

A new species of *Palaemon* (Crustacea, Decapoda, Palaemonidae) from Qatar

S. DE GRAVE¹ & I. AL-MASLAMANI²

¹ Oxford University Museum of Natural History, Parks Road, Oxford, OX1 3PW,
sammy.degrave@oum.ox.ac.uk.

² School of Ocean Sciences, University of Wales Bangor, Menai Bridge, Anglesey, Wales, UK, LL59 5EY

Abstract

A new species of palaemonid shrimp, *Palaemon khori* sp. nov. is described from Qatar. The new species is closely related to *Palaemon debilis* Dana, but can be distinguished from that species by its rostral shape, the near quadrate fifth pleuron, a wider and less elongate telson, longer mesial telson spines, as well as details of the male first and second pleopods. A number of other morphological features are recorded here for the first time in a species of *Palaemon*, notably the marginal setation of the distal half of the telson.

Key words: Crustacea, Palaemonidae, *Palaemon*, new species, Qatar

Introduction

Palaemon debilis Dana, 1852 was briefly described by Dana (1852a) on the basis of specimens from Hawaii, with the Latin diagnosis repeated and translated into English by Dana (1852b). The description is very brief, and mentions few taxonomically useful characters, although it does mention the long and slender rostrum, bifid at the apex, with the two flagella of the inner antenna (dorsolateral flagellum of the antennule?) united for a considerable distance. Subsequently, an illustration of the frontal region was given in Dana (1855). This illustration confuses matters further, as the rostrum (see Plate 38, fig. 6) does not appear noticeably longer than in the closely related *P. concinnus* (see Plate 38, fig. 8), whilst no details of the upper flagellum of the antennule are discernable. Dana (1852b) described a further form as var. *attenuatus*, as having the rostrum much longer, illustrated in Dana (1855, Plate 38, fig. 7). This situation has led to considerable confusion over the years, not helped by the absence of type material, which was either destroyed in the sinking of the Peacock or the great Chicago fire (Dana, 1852b; Manning, 1993). On the basis

of these description it remains difficult to unambiguously assign *Palaemon* population to *P. debilis* sensu Dana

As a result of this taxonomic confusion, many authors have assigned numerous populations across the entire Indo-west Pacific to *P. debilis*, whilst at the same time noting its extra-ordinary variability in taxonomically useful characters. Unfortunately, many of these authors failed to illustrate and/or adequately describe the variation they observed. For instance Kemp (1925) simply noted that specimens from the Red Sea and Gulf of Suez had a markedly different rostral ornamentation than Hawaiian specimens, but equally noted that the variability fell within the range of variation of specimens reported by Borradaile (1917) from Aldabra, but again not illustrated nor described in detail.

However, Chace (1972) eloquently described specimens from an Hawaiian population (type locality of *P. debilis*), and illustrated a specimen from Hilo, the only locality mentioned by Dana (1852a, b). These Hawaiian specimens are characterised by a upwardly curved, very gracile rostrum, combined with a acuminate fifth pleuron. Although Chace (1972) did mention some variability in rostral shape and dentition (which is the norm in *Palaemon* species, see De Grave (1999) for *P. concinnus*), he did not indicate anywhere the existence of shorter rostral types in the Hawaiian population. This description corresponds closely to the specimens described and illustrated by Holthuis (1950) from Indonesia (one further specimen being mentioned from South Africa), the description and illustration of Obuid-Allah (2000) from the Egyptian Red Sea, and specimens and photographs from Hawaiian specimens in Rathbun (1906) and Edmondson (1946). It therefore seems best to restrict the usage of the name *P. debilis* to populations conforming to Chaces (1972) diagnosis, and assume that *P. debilis sensu lato* is a species complex.

During the course of ecological fieldwork in Al-Khor Bay on the east coast of Qatar, a resident population of short rostrum-type *Palaemon* was discovered, which although closely allied to *P. debilis* sensu stricto, differs in a number of stable morphological characters. This population is here described as a new species, as a first step towards a more formal resolution of the *P. debilis* species complex.

Type material has been deposited in the collection of the Nationaal Natuurhistorisch Museum, Leiden (RMNH), the Natural History Museum (London) (NHM) and the Zoological Collections of the Oxford University Museum of Natural History (OUMNH ZC).

Family Palaemonidae Rafinesque, 1815

Genus *Palaemon* Weber, 1795

Palaemon khori sp. nov. (Figs. 1–4)

Material examined. Holotype: ovigerous female post orbital carapace length (pocl) 6.4 mm; collected by hand net amongst pneumatophores of *Avicennia marina* at low tide from

a creek on the northern side of Al-Khor Bay, east coast of Qatar, 51°33'30" E 25° 41'30"N;
11 April 2003, leg. I. Al-Maslamani (RMNH D51663).

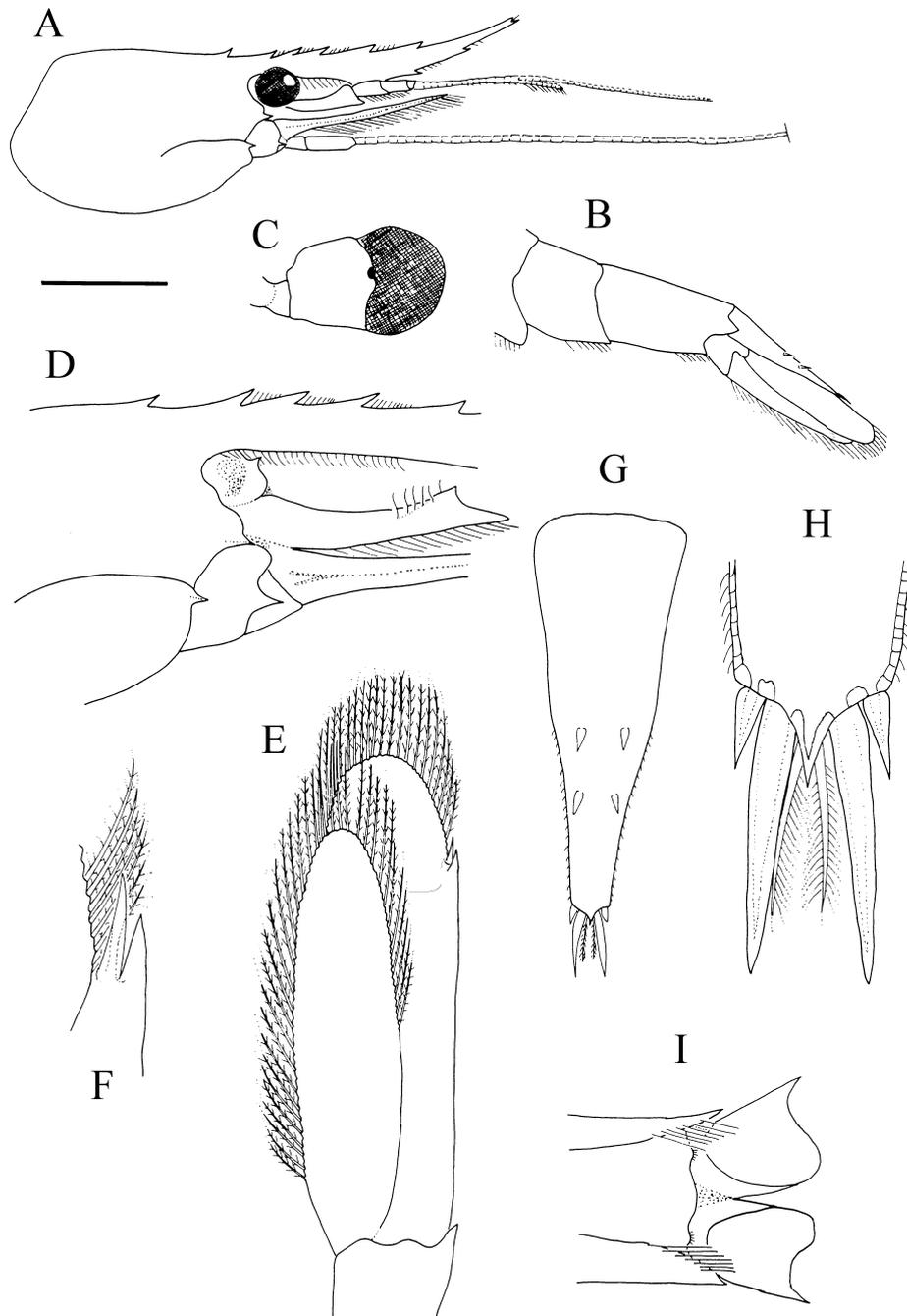


FIGURE 1 *Palaemon khori* sp. nov. A frontal region, lateral view; B Abdomen, lateral view; C eye, mesial view; D frontal region, lateral view; E Left uropods; F detail; G telson; H, tip of telson; I anal carina. A–B from female holotype (RMNH D51663), rest from male paratype (OUMNH ZC.2006-05-002). Scale bar indicates 3 mm (A, B), 1.5 mm (C–D), 1 mm (E, G, I) or 0.25 mm (F, H).

Paratypes: 3 ovigerous female (pocl 6.0–6.2 mm), 1 female (pocl 5.8 mm), 16 males (pocl 3.7–4.5 mm); same data as holotype (RMNH D51664); 1 ovigerous female (pocl 6.5 mm), 9 males (pocl 3.5–4.3 mm), same data as holotype (NHM 2006.91–100); 3 ovigerous females (pocl 5.5–6.0 mm), 4 males (pocl 3.7–4.2 mm), same data as holotype (OUMNH ZC.2006-05-001); 1 male (pocl 4.4 mm), fully dissected, same data as holotype (OUMNH ZC.2006-05-002); 1 ovigerous female (pocl 6.8 mm), fully dissected, same data as holotype (OUMNH ZC.2006-05-003)

Non-type material: 61 males, same data as holotype (OUMNH ZC.2006-05-004).

Description. A small sized *Palaemon*. Rostrum well developed, nearly straight in basal part, gently upturned in distal part (Fig. 1A); approximately 1.25–1.50 x post-orbital carapace length, over-reaching antennal scale by about one third of its length (Fig. 1A). Abdomen of usual shape in *Palaemon* species; fifth pleuron near-quadrate (Fig. 1B); sixth somite with small tooth at posteroventral angle; sixth somite 1.8–2.0 x length of fifth somite, near equal in length to telson (Fig. 1B).

Upper margin of rostrum with 7 teeth, posteriormost of which is situated posterior to orbital margin; two posteriormost teeth articulated; one subapical tooth present, separated from next dorsal tooth by naked interval; small setae present between each tooth in proximal half of each interval; 3–5 ventral teeth present (median value 4) in distal half of rostrum; proximal half of rostrum naked, furnished with double row of plumose setae (Fig. 1D).

Carapace glabrous (Fig. 1A); branchiostegal spine same size as antennal spine (Fig. 1D), placed on margin of carapace below branchiostegal suture; branchiostegal suture short, ventrally curved in posterior half.

Telson (Fig. 1G) with length-width ratio 0.29–0.36; two pairs of dorsal spines present, non marginal, placed at approximately 0.5 and 0.8 of telson length; margin distal to proximal pair of spines compartmentalised, furnished with series of small setae (Figs. 1G–H); posterior margin drawn out into to sharp point, reaching to about a quarter to a third of the length of the mesial pair of spines; posterior margin furnished with two pairs of spines, mesial pair more than twice as long as marginal pair; a pair of plumose setae mesially (Fig. 1H).

Eye stout (Fig. 1C), cornea as broad as stalk, furnished with small ocellus on mesial side.

First thoracic sternite of males with distally placed median spine, with an additional proximally placed ridge, furnished with a broad median notch.; second thoracic sternite of males with proximal ridge, medially deeply bifurcating; fifth thoracic sternite with median, blunt spine; median spine present on abdominal somite between first pleopods. Thoracic ornamentation of females similar, but with low plumose carina across fifth sternite. Pre-anal carina low (Fig. 1I), two small bosses present, each furnished with small setae.

Uropods slightly over-reaching telson, normal in shape (Fig. 1E); mobile lateral spine over-reaching fixed one (Fig. 1F).

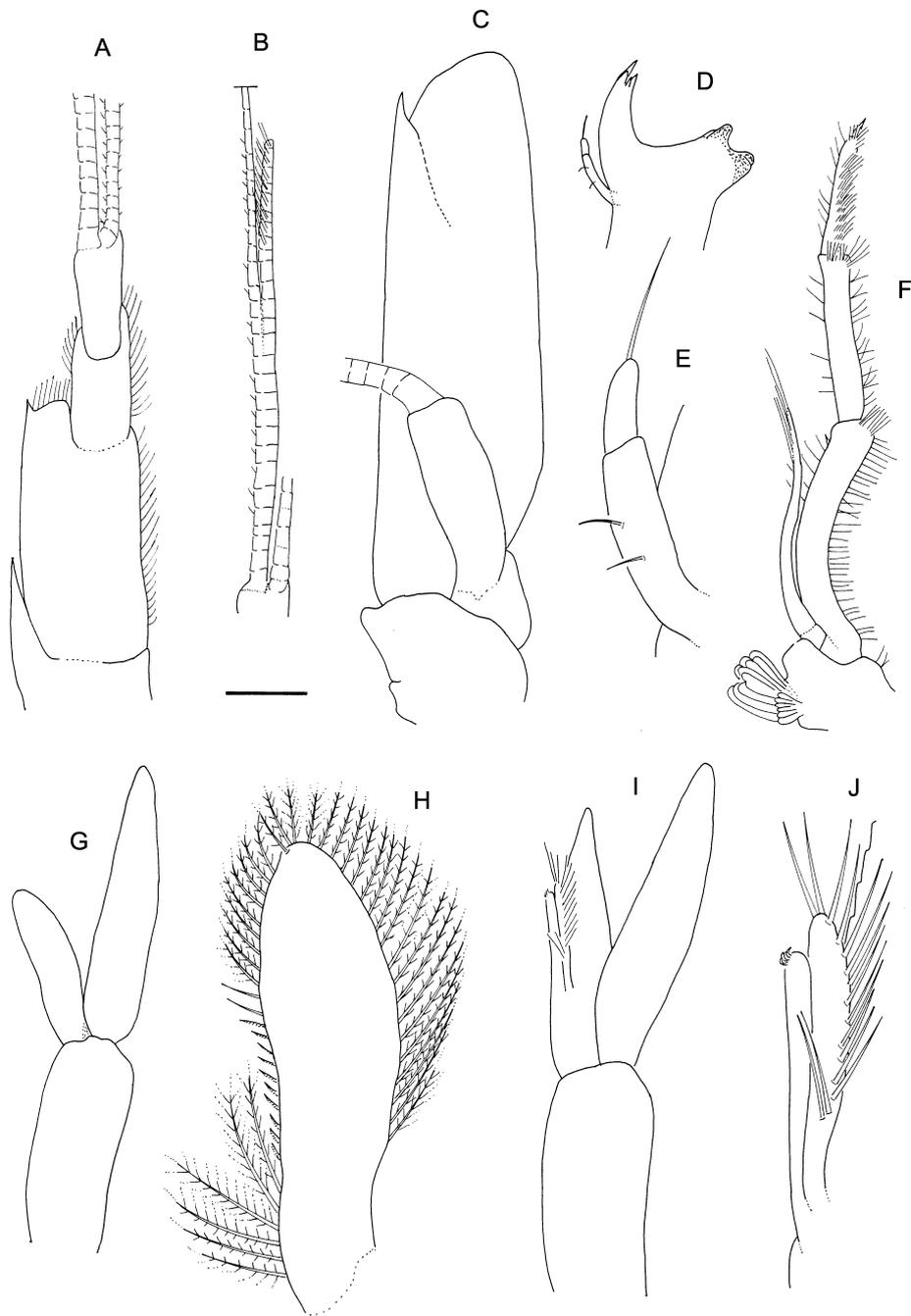


FIGURE 2. *Palaemon khori* sp. nov. A left antennular peduncle; B left antennular flagellum; C left antennular peduncle and scale; D left mandible; E mandibular palp; f third maxilliped; G first pleopod; H endopod of first pleopod; I second pleopod; J appendix masculina and interna. All from male paratype (OUMNH ZC.2006-05-002). Scale bar indicates 1 mm (A–C), 0.7 mm (D, G, I) or 0.2 mm (E–F, H, J).

Antennular peduncle with stylocerite reaching to 0.4 x length of basal segment (Fig. 2A); distolateral spine of basal segment slightly over-reaching convex distal margin of lateral extension; basal segment longer than second and third segment combined; second and third segment near equal in length; dorsolateral antennular flagellum comprised of two rami, approximately 2.5–3 times as long as carapace, fused portion (Fig. 2B) near equal to free rami; ventromesial flagellum about twice as long as carapace length.

Antennal peduncle as usual (Fig. 1A, D; Fig. 2C), basicerite armed with large lateral tooth (Fig. 1D); flagellum 4.5–5.0 times as long as carapace; scaphocerite about 3.5 times as long as wide, lateral margin nearly straight, distal tooth well developed, not reaching end of blade (Fig. 2C).

Mouthparts as usual for *Palaemon* species. Mandible with palp (Fig. 2D), incisor process armed with two strong lateral and two mesial teeth; mandibular palp two segmented, furnished with single distal seta (Fig. 2E); third maxilliped well developed, basal segment with small disto-lateral tooth, placed below distal margin (Fig. 2F).

First pereopods equal in size and shape, falling short of end of scaphocerite; fingers as long as palm (Fig. 3A); ischium shorter than merus, furnished with marginal carina; propodus 1.3–1.5 times as long as carpus.

Second pereopods slightly over-reaching scaphocerite; fingers approximately half as long as palm (Fig. 3B); opposable margins weakly ornamented, with small low boss proximally on each finger (Fig. 3c); tip furnished with single blunt spine; carpus 1.2 times length of merus, propodus 1.3 times as long as carpus, chelae about 0.7–0.8 times as long as propodus.

Third pereopod gracile (Fig. 3D), ischium about half length of merus, unarmed; carpus about half length of propodus, armed with three single spines along inferior margin, and a pair of spines at the infero-distal angle; dactylus short, about 0.4 x length of propodus, relatively stout.

Fourth pereopod (Fig. 3E) similar to third pereopod, propodus relatively longer, armed with three single spines along inferior margin, and a pair of spines at the infero-distal angle; dactylus short, about 0.3 x length of propodus, relatively stout.

Fifth pereopod (Fig. 3F) similar to fourth pereopod, propodus armed with two single spines along inferior margin, infero-distal setal brush well developed, extending proximally to about 0.3 of propodus length; dactylus short, about 0.25 x length of propodus, relatively stout.

Endopod of male first pleopod (Fig. 2G) reaching slightly beyond mid-length of exopod; mesial margin sinuous, without notch.

Appendix masculina of male second pleopod (Fig 2I) reaching to 0.75 of endopod, appendix interna reaching to approximately 0.90 of appendix masculina (Fig. 2J); appendix masculina furnished with 12 long spines in single row near lateral margin and three in a terminal cluster (Fig. 2J).

Eggs numerous, size approximately 1.0 x 0.6 mm (eyed embryo).

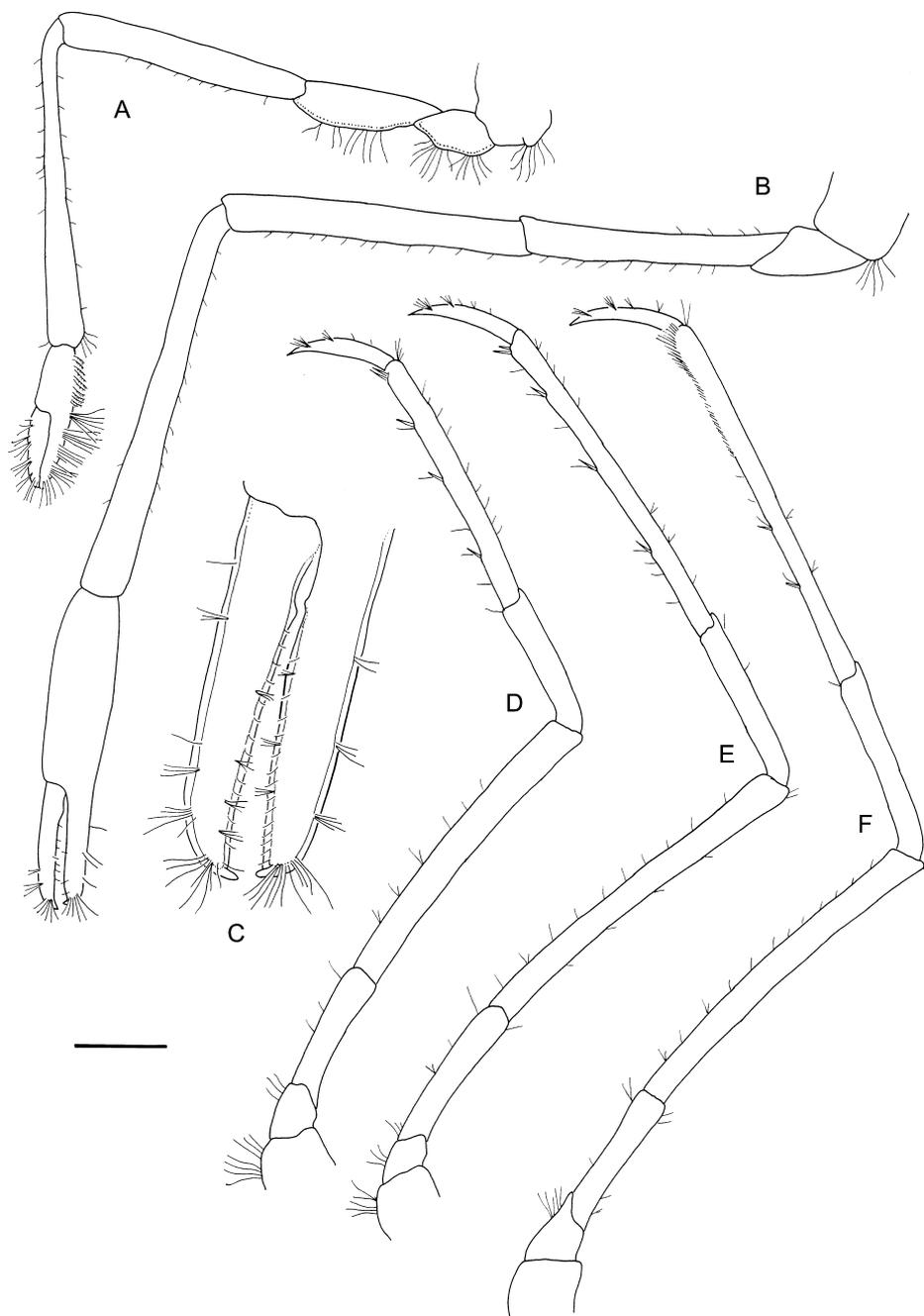


FIGURE 3. *Palaemon khori* sp. nov. A left first pereiopod; B left second pereiopod; C chelae; D third pereiopod; E fourth pereiopod; F fifth pereiopod. All from female paratype (OUMNH ZC.2006-05-003). Scale bar indicates 1 mm (A–B, D–F) or 0.4 mm (C).

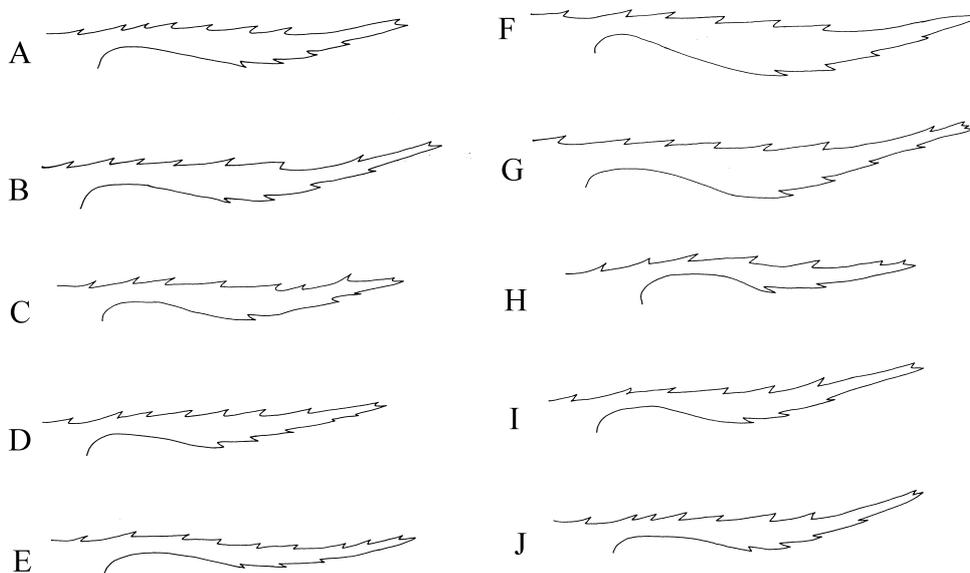


FIGURE 4. *Palaemon khori* sp. nov. rostral variation. A male pocl 4.0 mm; B male pocl 4.0 mm; C male pocl 4.2 mm; D male pocl 4.2 mm; E male pocl 4.3 mm; F female pocl 6.1 mm; G female pocl 6.3 mm; H male pocl 4.3 mm; I male pocl 4.2 mm; J male pocl 4.1 mm.

Variation. As is the norm in *Palaemon* species, a certain amount of rostral variation was observed in *P. khori* sp. nov. (Fig. 4). The majority of specimens harbour 7 teeth on the dorsal side of the rostrum, of which as a rule only the two most basal ones are articulated. The number of ventral rostral teeth varies from 3 to 5, 4 being the median (Fig. 4). In very few examples, the rostrum is relatively gracile (Fig. 4E) but does not approach the form exhibited by *P. debilis sensu* Chace (1972). The majority of specimens are more deep bladed (Fig. 4A–D, F–G). The length ratio of the fixed versus free portion of the dorsolateral antennular flagellum varies from 1.00:0.50 through to 1.00:1.11, with a mean value of 1.00:0.80. There is little variation in relative lengths of the appendix masculina and interna, with the appendix interna reaching to 0.89–0.91 x length of the appendix masculina. Equally, there is little variation in the tip of the telson reaching from 0.26–0.34 x the length of the medial spines; whilst the length/width ratio of the telson varies from 0.29–0.36. No significant sexual variation in these parameters could be observed.

Derivation of name. From the Arabic word khor, meaning lagoon, in reference to the species living amongst lagoonal mangrove roots.

Habitat. During the twelve month study period of the ecological project, *P. khori* sp. nov. was exclusively encountered between the pneumatophores of *Avicennia marina*. All life stages, from postlarvae through to ovigerous females were encountered, suggesting the population is resident in this habitat. Despite exhaustive searches throughout the bay, no

specimens were encountered in intertidal and subtidal seagrass beds and mudflats, nor any other habitat available within the bay. Associated fauna included non-identified isopods and amphipods which occur amongst the epiphytic red algae (*Polysiphonia* sp) associated with the mangrove roots, and which also are the main component of the diet of *P. khori* sp. nov., based on examination of gut contents.

Discussion. *Palaemon khori* sp. nov. is closely related to *P. debilis* Dana, as defined by Chace (1972). The new species shares with *P. debilis* a number of taxonomically important features, such as the fused portion of the upper antennular flagella near equal to the free part, the size and marginal placement of the branchiostegal spine, and the poorly developed armature of the chelae of the second pereopod. Nevertheless, the new species differs from *P. debilis* sensu Chace (1972) in the following characteristics: rostrum near horizontal, not gracile (versus strongly upturned and gracile); fifth pleuron near quadrate (versus acuminate); telson wider, less elongate; tip of the telson reaching to about 0.3 x length of medial spines (versus 0.6); medial spines longer, more gracile; endopod of first male pleopod without mesial notch; appendix interna reaching to about 0.9 x length of appendix masculina (versus 0.70); and the length/width ratio of the scaphocerite.

The marginal setation of the distal half of the telson was very noticeable in *P. khori* sp. nov., as was the presence of a disto-lateral tooth on the basal segment of the third maxilliped, but as these have not been noted yet in any other *Palaemon* species, it remains to be seen if this will further distinguish the two species. Similarly, the sternal armature has been poorly documented in *Palaemon* species (see Van Xuan, 1992), and is unknown in *P. debilis* sensu stricto populations, and indeed for the majority of *Palaemon* species.

As many morphological details here described for *P. khori* sp. nov. are not described and/or illustrated in the numerous Indo-Pacific wide records of *P. debilis* sensu lato, a full comparison must await a more detailed study of this species complex across its reported geographical range, which is beyond the scope of the present study.

Acknowledgements

We would like to thank Dr. Lewis Le Vay, University of Wales, Bangor (U.K.), Mr. Mohammed Al-Mohannadi and Dr. Jassim Al-Khayat of Qatar University for their advice and help during the field work. I. Al-Maslmani gratefully acknowledges the support of a postgraduate scholarship from the State of Qatar.

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