roux J. 1926b. Crustacés décapodes d'eau douce de la Nouvelle-Calédonie. *In*: *Nova Caledonia. Forschungen in Neu-Caledonien und auf den Loyalty-Inseln. A. Zoologie*: 181–240.

Roux J. 1929. Crustacea. III. Atyidae. Contribution à l'étude de la faune de Madagascar. *Faune des Colonies françaises* 3: 293–319.

Roux J. 1934. Notes de Carcinologie mélanésienne I. Décapodes d'eau douce de l'Archipel Bismarck et des iles de l'Amirauté. *Revue suisse de Zoologie* 41: 217–234. https://doi.org/10.5962/bhl.part.146001

Saito M., Yamashiro T., Hamano T. & Nakata K. 2012. Factors affecting distribution of freshwater shrimps and prawns in the Hiwasa River, southern Japan. *Crustacean Research* 41: 27–46. https://doi.org/http://doi.org/10.18353/crustacea.41.0_27

Sharp B. 1893. Catalogue of the crustaceans in the Museum of the Academy of Natural Sciences of Philadelphia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 45 (1): 104–127.

Shokita S. 1975. The distribution and speciation of the inland water shrimps and prawns from the Ryukyu Islands – I. *Bulletin of Science & Engineering Division, University of the Ryukyus, Mathematics & Natural Sciences* 18: 115–136.

Shokita S. 1979. The distribution and speciation of the inland water shrimps and prawns from the Ryukyu Islands – II. *Bulletin of the College of Science, University of Ryukyus* 28: 193–278.

Shokita S. 1981. Life-history of the family Atyidae (Decapoda, Caridea). *Aquabiology* 12: 15–23.

Shokita S. 2002. The origin of the terrestrial and freshwater crustacean fauna of the Ryukyu Islands, southern Japan. *In*: Kimura M. (ed.) *The Formation of the Ryukyu Arc and Migration of Biota to the Arc*: 163–173. Okinawa.

Shokita S. 2003. Atyidae. *In*: Nishida M., Shikatani N. & Shokita S. (eds) *The Flora and Fauna of Inland Waters in the Ryukyu Islands*: 249–254. Tokai University Press, Tokyo.

Shokita S. & Nishijima S. 1977. Land and inland water crustaceans of north-eastern Ryukyu, the Ryukyu Islands. *Ecological Studies of Nature Conservation of the Ryukyu Islands III*: 185–202.

Shokita S., Nagai T., Fujita Y., Naruse T., Ito A., Nagamatsu T., Yamazaki T., Shinjo K. & Nagata Y. 2002. Distribution and abundance of crustaceans in the Ohura River mangrove swamp of Okinawa Island, Japan. *In*: *A Comprehensive Study for Mangrove Ecosystem in Okinawa*: 73–86. Research Institute for Subtropics, Okinawa.

Shokita S., Fujita Y., Nagai T., Ito A., Kawahara T. & Noho H. 2003a. Distribution and abundance of crustaceans in the mangrove swamp and upper reaches of the Nagura River, Ishigaki Island, Japan. *In*: *A Comprehensive Study for Mangrove Ecosystem in Okinawa*: 97–111. Research Institute for Subtropics, Okinawa.

Shokita S., Fujita Y., Nagai T., Ito A., Kawahara T. & Noho H. 2003b. Distribution and abundance of crustaceans in the mangrove swamp and upper reaches of the Sumiyou River and Yakugachi River, Amami-ohshima Island, Japan. *In*: *A Comprehensive Study for Mangrove Ecosystem in Okinawa*: 113–124. Research Institute for Subtropics, Okinawa.

Short J.W. 2000. Freshwater and terrestrial Crustacea. *In*: Ryan M. & Burwell C. (eds) *Wildlife of Tropical North Queensland: Cooktown to Mackay*: 58–67. Queensland Museums, South Brisbane.

Short J.W. 2009. *Freshwater Crustacea of the Mimika Region, New Guinea*. PT Freeport Indonesia, Timika.

Shy J.Y. & Yu H.P. 1998. *Freshwater Shrimps of Taiwan*. National Museum of Marine Biology and Aquarium.

de Silva K.H.G.M. 1982. Studies on Atyidae (Decapoda, Caridea) of Sri Lanka I. On a new species, a new subspecies, and two species new to Sri Lanka. *Crustaceana* 43 (2): 127–141.

de Silva K.H.G.M. 1983. Studies on Atyidae (Decapoda, Caridea) of Sri Lanka. II. Distribution of atyid shrimps in Sri Lanka. *Crustaceana* 44 (2): 205–215.

Soomro A.N., Suzuki H., Kitazaki M. & Kobari T. 2010. Species composition of freshwater shrimp in Kikai-jima Island, Southern Japan. *Journal of Crustacean Biology* 30 (4): 721–726. https://doi.org/10.1651/09-3208.1

Soomro A.N., Suzuki H., Kitazaki M. & Yamamoto T. 2011. Reproductive aspects of two atyid shrimp *Caridina sakishimensis* and *Caridina typus* in head water streams of Kikai-Jima Island, Japan. *Journal of Crustacean Biology* 31 (1): 41–49. https://doi.org/10.1651/10-3329.1

Soomro A.N., Waryani B., Hiroshi S., Baloch W.A., Masashi S., Qureshi S.T. & Saddozai S. 2016. Diversity of freshwater shrimps (Atyidae and Palaemonidae) along the continnum of Urabaru Stream, Kikaijima Island, Japan. *Pakistan Journal of Zoology* 48 (2): 569–573.

Soomro A.N., Suzuki H., Qureshi S.T. & Baloch W.A. 2020. Migration of two atyid shrimps, *Caridina sakishimensis* (Fujino and Shokita, 1976) and *Caridina typus* (H. Milne Edwards, 1937) in Urabaru, Kikai-jima Island, Southern Japan. *Pakistan Journal of Zoology* 52 (4): 1333–1340. https://doi.org/10.17582/journal.pjz/20181207061204

Stimpson W. 1860. Prodromus descriptionis animalium evertebratorum, quae in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit. Pars VIII, Crustacea Macrura. *Proceedings of the Academy of Natural Sciences of Philadelphia* 1860: 22–47.

Suzuki H. 1972. Freshwater and commensal crustacean decapods from the Bonin Islands. *Science Reports Yokohama Univ.* 19: 1–26.

Suzuki H. 2001. A comment on the geological formation of the Mishima islands (Takeshima, Ioujima and Kuroshima) as inferred from their freshwater crustacean faunas. *Kagoshima University Research Center for the Pacific Islands, Occasional Papers* 34: 137–140

Suzuki H. & Sato M. 1994. *Kagoshima Nature Guide — Freshwater Shrimps, Prawns and Crabs*. Nishinohon-shimbunsha, Fukuoka.

Suzuki H., Tanigawa N., Nagamoto T. & Tsuda E. 1993. Distribution of freshwater caridean shrimps and prawns (Atyidae and Palaemonidae) from Southern Kyushu and adjacent islands, Kagoshima Prefecture, Japan. *Crustacean Research* 22: 55–64. https://doi.org/10.18353/crustacea.22.0_55

Thallwitz J. 1891. Decapoden-studien, insbesondere basirt auf A.B.Meyer's Sammlungen im Ostindischen Archipel, nebst einer Aufzählung der Decapoden und Stomatopoden des Dresdener Museums. *Abhandlungen und Berichte des Königlichen Zoologischen und Anthropologisch-Ethnographischen Museums zu Dresden* 1890–1891 (3): 1–55.

Tiwari K.K. & Pillai R.S. 1971. Atyid Shrimps of the genus *Caridina* H. Milne Edwards, 1837, from the Andaman Islands (Decapoda, Caridea). *Crustaceana* 21 (1): 79–91.

Vijayamma J.K., Dhamorikar A. & Manchi S. 2021. A new species of *Caridina* H. Milne Edwards, 1837 (Family: Atyidae) from a limestone cave on Interview Island, Andaman and Nicobar Islands, India. *Zootaxa* 5057 (3): 402–414. https://doi.org/https://doi.org/10.11646/zootaxa.5057.3.5

von Rintelen K., von Rintelen T. & Glaubrecht M. 2007. Molecular phylogeny and diversification of freshwater shrimps (Decapoda, Atyidae, *Caridina*) from ancient Lake Poso (Sulawesi, Indonesia) – The importance of being colourful. *Molecular Phylogenetics and Evolution* 45 (3): 1033–1041. https://doi.org/10.1016/j.ympev.2007.07.002

von Rintelen K., Karge A. & Klotz W. 2008. News from a small island – First record of a freshwater shrimp (Decapoda, Atyidae, *Caridina*) from Peleng, Banggai Islands, Indonesia. *Journal of Natural History* 42 (33–34): 2243–2256. https://doi.org/10.1080/0022293080225468

Weber M. 1897. Beiträge zur Kenntniss der Fauna von Süd-Afrika. I. Zur Kenntniss der Süsswasser-Fauna von Süd-Afrika. *Zoologische Jahrbücher* 10 (2): 135–200.

Wood L.E., de Grave S. & Daniels S.R. 2019. A comparative evolutionary study reveals radically different scales of genetic structuring within two atyid shrimp species (Crustacea: Decapoda: Atyidae). *Zoological Journal of the Linnean Society* 186 (1): 200–212. https://doi.org/https://doi.org/10.1093/zoolinnean/zly044

Woltereck E. 1937a. Systematisch-variationsanalytische Untersuchungen über die Rassen- und Artbildung bei Süßwassergarneelen aus der Gattung *Caridina* (Decapoda, Atyidae). *Internationale Revue der gesamten Hydrobiologie und Hydrographie* 34 (1–6): 208–262. https://doi.org/10.1002/iroh.19370340113

Woltereck E. 1937b. Zur Systematik und geographischen Verbreitung der Caridinen. *Internationale Revue der gesamten Hydrobiologie und Hydrographie* 34 (1–6): 294–330. https://doi.org/10.1002/iroh.19370340117

Wowor D., Cai Y. & Ng P.K.L. 2004. Crustacea: Decapoda, Caridea. *In*: Yule C.M. & Sen Y.H. (eds) *Freshwater Invertebrates of the Malaysian Region*: 337–357. Academy of Sciences Malaysia.

Yeo D.C.J., Cai Y. & Ng P.K.L. 1999. The freshwater and terrestrial decapod Crustacea of Pulau Tioman, Peninsular Malaysia. *Raffles Bulletin of Zoology* 47 (6 Suppl.): 197–244.

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