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First record of the genus *Paraimene* Javed & Ahmed, 1988 (Crustacea: Isopoda: Sphaeromatidae) from Iranian coast of the Gulf of Oman, with a revised diagnosis to the genus

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Abstract

Paraimene tuberculata Javed & Ahmed, 1988, the type species of the genus is redescribed, photographed and illustrated, based on material from the Gulf of Oman. This species is distinguished from all other species of the genus by pereonites 2–4 bearing 3 rounded tubercles, pereonites 5–7 with 3 rounded and 2 elongated tubercles, and a pleotelson with 7 elongated tubercles on dorsal surface. This species is the only known member of the genus that occurs Indian Ocean from Pakistan coasts to the Iranian coast of the Gulf of Oman. A revised generic diagnosis is provided for the genus *Paraimene*.

Key words: Isopoda, Sphaeromatidae, *Paraimene*, Gulf of Oman, Iran.

INTRODUCTION

The isopod fauna of the Gulf of Oman is poorly known. Only sporadic studies have been carried out along the Iranian coasts of the Gulf of Oman, and there are only a few records of Isopoda from this region (Hobbins & Jones, 1993; Khalaji-Pirbalouty et al., 2015; Khalaji-Pirbalouty 2016, 2018). *Paraimene* Javed & Ahmed, 1988 is a small genus of five described species (Boyko et al. 2008 onwards), known from the tropical Western Indian Ocean and North Atlantic Ocean. While the type species *Paraimene tuberculata* Javed & Ahmed, 1988 was described from the rocky intertidal zone of Cape Monze, Karachi, Pakistan (Javed and Ahmad, 1988), the remaining four species occur in the North Atlantic Ocean. Three species are known from Cuba: *P. ibarzabalae* Kensley, Ortiz & Schotte, 1997 from Punta Frances; *P. tumulus* Kensley, Ortiz & Schotte, 1997 from Cayo Frances; and *P. danieli* Ortiz, Winfield & Cházaro-Olvera, 2012 from Cojimar Bay. The last species, *P. charlesae* Kensley & Schotte, 1994, is reported from Grand Bay, Dominican. The aim of this study was to redescribe *P. tuberculata* Javed & Ahmed, 1988 from the Iranian side of the Gulf of Oman, and add an updated generic diagnosis for the genus based on all reported species.

MATERIAL AND METHODS

Specimens for this study were collected from intertidal habitats along the Iranian coastline of the Gulf of Oman during 2013–2015. The material was deposited in the Zoological Museum,



Shahrekord University, Shahrekord, Iran. Drawings were made using a camera lucida mounted on a compound microscope (Olympus BX 51). Line drawings were made from pencil drawings using Corel Draw (version X6) and Adobe Photoshop (version CS5). A Zeiss AxioCam ERc5s camera mounted on a Zeiss Stereomicroscope (Stemi 508) equipped with an imaging system was employed to obtain color images of the specimens.

RESULTS

Taxonomy

Family Sphaeromatidae Latreille, 1825

Genus *Paraimene* Javed & Ahmed, 1988

Abbreviated synonymy. *Paraimene* Javed & Ahmed, 1988:371.— Kensley & Schotte, 1994: 494.— Kensley, Ortiz & Schotte, 1997: 89.— Ortiz, Winfield & Cházaro-Olvera, 2012: 976.

Type species: *Paraimene tuberculata* Javed & Ahmed, 1988; by original designation.

Generic diagnosis. Body length about two times as long as greatest width. Head dorsal surface smooth; rostral point slightly visible in dorsal view; epistome anteriorly broadly rounded. Pereonite 1 smooth, longest; pereonites 2–7 without coxal plate sutures, with or without tubercles or transverse carina. Pleon posterior margin with two separate sutures on either side, smooth or with 1 or 2 pairs of rounded tubercles. Pleotelson markedly domed, with 4–8 protuberances, edges of pleotelson folding ventrally to form vertical slit. Antennula with broad basal article; flagellum of 6–10 articles. Antenna subequal in length to antennula, peduncle articles 3 and 5 shortest and longest, respectively. Maxilla with four curved pectinate robust setae on middle and lateral endites. Pereopods 1–7 increasing in length posteriorly, inferior margins of merus, carpus, and propodus bearing dense fine setae fringe. Penial processes short, separated, close together, distally rounded. Appendix masculina elongate, extending well beyond apex of endopod. Pleopod 3 exopod with transverse suture in distal fifth. Pleopods 4 and 5 rami bearing thickened transverse ridges; pleopod 5 exopod with 3 scale patches (2 distally and 1 proximal to transverse suture). Uropodal rami lamellar, subequal, and extending well beyond pleotelson apex.

Paraimene tuberculata Javed & Ahmed, 1988

Type locality: Cape Monze, Karachi, Pakistan.

Material examined: Pasabandar, Sistan and Baluchestan Province, Iran, Gulf of Oman, 25° 4'15.93"N, 61°24'32.76"E; 1 ♂ (3.5 mm); 1 ♀ (3.1 mm), 20 May 2013, coll. V. Khalaji-Pirbalouty (ZMSU 1048). Ramin, Sistan and Baluchestan Province, Gulf of Oman, 25°16'08.46"N, 60°45'03.83"E, 2 ♂ (3.1, 2.6 mm), 1 ♀ (3.1 mm), 19 May 2013, coll. V. Khalaji-Pirbalouty (ZMSU 1049). Bahl Village, near Jask, Hormuzgan Province, Iran, Gulf of Oman, 25°40'48.95"N, 57°51'13.36"E, 1 ♂ (3.2 mm); 28 June 2013, coll. V. Khalaji-Pirbalouty (ZMSU 1050).

Redescription. (Based on specimens from Gulf of Oman)

Body about 1.6 times as long as greatest width, widest at pereonite 6 (Fig. 1 A). *Head* with small rostral point. *Pereonite 1* smooth, pereonites 2–4 with 3 tubercles, *pereonites 5–7* with 3 round medial and 2 elongated lateral tubercles (Fig. 1 A, B). *Pleon* posterior margin with 2 median tubercles. *Pleotelson* about 2.3 times as long as width, markedly domed, dorsal surface bearing two pairs of elongated tubercles followed by a single median elongated tubercle on apex and flanked on either side by a single longitudinal elongated tubercle (Fig. 1 A, B). *Antennula* (Fig. 1 C) not extending to posterior of pereonite 1; first peduncle article 1.3 times as long as article 2; peduncle article 3 subequal to article 2; flagellum with 7 articles, articles 2–6 bearing aesthetascs. *Antenna* peduncular articles all collinear, articles 2 and 4 subequal, article 5 longest; flagellum with 9 articles. *Pereopod 1* (Fig. 1 E) basis about 2.3 times as long as greatest width; ischium, merus, carpus, and propodus inferior margins fringed with dense fine setae; ischium superior margin with 3 long

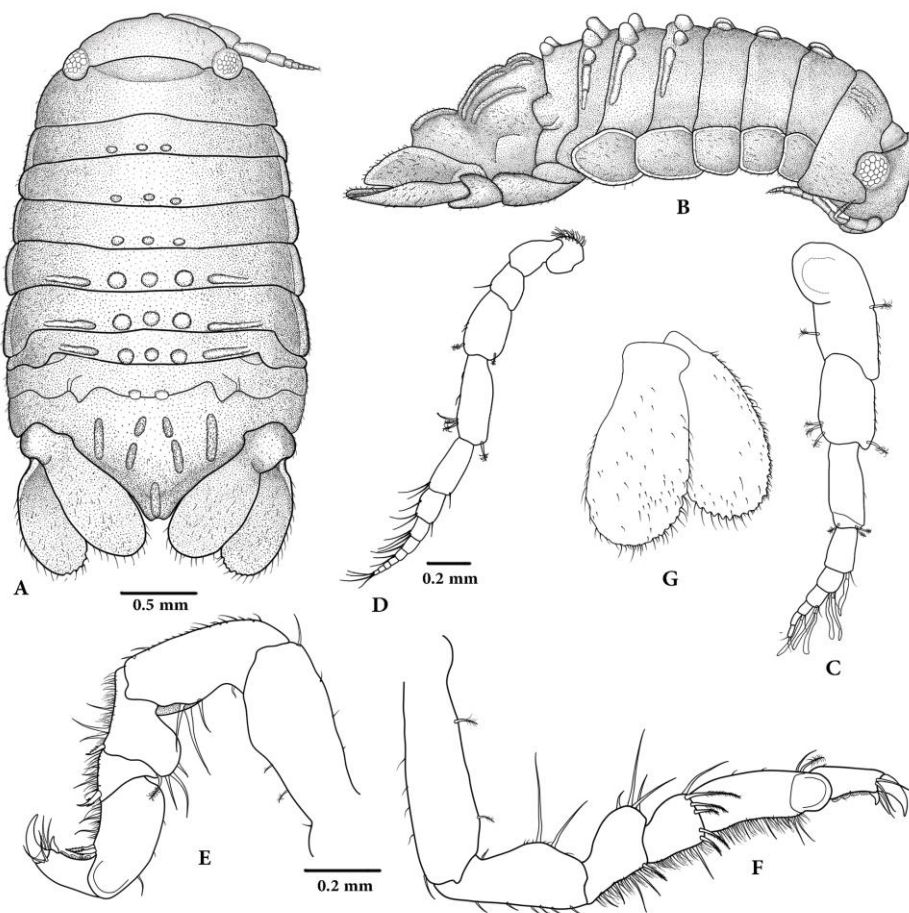


FIGURE 1. *Paraimene tuberculata* Javed & Ahmed, 1988: A. dorsal view; B. lateral view; C. antennula; D. antenna; E. pereopod 1; F. pereopod 7; G. uropod.

simple setae; inferior margin fringed with some small fine setae; merus superodistal corner with 3 long simple and 1 single sensory palmate seta, inferodistal angle with 1 biserrate robust seta; carpus triangular, inferodistal angle with 1 biserrate robust seta; propodus about 2 times as long as wide, inferodistal angle with 2 biserrate robust setae; dactylus bearing a small secondary unguis, inferior margin with cuticular scales. *Pereopod 7* (Fig. 1, F) basis about 5 times as long as greatest width, ischium, merus, carpus, and propodus inferior margins fringed with dense fine setae; ischium superior margin with 2 long simple setae; merus superodistal corner with 4 long simple setae, inferodistal angle with 1 biserrate robust seta; carpus distal angle with 5 biserrate robust setae; propodus about 2.7 times as long as wide; dactylus bearing a small secondary unguis, inferior margin with cuticular scales. *Uropodal rami* (Fig. 1, G) lamellar, subequal, extending well beyond pleotelson apex, fringed with dense small marginal setae. *Penial processes* (Fig. 2, A) smooth, unfused but close together, each about 2.4 as long as basal width. *Pleopod 1* (Fig. 2, B) exopod and endopod with 20 and 14 plumose marginal setae respectively, endopod shorter than exopod; sympodite mesial margin with 3 coupling hooks.

Pleopod 2 (Fig. 2, C) exopod and endopod subequal in length, with 22 and 18 plumose marginal setae respectively; *appendix masculina* arising basally, proximally slightly swollen, distally

narrowing, extending well beyond endopod by about 1.45 as long as endopod, most of surface bearing cuticular setules; sympodite mesial margin with 3 coupling hooks. Pleopod 3 (Fig. 2, D) exopod shorter than endopod, with 20 and 8 plumose marginal setae respectively; sympodite mesial margin with 3 coupling hooks. *Pleopod 4* (Fig. 2, E) both rami subequal in length, with transverse folds. *Pleopod 5* (Fig. 2, F) both rami with transverse folds, exopod with 3 scale patches (2 distally and 1 proximal to transverse suture), lateral margin with slender simple marginal setae.

Female: Similar to male with the exception of the sexual characters.

Remarks. *Paraimene tuberculata* Javed & Ahmed, 1988 is distinguished from all other species of the genus by pereonites 2–4 with 3 rounded tubercles, pereonites 5–7 with 3 rounded and 2 elongated tubercles, and a pleotelson with 7 elongated tubercles on dorsal surface. Whereas, *P. tumulus* and *P. charlesae* have no ornamentation on dorsal surface of pereonites 2–7, and *P. ibarzabalae* has low carinae on pereonites 5 and 6. *Paraimene tuberculata* is most similar to *P. danieli* from Cuba, as both species have a pleotelson with elongated tubercles. However, *P. danieli* is distinguishable by a pelon with 2 pairs of rounded tubercles on posterior margin and a pleotelson with 4 rounded and 4 elongated tubercles.

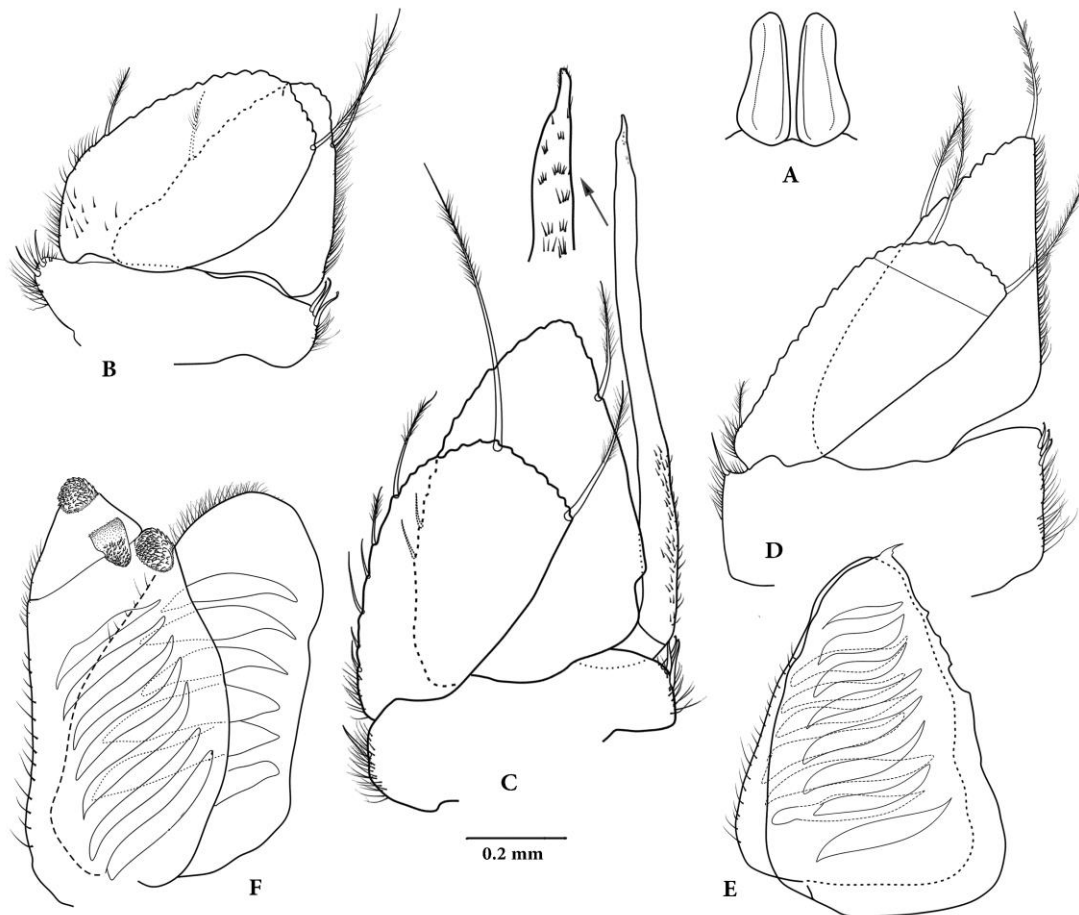


FIGURE 2. *Paraimene tuberculata* Javed & Ahmed, 1988: A. penes; B–F, pleopods 1– 5.



FIGURE 3. *Paraimene tuberculata* Javed & Ahmed, 1988: A. dorsal view; B. lateral view.

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