

***Salmoneus durisi* sp. nov., an infaunal alpheid shrimp probably associated with callianassid ghost shrimps in the tropical Indo-West Pacific (Malacostraca: Decapoda: Caridea)**

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Abstract

A new species of the alpheid shrimp genus *Salmoneus* Holthuis, 1955, probably an obligate associate of ghost shrimp burrows, is described based on material from Oman (type locality: Darsait near Muscat), Iran, Philippines, Indonesia and Solomon Islands. *Salmoneus durisi* **sp. nov.** is characterised principally by both chelipeds enlarged, robust, with ventral and dorsal margins of chelae carrying long fine setae, and with minor chela fingers armed with a few large teeth on cutting edges. All specimens of *Salmoneus durisi* **sp. nov.** were collected either directly from burrows of larger decapod crustaceans with the aid of a suction pump, or by exposing burrows dug under large subtidal rocks. The Iranian specimen was found together with its presumed host, *Neocallichirus calmani* (Nobili, 1904).

Key words. Alpheididae, *Salmoneus*, symbiosis, infauna, new species, marine biodiversity, Indian Ocean, Pacific Ocean.

Introduction

Most species in the third-largest alpheid shrimp genus *Salmoneus* Holthuis, 1955 are characterised by the very unequal and asymmetrical chelipeds, i.e. with a greatly enlarged major chela, typically with cutting edges of both fingers (variously) serrated, and a much smaller, weaker minor chela, with cutting edges of both fingers usually unarmed (e.g. Coutière 1899; Banner & Banner 1981; Anker & Marin 2006). However, several species presently assigned to *Salmoneus* display notable deviations from this configuration in that the chelipeds are subequal in size and asymmetrical in shape (Dworschak *et al.* 2000; Anker 2003, 2010; Komai 2009; Anker *et al.* 2014). The cheliped asymmetry most notably affects the proportions of the chela palm and the armature on the cutting edges of the chela fingers. Presently it is not known

whether these species are closely related, e.g. forming a single clade within *Salmones*, but remarkably all of them seem to be associated with muddy substrates and/or burrows of larger animals, typically ghost shrimps of the family Callinassidae (Dworschak *et al.* 2000; Komai 2009).

Recent sampling realised by the two authors independently at several localities across the Indo-East Pacific (AA in Oman, Indonesia and Solomon Islands in 2010–2016, HA in Iran in 2018) and specifically targeting infaunal decapod crustaceans resulted in the collection of several specimens of *Salmones* with subequal enlarged chelipeds. An additional, morphologically very similar specimen was collected by Dr. Peter C. Dworschak during the Panglao 2004 Expedition in the Philippines (see Acknowledgements). This material combined is used herein as a basis for the description of a new, possibly symbiotically living species of *Salmones*, apparently widely distributed in the Indo-West Pacific.

The material used in the present study is deposited in the crustacean collections of the following institutions: Muséum National d'Histoire Naturelle, Paris, France (MNHN); Oxford University Museum of Natural History, Oxford, United Kingdom (OUMNH); Museum Zoologi Bogor, Lembaga Ilmu Pengetahuan Indonesia - LIPI (Bogor Zoology Museum, Indonesian Institute of Sciences), Bogor, Indonesia (MZB). Carapace length (cl, in mm) is measured from the tip of the rostrum to the posterior margin of the carapace. Field collection number (fcn) corresponding to a photographic voucher is provided for all specimens. The term “cuspidate seta” is used for stout spiniform setae inserted in deep pits, e.g. on the dorsal surface of the telson and on the pereopod ischia (formerly often called “spines”). The distinction between the major and minor chelipeds follows Anker (2010) independently from the actual relative size of the chelipeds. The new species’ description is based on the holotype and additional material, with tentatively identified material discussed further below.

Taxonomic section

Genus *Salmones* Holthuis, 1955

***Salmones durisi* sp. nov.**

Figs. 1–5

Type material. Holotype: ovigerous specimen (cl 5.0 mm, dissected), OUMNH ZC 2015-08-030, Oman, near Muscat, Darsait, 23°38'04.7"N 58°32'52.0"E, near-shore sand flat with rocks, depth at low tide: 0.5–1 m, deep under large rocks on fine sand-silt, leg. A. Anker, 24.08.2010 [fcn OM-002].

Additional material. 1 non-ovigerous specimen (cl 5.2 mm), MNHN-IU-~~00000~~2014-20782, Iran, Persian Gulf, Qeshm Island, Ramchah, 26°53'42.81"N 56°09'41.09"E, sandy and partly rocky intertidal, sand with smaller and larger boulders, in burrow of *Neocallichirus calmani* (Nobili, 1904), leg. H. Ashrafi, 30.01.2018; 1 non-ovigerous specimen (cl 4.3 mm, minor cheliped missing), MNHN-IU-~~00000~~2014-20783, Philippines, Panglao 2004 International Expedition, sta. M11, Panglao Island, Sungcolan Bay, 9°38.3' N, 123°49.6' E, rock-sand intertidal, fringing mangrove, suction pump, leg. P.C. Dworschak 15.06.2004 [fcn PD50].

Tentatively identified material: *Salmoneus* cf. *durisi* **sp. nov.** 1 ovigerous specimen (cl 4.7 mm), MZB 00000, Indonesia, east of Flores, Kanawa Island, shallow intertidal and subtidal sand flat with adjacent sea grass and abundant coral rubble, leg. A. Anker, 27–28.09.2014 [fcn K24]; 1 ovigerous specimen (cl 2.5 mm, missing minor cheliped), OUMNH ZC 2015-08-032, Solomon Islands, New Georgia, Munda, Kunda Kunda Hite, shallow sand-rubble flat with coral “bommies” near reef, deep under coral rubble, leg. A. Anker, 15.09.2016 [fcn SOL-154].

Description. Small-sized (maximum cl 5.2 mm) alpheid shrimp with stout, non-compressed body. Carapace glabrous, not conspicuously setose. Rostrum moderately developed, subtriangular, about as long as broad at base, acute distally, reaching or slightly overreaching distal margin of first article of antennular peduncle, lateral margins almost straight; rostral or mid-dorsal carina, as well as subdistal tooth on ventral margin absent (Fig. 1a, b, j). Orbital teeth moderately developed, sharp distally, pointing somewhat mesially in dorsal view, anteriorly in lateral view (Fig. 1a, b, j). Pterygostomial region broadly rounded; anterolateral suture present (Fig. 1b); cardiac notch well developed. Each epistomial sclerite with strong acute process.

Pleon with first to fourth pleura broadly rounded to slightly angular; fifth pleuron with posteroventral margin forming subacute angle; sixth pleonite with short suture at posteroventral angle, but without well-marked articulated flap, posterior margin blunt, not acutely produced (Fig. 1c); preanal plate rounded. Telson moderately slender, subrectangular, distinctly tapering distally, about 2.7 times as long as maximum (proximal) width; dorsal surface with two pairs of stout cuspidate setae both inserted at some distance from lateral margin, first pair at about telson mid-length, second pair at about 0.7 of telson length; posterior margin with deep U-shaped notch flanked by two long plumose setae, remaining margin with two pairs of stout spiniform setae, mesial slightly stouter and about 1.2–1.3 times as long as lateral (Fig. 1d, e).

Eyes completely or almost completely concealed in dorsal view, except for distal-most portion, partly exposed in lateral view; corneal area somewhat reduced, restricted to

dorsolateral surface of eyestalk; anteromesial margin of eyestalk rounded, without tubercle (Fig. 1a, b, j).

Antennular peduncle stout; stylocerite elongate, moderately slender, with sharp tip overreaching mid-length of second article but not reaching its distal margin; ventromesial carina with small anteriorly directed tooth; second article slightly longer than wide; lateral antennular flagellum with very short fused portion, consisting of three joints, and well-developed secondary ramus, latter with four groups of aesthetascs; mesial antennular flagellum much stouter than lateral (Fig. 1a, b, f). Antenna with stout basicerite bearing stout sharp distoventral tooth; scaphocerite ovoid in general shape, not overreaching end of antennular peduncle, with straight lateral margin and broad blade, latter convex anteriorly, slightly overreaching small sharp distolateral tooth; carpocerite very short, cylindrical, not reaching mid-length of scaphocerite (Fig. 1a, b, g).

Third maxilliped slender, pediform; coxa with rounded lateral plate; antepenultimate article slightly flattened ventrolaterally; penultimate article less than four times as long as wide; ultimate article tapering distally, with numerous rows of short serrulate setae and longer simple setae, tip with blunt corneous point and one robust spiniform seta subdistally; arthrobranch well developed (Fig. 2a, b).

Chelipeds subequal in size, asymmetrical in shape, carried flexed when not in use (Figs. 3–5). Major cheliped moderately slender; ischium unarmed, flattened ventrolaterally, with blunt process distomesially; merus about 4.5 times as long as maximum width, somewhat wider near mid-length, smooth, distodorsal and distomesial margins blunt, ventrolateral surface distinctly depressed; carpus somewhat bent, cup-shaped, with several lobes distally; chela subcylindrical, more or less rounded in cross-section (Fig. 3a, b); palm shorter than fingers, smooth, except for broad proximolateral bump, ventral margin with row of long fine setae continuing onto pollex, dorsal margin with some long fine setae subdistally; fingers not gaping when closed, subequal in length, crossing distally, not noticeably twisted, with evenly serrated cutting edges; cutting edge of both dactylus and pollex with about 20 subtriangular teeth, most-distal teeth in form of shallow bumps; dactylus with row of long fine setae along dorsal margin (Fig. 3c, d). Minor cheliped as long and as robust as major cheliped, with slightly stouter chela; ischium unarmed, slightly flattened ventrolaterally; merus about five times as long as maximum width, somewhat wider near mid-length, smooth, distodorsal and distomesial margins blunt, ventrolateral surface depressed; carpus somewhat bent, cup-shaped, with two rounded lobes distally (Fig. 3e); chela slightly compressed, more or less oval in cross-section; palm about 1.5 times longer than dactylus, smooth, ventral margin with row

of long fine setae continuing onto pollex, dorsal margin also with row of long fine setae; fingers somewhat gaping when closed, unequal in length, dactylus much longer than pollex, strongly crossing distally, slightly twisted; dactylus with distal portion strongly curved, bent backwards, its cutting edge armed with one proximal low tooth-like process and two distinct teeth, first tooth stronger, rounded, second (most-distal) tooth much smaller, situated at about mid-length of dactylus, distal portion unarmed, hiatus-like, dorsal margin with row of long fine setae; pollex less strongly curved compared to dactylus, its cutting edge armed with two large teeth intercalating with dactylar teeth (Fig. 3f, g).

Second pereopod slender; ischium unarmed on ventrolateral surface; merus about 1.4 times as long as ischium; carpus with five joints, first joint slightly longer than sum of other four joints, with ratio of joints approximately equal to 4.0/1.0/0.7/0.7/1.2; chela much longer than distal-most carpal joint, simple (Fig. 2c). Third pereopod moderately robust; ischium with two cuspidate setae on ventrolateral surface; merus about five times as long as wide, unarmed; carpus almost 0.6 times length of merus, noticeably more slender, with small spiniform seta distoventrally; propodus not noticeably longer than carpus, with three widely spaced spiniform setae on ventral margin, in addition to two spiniform setae near dactylar base, one of them much longer; dactylus about half-length of propodus, moderately slender, conical, simple, smoothly curving distally (Fig. 2d, e). Fourth pereopod more slender than third pereopod; ischium with one very small cuspidate seta on ventrolateral surface; merus almost five times as long as wide; carpus half as long as merus, more slender, with small spiniform seta distoventrally; propodus distinctly longer than carpus, with three spiniform setae on ventral surface, in addition to one pair of spiniform setae distoventrally, adjacent to dactylus; dactylus about half-length of propodus, similar to that of third pereopod (Fig. 2f). Fifth pereopod more slender than fourth pereopod; ischium unarmed; merus more than six times as long as wide, unarmed; carpus noticeably more slender than merus, about 0.8 times length of merus, unarmed distoventrally; propodus long, slender, 1.2 times as long as carpus, with few rows of serrulate setae forming moderate cleaning brush on distal ventrolateral surface, ventromesial margin with one stout and several weaker spiniform setae, distal margin with one pair of longer spiniform setae; dactylus about 0.4 times length of propodus, very slightly curved, otherwise similar to that of third and fourth pereopods (Fig. 2g, h).

Second pleopod with appendix masculina much shorter than appendix interna, furnished with five stiff setae on apex and subapical area (Fig. 1h). Uropod with lateral lobe of protopod ending in blunt tooth; exopod broadly ovoid, with sharp distolateral tooth and well-developed

distolateral spiniform seta; diaeresis sinuous, with strong subtriangular tooth mesial to spiniform seta; endopod as long as exopod, ovoid, without specific features (Fig. 1i).

Colouration. Semitranslucent creamy-whitish, chelipeds hyaline-white, yolk-yellow ovaries visible due to translucence of carapace integument (Figs. 4, 5).

Type locality. Darsait (also spelled as Darsayt), near Muscat, Oman.

Distribution. Indo-West Pacific: Oman (near Muscat), Iran (Qeshm Island in the Persian Gulf), Philippines (Panglao), possibly also in central Indonesia (Kanawa Island west of Flores) and Solomon Islands (New Georgia). However, see remarks on the material from the Solomon Islands and Indonesia tentatively identified as *S. cf. durisi* **sp. nov.** below.

Ecology. Intertidal and shallow subtidal (less than 2 m) sand flats or sandy-rocky flats, typically associated with burrows. The Iranian specimen was collected together with the callianassid ghost shrimp, *Neocallichirus calmani* (Nobili, 1904); for all the other specimens, the hosts remain unknown, but suspected to be large burrowing callianassids.

Etymology. The new species is named after the authors' colleague, Dr. Zdeněk Ďuriš (University of Ostrava, Czech Republic), a well-known expert of caridean shrimps.

Remarks. *Salmonius durisi* **sp. nov.** belongs to a small group of species characterised by both chelipeds enlarged, equal or subequal in size, however, more or less asymmetrical in shape. These species are: *Salmonius sketi* Fransen, 1991, *S. erasimorum* Dworschak, Anker & Abed-Navandi, 2000, *S. caboverdensis* Dworschak, Anker & Abed-Navandi, 2000 (all three from the eastern Atlantic), *S. degravei* Anker, 2010 (from the western Atlantic), *S. seticheles* Anker, 2003, *S. brucei* Komai, 2009, and *S. yoyo* Anker, Firdaus & Pratama, 2014 (all three from the Indo-West Pacific) (Fransen 1991; Dworschak *et al.* 2000; Anker 2003, 2010; Komai 2009; Anker *et al.* 2014). In some other species of *Salmonius*, the minor cheliped is comparatively larger than in the majority of species of the genus, but is still noticeably smaller, shorter and/or less robust than the major cheliped (Anker 2010, 2011). A comprehensive phylogeny of *Salmonius* is needed to answer the open questions whether all these species form a monophyletic group and whether the relatively large minor cheliped represents a derived state (= i.e. relative enlargement of the minor cheliped, once or multiple times) or an ancestral condition (= both chelipeds ancestrally large, followed by miniaturisation in some clades) within this lineage. Noteworthy, in the holotype of *S. durisi* **sp. nov.**, the minor chela is noticeably more robust than the major chela (Figs. 3c, f, 4, 5).

The presence of rows of long fine setae on the ventral and dorsal margins of the major and minor chelipeds (Fig. 3) in *S. durisi* **sp. nov.** immediately separates the new species from *S. sketi*, *S. erasimorum*, *S. caboverdensis*, *S. degravei* and *S. yoyo*, in which these setae are absent

(cf. Fransen 1991; Dworschak *et al.* 2000; Anker 2010; Anker *et al.* 2014). On the other hand, their presence, as well as the general shape and armature of the minor chela, place *S. durisi* **sp. nov.** closer to *S. seticheles* and *S. brucei* (cf. Anker 2003; Komai, 2009).

Salmaneus durisi **sp. nov.** can be distinguished from *S. seticheles* by (i) the noticeably more robust third to fifth pereopods, with the dactylus moderately elongate and slender (vs. generally much more slender and with a very slender, elongate, sickle-shaped dactylus in *S. seticheles*); (ii) the eyes largely concealed in dorsal view (vs. partly exposed dorsally in *S. seticheles*); (iii) the basally much wider rostrum, being almost as long as wide (vs. 1.5 times longer than wide in *S. seticheles*); (iv) the distoventral margin of the rostrum unarmed (vs. with a small subdistal tooth in *S. seticheles*); (v) the absence of a rostral carina (vs. its presence, albeit in a moderate form, in *S. seticheles*); and (vi) the less slender telson, being less than 2.5 times as long as its proximal width (vs. almost three times in *S. seticheles*) (cf. Anker 2003: fig. 2A, D, M, 3E, G). The identity of the species from the Red Sea represented by a single cheliped and tentatively identified as *S. aff. seticheles* by Ďuriš & Horká (2016), as well as the interesting cheliped polymorphism in *S. seticheles* (Anker 2003) will be discussed elsewhere (Anker, in prep.).

Salmaneus durisi **sp. nov.** is readily distinguishable from *S. brucei*, for instance, by (i) the presence of orbital (extra-corneal) teeth (vs. their absence in *S. brucei*); (ii) the cutting edges of the major chela with more numerous teeth, around 17 (vs. only 7–9 in *S. brucei*); (iii) the posterior margin of the telson with a fairly deep median notch (vs. straight in *S. brucei*); (iv) the uropodal exopod with a moderately developed spiniform seta (vs. with a very long, robust spiniform seta in *S. brucei*) (cf. Komai 2009: figs. 2B, D, H, 3C, D).

Despite the absence of the marginal setal rows on the chelipeds of *S. erasimorum*, *S. caboverdensis* and *S. degravei*, these three species show various degrees of morphological similarity to *S. durisi* **sp. nov.**, especially in the general configuration of the major and minor chelipeds (Dworschak *et al.* 2000; Anker 2010). For instance, in *S. caboverdensis*, the fingers of the minor chela are strikingly dissimilar, with the dactylus strongly curved ventrally and reaching far beyond the pollex (cf. Dworschak *et al.* 2000: fig. 31); this configuration of the minor chela is remarkably similar to that of the new species. In *S. degravei*, the fingers of the minor chela are rather similar in length, but the dactylus is extremely curved and slightly bent backwards (cf. Anker 2010: fig. 9c), resembling the condition of *S. durisi* **sp. nov.** However, *S. durisi* **sp. nov.** can be easily separated from both *S. caboverdensis* and *S. erasimorum*, in addition to the setal fringe on the chelipeds, also by the absence of a rostral carina and cuspidate setae on the cheliped ischia (vs. their presence in these two species), and from *S. degravei* by the

well-developed orbital teeth (vs. reduced in *S. degravei*), the rounded lateral plate on the coxa of the third maxilliped (vs. produced posteriorly in *S. degravei*) and the presence of a notch on the posterior margin of the telson (vs. its absence in *S. degravei*) (cf. Dworschak *et al.* 2000; Anker 2010). On the other hand, *S. sketi* (a cave-dwelling species) and *S. yoyo* each display a series of unique characters and are not closely related to *S. durisi* **sp. nov.** (cf. Fransen 1991; Anker *et al.* 2014). This is also the case of several species of *Salmaneus* with only partly enlarged minor cheliped, such as *S. camaroncito* Anker, 2010, *S. paulayi* Anker, 2011, *S. komaii* Anker, 2011, and *S. poupini* Anker, 2011, all morphologically very different from the herein described new species (cf. Anker 2010, 2011).

Finally, the two species of *Salmaneus* presently known based on incomplete specimens lacking major chelipeds, viz. *S. hilarulus* (De Man, 1910) and *S. tafaongae* Banner & Banner, 1966, are clearly different from *S. durisi* **sp. nov.** The former species differs from *S. durisi* **sp. nov.** in the general proportions of the third pereopod, especially the unusually stout dactylus, and the shallower rostro-orbital notches (cf. De Man 1911: fig. 10, 10g). The latter species can be distinguished from *S. durisi* **sp. nov.** by the much longer slender rostrum, reaching to the end of the third article of the antennular peduncle (vs. barely overreaching the distal margin of the first article in the new species), the up-turned orbital teeth (vs. not up-turned in the new species), as well as the more elongate second article of the antennular peduncle, being 1.3 times as long as wide (vs. not much longer than wide in the new species) (cf. Banner & Banner 1966). Although a full redescription of *S. tafaongae* based on new material will be published elsewhere, it can be already stated here that the chelipeds of this species are very different from those of *S. durisi* **sp. nov.** (A. Anker, pers. obs.).

The specimens from the Solomon Islands and Indonesia are here tentatively identified as *S. cf. durisi* **sp. nov.** The specimen from the Solomon Islands is a young although already ovigerous female missing its minor cheliped. Since the minor chela bears several important diagnostic features of the species, the identification of this specimen as *S. durisi* **sp. nov.** would be uncertain. The ovigerous specimen from Sumba (Fig. 6) presents a series of differences with the holotype, the most notable being the proportionally larger corneal area of the eyestalks, the presence of short erect setae on most of the body surface (carapace, pleon, telson), and the minor chela dactylus although strongly curved downwards not recurrent posteriorly, as in the holotype (all these features being visible in Fig. 6). As most other characters match *S. durisi* **sp. nov.**, the specimen is herein assigned to *S. cf. durisi* **sp. nov.**, awaiting a thorough genetic analysis of this material.

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Literature cited

- Anker, A (2003) New records of *Salmoneus* Holthuis, 1955 (Crustacea: Decapoda: Alpheidae) from northern Australia, with description of one new species and remarks on *S. serratidigitus* (Coutière, 1896). *Beagle – Records of the Museum and Art Gallery of the Northern Territory*, 19, 101–109.
- Anker, A. (2010) The shrimp genus *Salmoneus* Holthuis, 1955 (Crustacea, Decapoda, Alpheidae) in the tropical western Atlantic, with description of five new species. *Zootaxa*, 2372, 177–205.
- Anker, A. (2011) Three new species of the alpheid shrimp genus *Salmoneus* Holthuis, 1955 (Crustacea, Decapoda) from the tropical western Pacific. *Zootaxa*, 2839, 67–84.
- Anker, A., Firdaus, M. & Pratama, I.S. (2014) *Salmoneus yoyo* nov. sp., a peculiar new infaunal shrimp from Lombok, Indonesia (Decapoda, Caridea, Alpheidae). *Zootaxa*, 3852, 489–495.
- Anker, A. & Marin, I.N. (2006) New records and species of Alpheidae (Crustacea, Decapoda) from Vietnam. Part I. Genus *Salmoneus* Holthuis, 1955. *The Raffles Bulletin of Zoology*, 54, 295–319.
- Banner, A.H. & Banner, D.M. (1966) Contributions to the knowledge of the alpheid shrimp of the Pacific Ocean. Part X. Collections from Fiji, Tonga and Samoa. *Pacific Science*, 20, 145–188.
- Banner, D.M. & Banner, A.H. (1981). Annotated checklist of the alpheid shrimp of the Red Sea and Gulf of Aden. *Zoologische Verhandelingen*, 190, 1–99.

- Coutière, H. (1899) Les Alpheidæ. Morphologie externe et interne, formes larvaires, bionomie. *Annales des Sciences Naturelles, Zoologie et Paléontologie*, 8, 9, 1–559, pls. 1–6. Masson, Paris.
- De Man, J.G. (1910) Diagnoses of new species of macrurous decapod Crustacea from the "Siboga-Expedition". *Tijdschrift der Nederlandsche Dierkundige Vereeniging*, 2, 11, 287–319.
- De Man, J.G. (1911) The Decapoda of the Siboga Expedition. Part II. Family Alpheidae. *Siboga Expeditie*, 39a1, 133–465; (1915) Supplement – Explanations of plates of Alpheidae, pls. 1–23. E.J. Brill, Leiden.
- Đuriš, Z. & Horká, I. (2016) *Salmoneus chadwickae*, a new alpheid shrimp (Crustacea: Decapoda: Alpheidae) from the Red Sea, with remarks on related or regional congeners. *Marine Biodiversity*, 46, 773–793.
- Dworschak P.C., Anker A. & Abed-Navandi, D. (2000) A new genus and three new species of alpheids (Decapoda: Caridea) associated with thalassinids. *Annalen des Naturhistorischen Museums in Wien*, 102B, 301–320.
- Fransen, C.H.J.M. (1991) *Salmoneus sketi*, a new species of alpheid shrimp (Crustacea: Decapoda: Caridea) from a submarine cave in the Adriatic. *Zoologische Mededelingen, Leiden*, 65, 171–179.
- Holthuis, L.B., (1955) The recent genera of the caridean and stenopodidean shrimps (Class Crustacea, order Decapoda, supersection Natantia) with keys for their determination. *Zoologische Verhandelingen*, 26, 1–157.
- Komai, T. (2009) A new species of the alpheid shrimp genus *Salmoneus* (Decapoda, Caridea) from the Ryukyu Islands, Japan, associated with a callianassid ghost shrimp (Decapoda, Thalassinidea). *Crustaceana*, 82, 869–880.
- Nobili, G. (1904) Diagnoses préliminaires de vingt-huit espèces nouvelles de stomatopodes et décapodes macroures de la Mer Rouge. *Bulletin du Muséum d'Histoire Naturelle*, 10, 228–238.

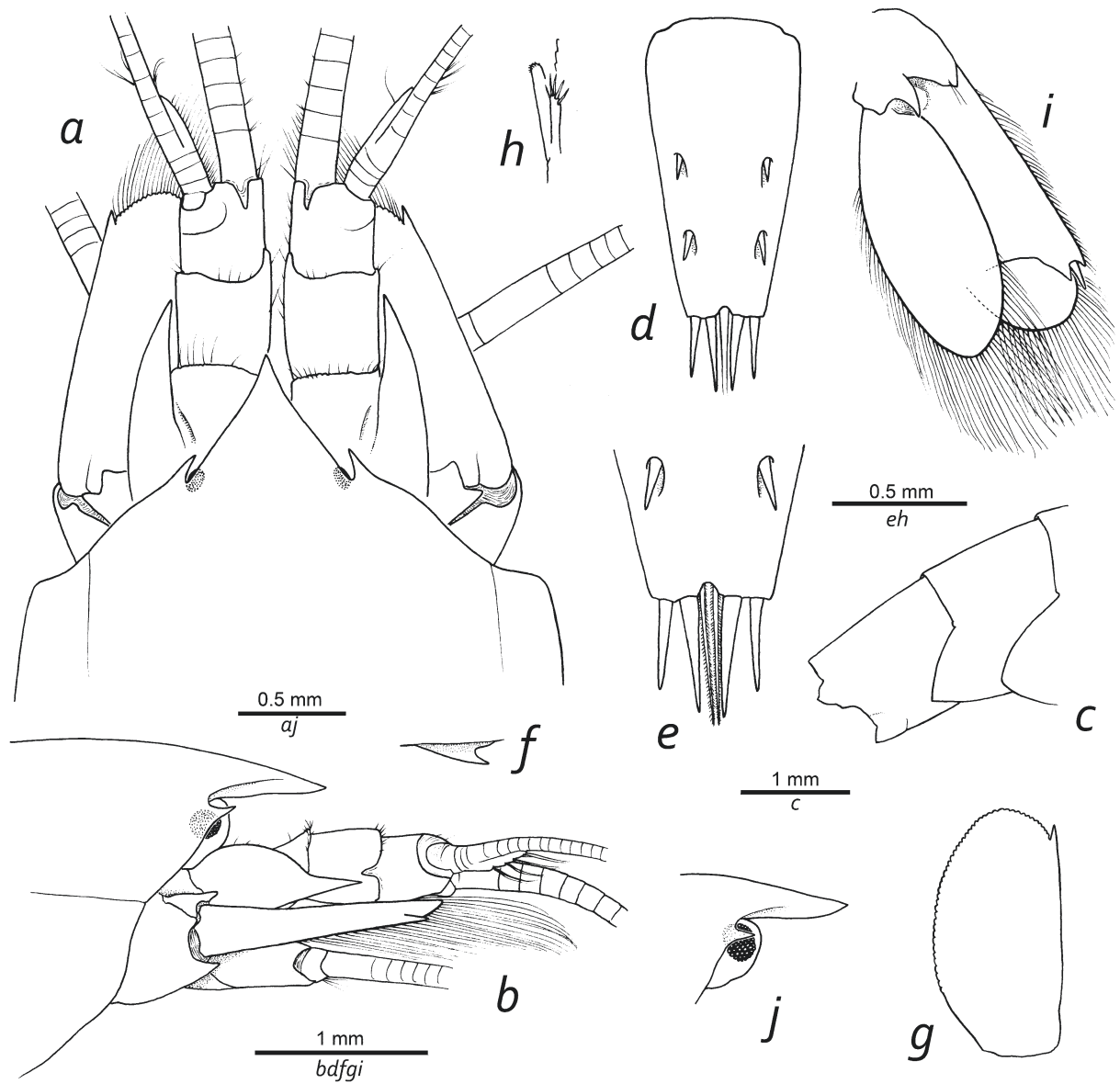


FIGURE 1. *Salmoneus durisi* **sp. nov.**: holotype, ovigerous specimen (cl 5.0 mm) from Darsait, Oman, OUMNH ZC 2015-08-030 [a–i]; non-ovigerous specimen (cl 4.3 mm) from Panglao, Philippines, MNHN-IU-00000 [j]; a – frontal region, dorsal view; b – same, lateral view; c – posterior pleonites, lateral view; d – telson, dorsal view; e – same, posterior margin, dorsal view; f – tooth on ventromesial carina of first article of antennular peduncle, lateral view; g – antennal scaphocerite; h – second pleopod, appendix interna and appendix masculina, lateral view; i – uropod, dorsal view; j – rostro-orbital area of carapace and eyes, lateral view.

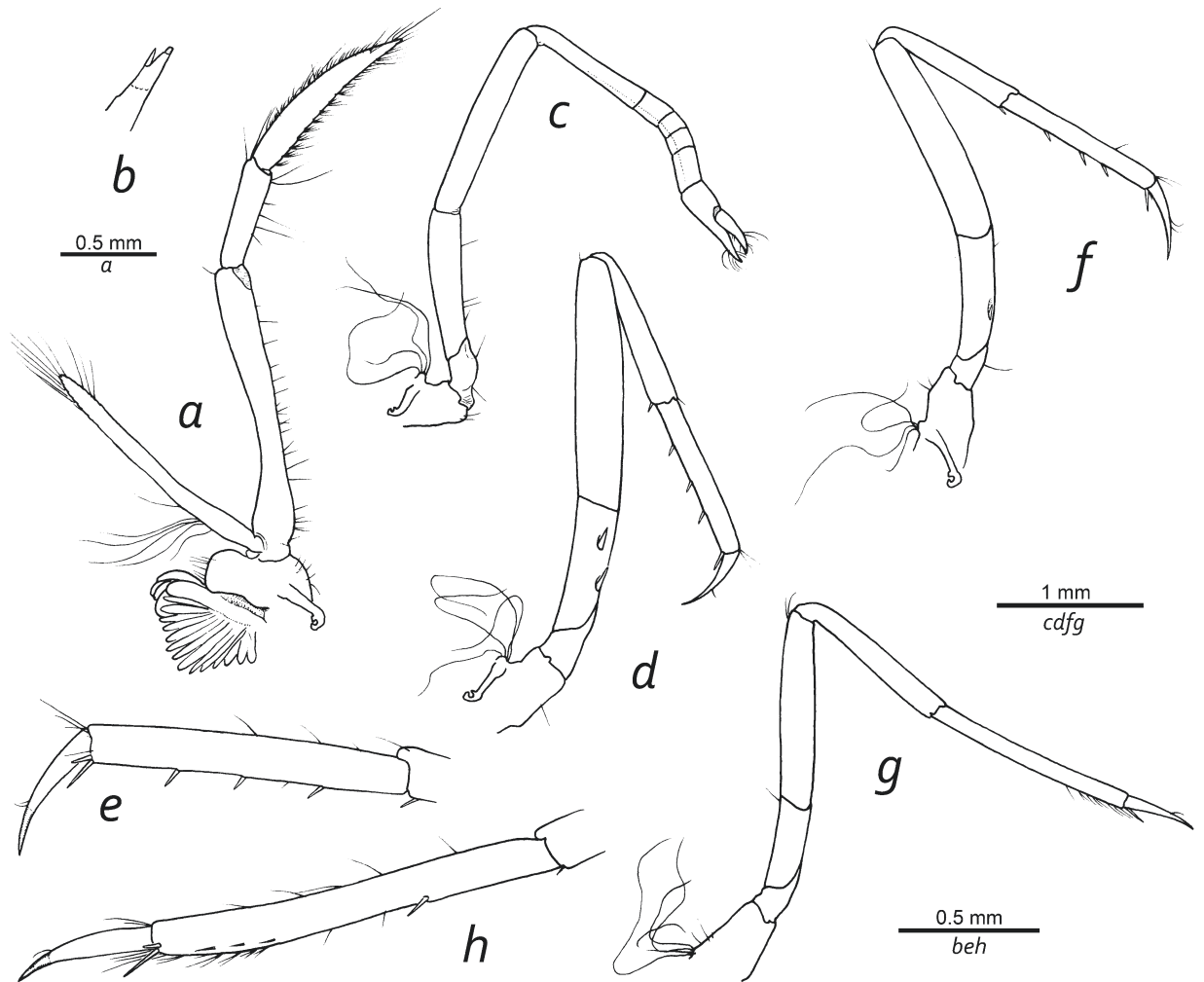


FIGURE 2. *Salmoneus durisi* **sp. nov.**: holotype, ovigerous specimen (cl 5.0 mm) from Darsait, Oman, OUMNH ZC 2015-08-030; a – third maxilliped, lateral view; b – same, tip of ultimate article, lateral view; c – second pereopod, lateral view; d – third pereopod, lateral view; e – same, distal portion of carpus, propodus and dactylus, mesial view; f – fourth pereopod, lateral view; g – fifth pereopod, lateral view; h – same, distal portion of carpus, propodus and dactylus, mesial view.

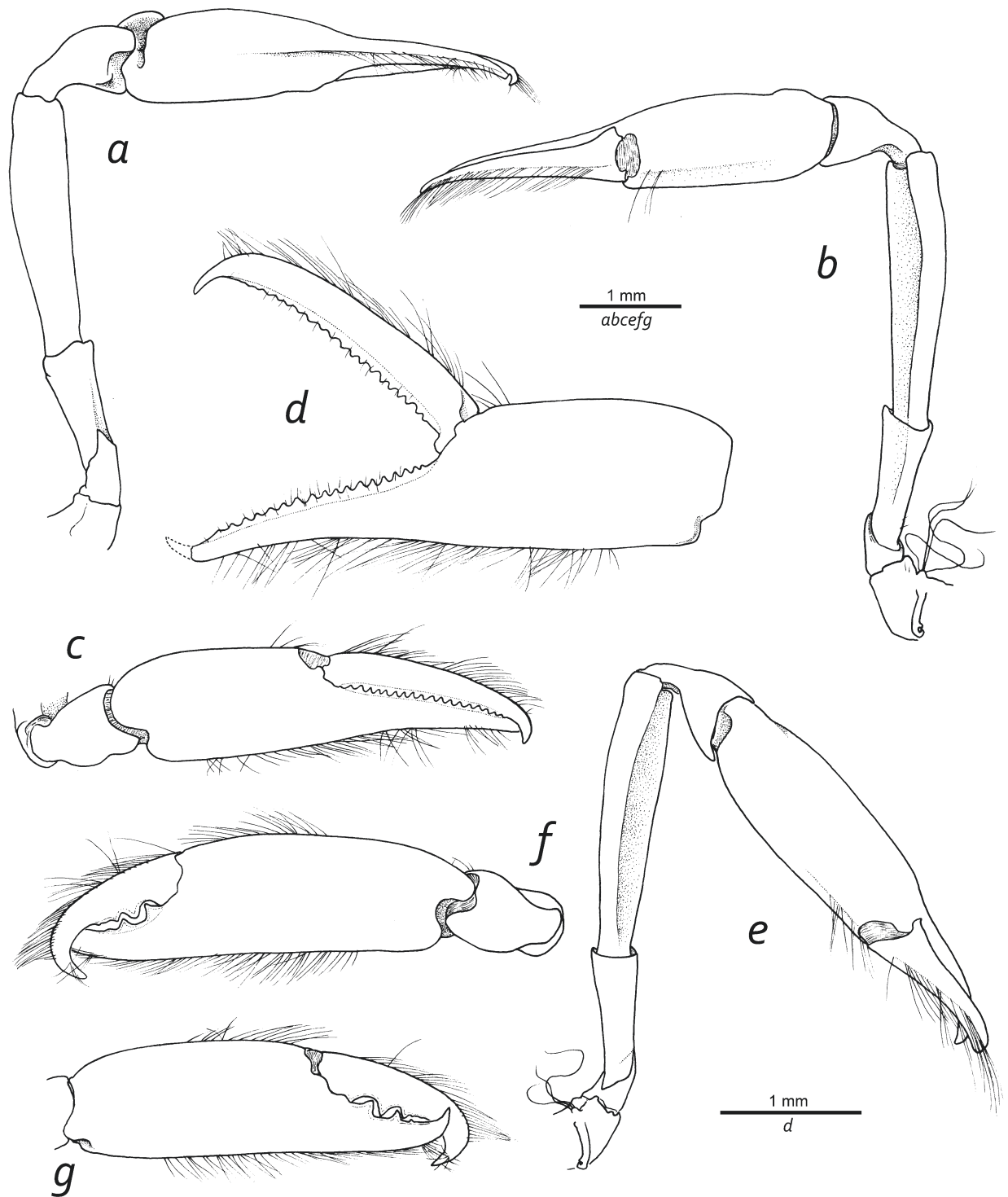


FIGURE 3. *Salmoneus durisi* **sp. nov.**: holotype, ovigerous specimen (cl 5.0 mm) from Darsait, Oman, OUMNH ZC 2015-08-030; a – major cheliped, mesial view; b – same, lateral view; c – same, carpus and chela, ventromesial view; d – same, chela fingers opened, ventrolateral view; e – minor cheliped, lateral view; f – same, carpus and chela, ventromesial view; g – same, chela, ventrolateral view.

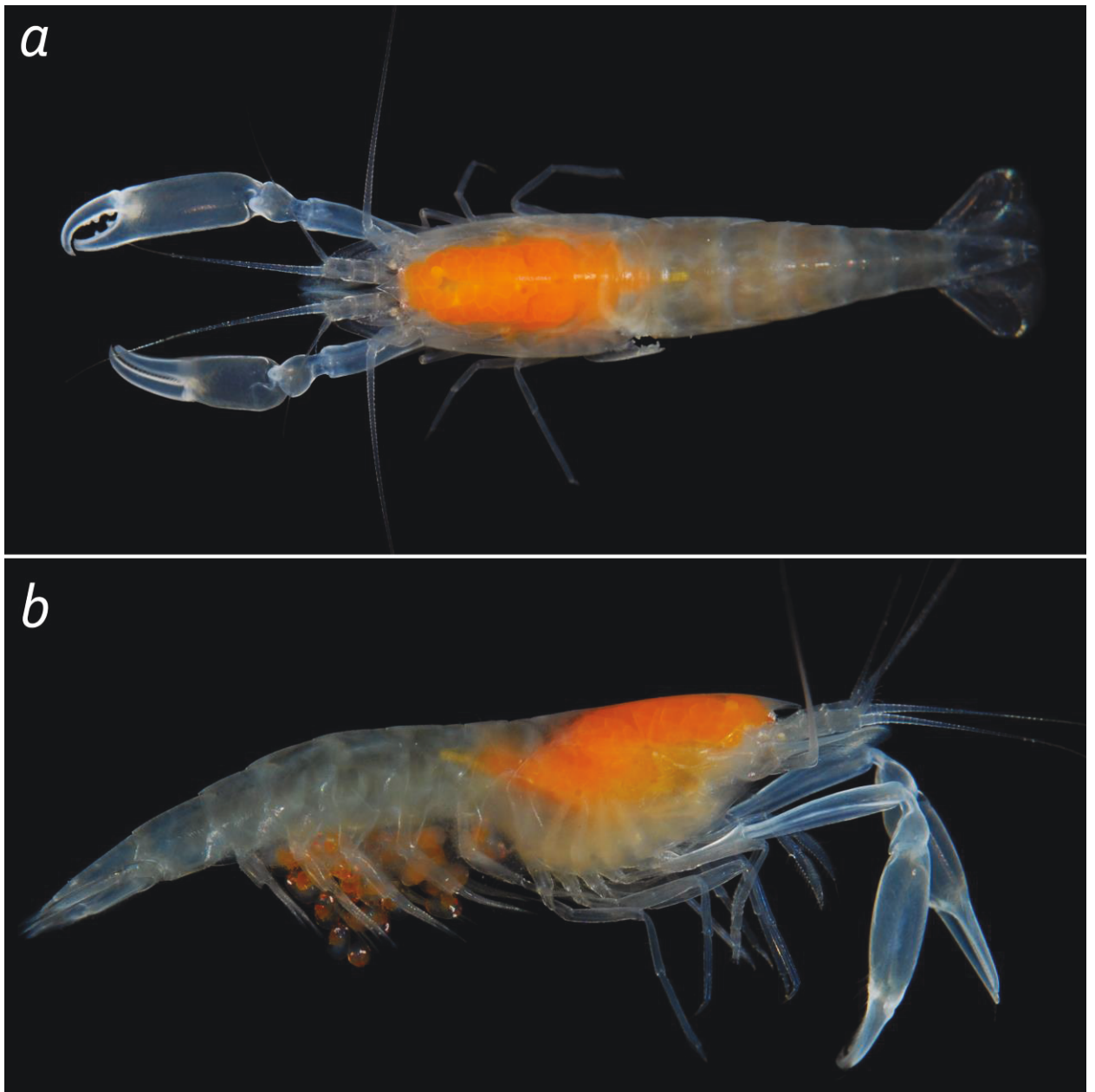


FIGURE 4. *Salmoneus durisi* **sp. nov.**: holotype, ovigerous specimen (cl 5.0 mm) from Darsait, Oman, OUMNH ZC 2015-08-030; a – living individual, dorsal view; b – same, lateral view (both photographs by the first author).



FIGURE 5. *Salmoneus durisi* **sp. nov.**: holotype, ovigerous specimen (cl 5.0 mm) from Darsait, Oman, OUMNH ZC 2015-08-030, living individual, frontal view (photograph by the first author).

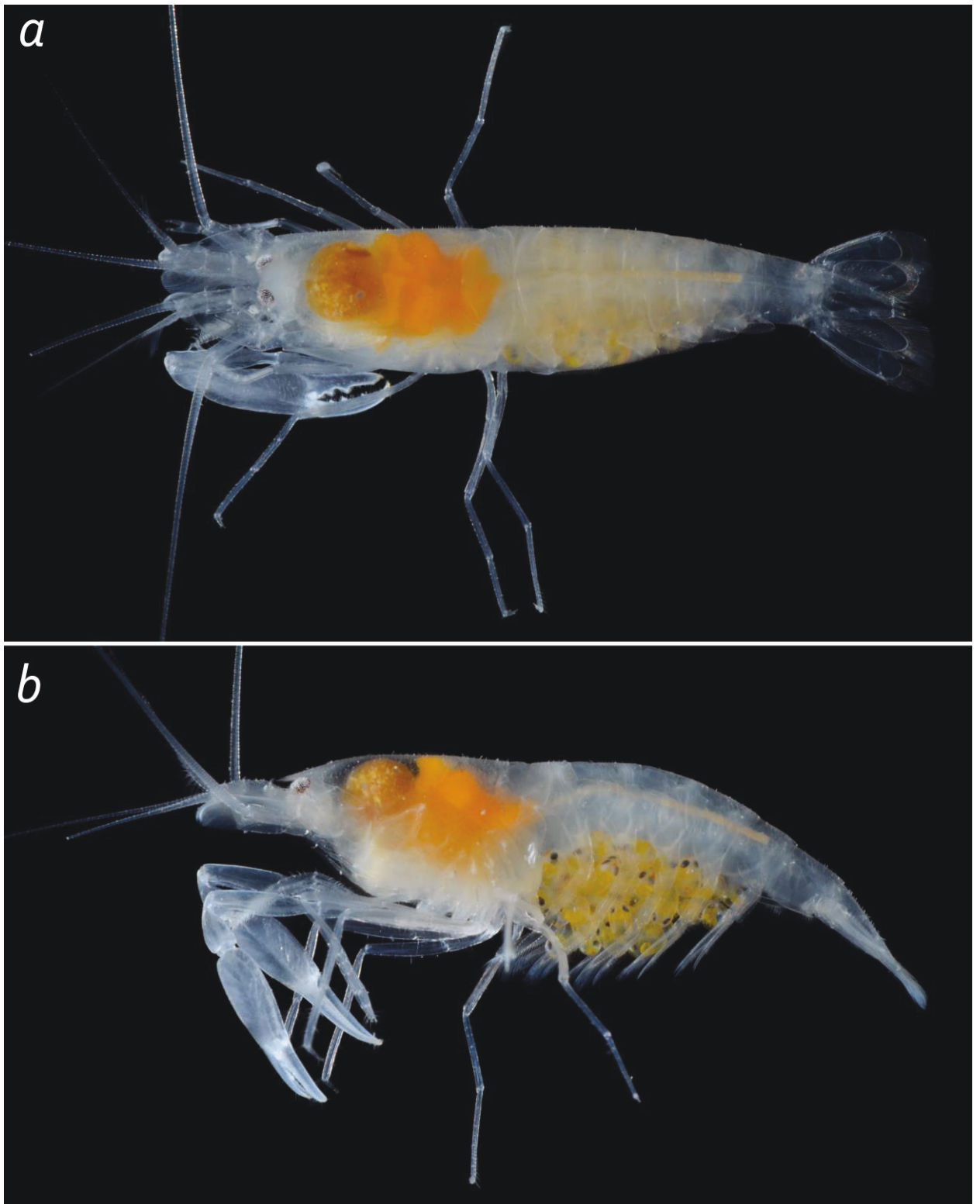


FIGURE 6. *Salmoneus* cf. *durisi* **sp. nov.**: ovigerous specimen (cl 4.7 mm) from Kanawa Island east of Flores, Indonesia, MZB 00000; a – living individual, dorsal view; b – same, lateral view (both photographs by the first author).