

Ampithoe qeshmensis sp. nov. (Amphipoda: Ampithoidae), a new herbivorous amphipod from the Persian Gulf

YEGANEH LAYEGHI¹ AND FARZANEH MOMTAZI²

¹Department of Zoology, Faculty of Science, Kharazmi University, Tehran, Iran, ²Iranian National Institute for Oceanography and Atmospheric Science, Tehran, Iran

Herbivorous amphipods of the family Ampithoidae have an important role in marine ecosystems. Ampithoe qeshmensis sp. nov. is a new member of Ampithoidae from the Qeshm Island, Persian Gulf. The new species resembles A. kava, A. katae and A. cookana based on the second male gnathopod. Ampithoe qeshmensis sp. nov. is characterized by round and reduced distoventral spur on uropod 1 in male, mandibular palp article 3 longer than second one, robust seta on palm of second male gnathopod, and longer flagellum than peduncular article 5 on the second antenna.

Keywords: Ampithoidae, Persian Gulf, new species, herbivorous amphipod

Submitted 30 May 2016; accepted 4 October 2016; first published online 11 November 2016

INTRODUCTION

The Ampithoidae are herbivorous amphipods that are vital to the food chain in marine habitats (Grosse *et al.*, 1986; Klumpp *et al.*, 1992). Tube building behaviour and silk production are also some interesting features of the ampithoids that have been studied by various authors (e.g. Appadoo & Myers, 2003).

The genus *Ampithoe* Leach, 1814 is the most speciose genus in the family Ampithoidae with more than 86 species listed in WORMS (Horton *et al.*, 2016). Genus *Ampithoe* can be distinguished by the absence of the accessory flagellum in antenna 1, notched outer lobes of lower lip, and the spur on the peduncle of uropod 1 absent or reduced and rounded (Poore & Lowry, 1997).

Previous studies of the family Ampithoidae in the Persian Gulf has been limited to the reporting of two species of the genus *Cymadusa* from Kuwait (Jones, 1986).

In the present study, a new species, *Ampithoe qeshmensis*, from Qeshm Island in the Persian Gulf is described.

MATERIALS AND METHODS

Materials were collected in April 2014 from the intertidal zone of Qeshm Island (26°43'58"N 55°50'2"E). The specimens examined were deposited in the Iranian National Institute for Oceanography and Atmospheric Science (INIOAC). The material was fixed in 70% ethanol, dissected in glycerol and then mounted by glycerin gelatin. Type material was drawn by Camera Lucida mounted on compound microscope. Due

to the loss of mandible and first maxilla during dissection, these parts were drawn based on paratype.

SYSTEMATICS

Order Amphipoda Latreille, 1816

Family Ampithoidae Boeck, 1871

Genus *Ampithoe* Leach, 1814

Ampithoe qeshmensis sp. nov.

(Figures 1–4)

Type material. Holotype male, 3.6 mm, INIOC1–37S, Qeshm Island, Persian Gulf, Iran (~26°30'N 55°48'E), seaweeds and associates, rocky intertidal zone, 21 April 2014, collected by Y. Layeghi. Paratype: 1 female, 4 mm, INIOC1–38S, same data as holotype.

Other material examined. Five females, four males and five juveniles, INIOC 1–39S, same data as types.

Type locality. Qeshm Island, Persian Gulf, Iran (~26°30'N 55°48'E).

DIAGNOSIS

(based on male) smooth body, antenna 2 densely setose and flagellum longer than peduncular article 5, mandibular palp article 3 longer than second one, palm of second male gnathopod slightly incised with short proximal thumb-like projection and robust seta, round and reduced distoventral spur on uropod 1.

DESCRIPTION

Based on holotype, male, 3.6 mm, INIOC1–37S.

Head. Head as long as deep (Figure 1). Antenna 1 (Figure 2) 1.4 × length antenna 2; peduncular article 1 subequal to article 2; flagellum not complete. Antenna 2 (Figure 2) peduncle densely setose on ventral margin; article 4 subequal

Corresponding author:

F. Momtazi

Email: momtazi.f@gmail.com

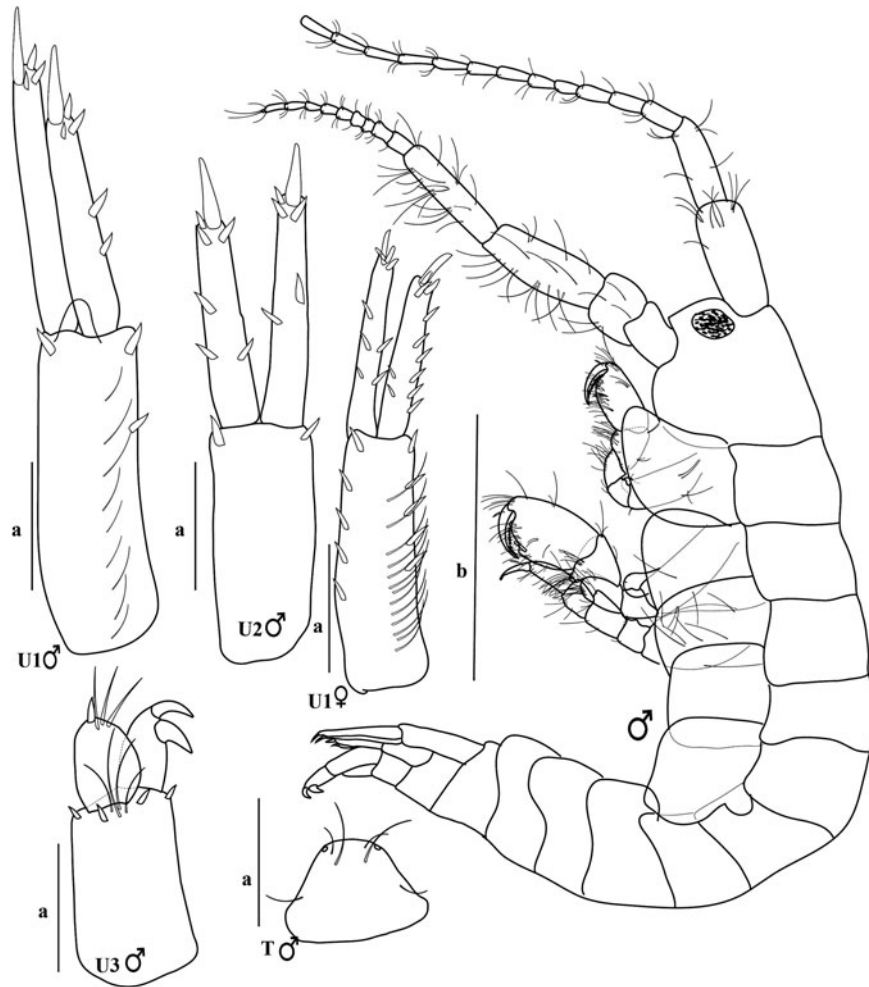


Fig. 1. *Amphithoe qeshmensis* sp. nov. (W♂) whole body, (U1♂) first uropod, (U2♂) second uropod, (U3♂) third uropod, (T) male telson from type specimen and (U1) first uropod of female paratype. Scale a: 0.1 and b: 1 mm.

to article 5; flagellum with 9 articles, $1.36 \times$ length peduncular article 5. *Upper lip* (Figure 2) distally setose. *Lower lip* (Figure 2) outer plates notched forming a deep distal cleft. *Mandible* (holotype damaged, based on paratype) (Figure 2) molar well developed, triturating, accessory setal row with 4 serrate setae; palp 3-articulate, article 1 shorter than article 2; article 2 subequal in length to article 3, with 2 marginal palmate setae, article 3 with 6 terminal palmate setae. *Maxilla 1* (holotype damaged, based on paratype) (Figure 2) inner plate with 2 setae; palp article 2 slender. *Maxilla 2* (Figure 2) inner plate narrower than outer plate. *Maxilliped* (Figure 2) outer plate with row of large robust setae along medial margin, palp 4-articulate.

Pereon. *Gnathopod 1* (Figure 3) sexually dimorphic; smaller than gnathopod 2; coxa 1 smaller than coxa 2, produced, anterior margin straight, anteroventral corner rounded; basis longer than coxa, anterodistal lobe large, rounded, with 1 robust seta, 2 slender setae on posteroventral corner; ischium small, trapezoid-shaped; merus anterodistal lobe acute; carpus shorter than propodus, subtriangular, with slender setae on posterior margin, anterior margin with one robust seta; propodus subrectangular, length $2.14 \times$ width, palm slightly acute, straight, with one defining large robust seta; dactylus subequal in length to palm, inner margin crenate. *Gnathopod 2* (Figure 3) sexually dimorphic; coxa as long as deep; basis with large

anterodistal lobe, with 3 slender setae on anterior margin, lobe with one robust seta; merus with long slender setae on ventral margin; carpus shorter than propodus, subtriangular, with small posterodistal lobe, lobe with long slender setae; propodus $1.6 \times$ width, produced anterodistally, anterior margin with fringe of slender setae; palm acute, slightly incised, covered by long setae, posterodistal tooth short and apically blunt with defining one robust seta; dactylus subequal in length to palm, tapering evenly, inner margin crenulate. *Pereopod 3–4* (Figure 4) basis slightly expanded, merus longer than carpus; propodus with 4 slender setae on posterior margin. *Pereopod 5* (Figure 4) coxa without medial slender setae; basis expanded, with 4 short slender setae on anterior margin; merus short, subrectangular; carpus subquadrate, short; propodus subrectangular, slightly expanded distally, with 1 robust seta on posterior margin and 3 distal robust setae; dactylus strongly curved with inner smooth margin. *Pereopod 6* (Figure 4) basis weakly expanded, with 4 short slender setae on anterior margin, posterior margin curved; propodus with 3 anterodistal robust setae. *Pereopod 7* (Figure 4) similar to pereopod 6, propodus with 4 anterodistal robust setae.

Pleon. *Uropod 1* (Figure 1) sexually dimorphic; peduncle with 3 robust setae, with long fringe of slender setae, with small rounded distoventral spur; outer ramus without lateral

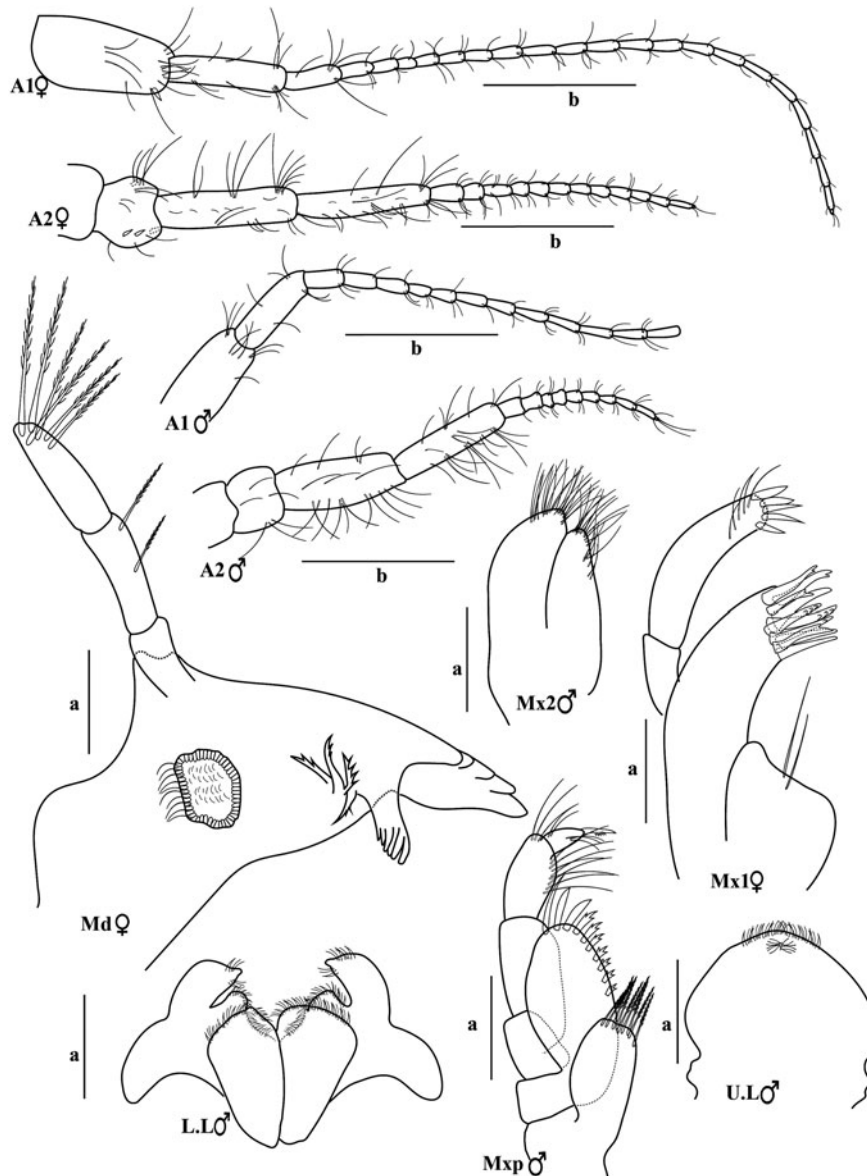


Fig. 2. *Ampithoe qeshmensis* sp. nov. (A1♂) first antenna, (A2♂) second antenna, (U.L♂) upper lip, (L.L♂) lower lip, (Mxp♂) maxilliped, (M2♂) second maxilla from type specimen and (A1♀) first antenna, (A2♀) second antenna, (Mx1♀) first maxilla, (Md♀) mandible from female paratype. Scale a: 0.1 and b: 0.5 mm.

robust setae; inner ramus with 2 lateral robust setae, each ramus with 4 terminal robust setae. *Uropod 2* (Figure 1) peduncle with 2 dorsolateral robust setae; rami subequal in length; outer ramus with 2 lateral and 4 terminal robust setae; inner ramus with 3 lateral and 4 terminal robust setae. *Uropod 3* (Figure 1) peduncle longer than broad; peduncle with 4 distal robust setae, inner ramus 0.4 × peduncle, with 4 apical robust setae and 4 long simple setae; outer ramus with 2 apical large curved robust setae; inner ramus with one robust and three long simple setae. *Telson* (Figure 1) sub-trapezoidal, apically truncated, with 4 apical and 2 lateral setae.

Female (sexually dimorphic characters). Based on paratype, 4 mm, INIOC1–38S. *Antenna 1* (Figure 2) flagellum 20-articulate. *Antenna 2* (Figure 2) flagellum 12-articulate. *Gnathopod 1* (Figure 3), subequal to gnathopod 2; anterodistal lobe of basis with 1 slender seta, carpus anterior margin

without one robust seta. *Gnathopod 2* (Figure 3) coxa as long as deep; basis without 3 slender setae on anterior margin, lobe without robust seta; palm sinusoidal, with 1 robust seta defining palm. *Uropod 1* peduncle with 10 lateral robust setae, with long fringe of slender setae, without small rounded distoventral spur; outer ramus with 5 lateral robust setae; inner ramus with 8 lateral robust setae.

Habitat. Living in intertidal zone, on macroalgae of genus *Laurencia*.

Etymology. This species is named for its type locality, Qeshm Island.

Remarks. *Ampithoe qeshmensis* sp. nov. is the first representative of the genus *Ampithoe* from Qeshm Island in the Persian Gulf. The new species is most similar to *A. cookana* Peart, 2007; *A. katae* Peart, 2007; *A. kava* Myers, 1985; *A. kuala* Myers, 1985; *A. platycera* Sivaprakasam, 1970; and *A. ramondi* Audouin, 1826.

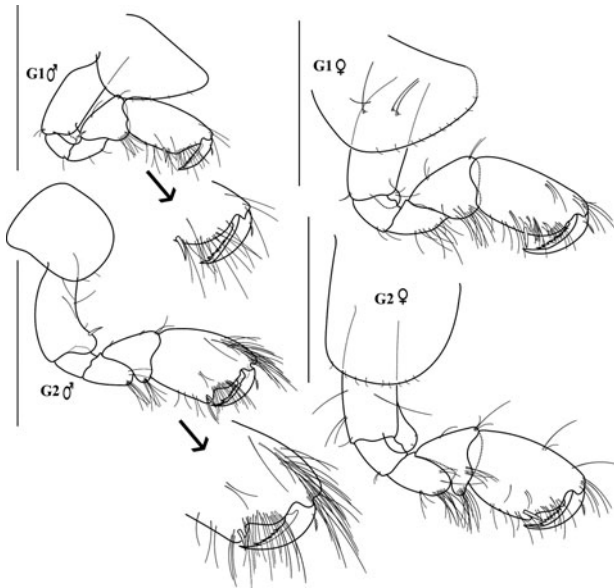


Fig. 3. *Ampithoe qeshmensis* sp. nov. (G1♂) first gnathopod, (G2♂) second gnathopod from type specimen and (G1♀) first gnathopod, (G2♀) second gnathopod from female paratype. Scale 0.5 mm.

Ampithoe qeshmensis differs from *A. cookana*, *A. katae*, *A. kuala*, *A. platycera* and *A. ramondi* by having a clearly rounded and reduced distoventral spur on the peduncle of the male uropod 1.

The main characters that separate the new species from *Ampithoe kava* are the ratio of the flagellum to the peduncular

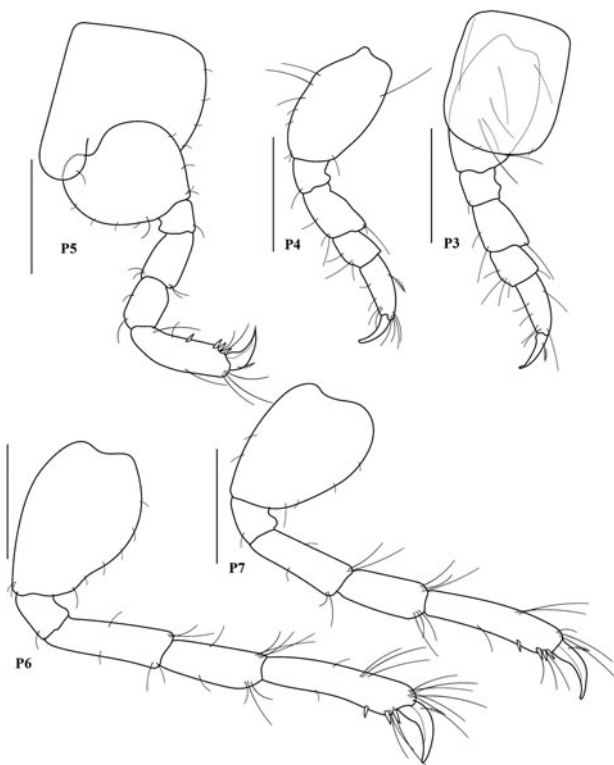


Fig. 4. *Ampithoe qeshmensis* sp. nov. (P3) third pereopod, (P4) fourth pereopod, (P5) fifth pereopod, (P6) sixth pereopod and (P7) seventh pereopod from type specimen. Scale 0.25 mm.

article 5 in Antenna 2 (about $1.4 \times$ in *A. qeshmensis*, less than $1 \times$ in *A. kava*), presence of a robust seta on the palm of gnathopod 2 in male (absent in *A. kava*) and the palm structure in gnathopod 2 (thumb-like with narrow cleft in *A. kava*, but short thumb-like without cleft in *A. qeshmensis*).

Ampithoe qeshmensis resembles *A. cookana* and *A. katae* based on the propodus of second gnathopod (short thumb-like defining palm) while it differs with *A. cookana* in the carpal robust setae of gnathopod 2 (more than 4 in *A. cookana*, absent in *A. qeshmensis*), a robust seta on the palm of second gnathopod and on the basal lobe of the first gnathopod in *A. qeshmensis*. It is different from *A. katae* based on the shorter second mandibular palp article than ultimate article ($0.82 \times$) in *A. qeshmensis*, while it is longer in *A. katae* ($1.35 \times$), and also the defining robust setae on the palm of gnathopod 2 in *A. qeshmensis*.

Recently *Ampithoe ramondi* was recorded from Kuwait in the north-west of the Persian Gulf (Myers & Nithyanandan, 2016). The type locality of *A. qeshmensis* is on the eastern part of the region. Consequently, the family Ampithoidae has four members in the Persian Gulf including: *Cymadusa filosa* (Jones, 1986; Myers & Nithyanandan, 2016), *C. setosa* (Jones, 1986), *A. ramondi* (Myers & Nithyanandan, 2016) and *A. qeshmensis*.

ACKNOWLEDGEMENTS

The authors would like to thank Dr Abdolvahab Maghsoudlou and Vahid Sepahvand for collaboration during this study.

FINANCIAL SUPPORT

This study was financed by the Iranian National Institute for Oceanography and Atmospheric Science (INIOAS) (project grant number '392-011-11').

REFERENCES

- Appadoo C. and Myers A.A. (2003) Observations on the tube-building behavior of the marine amphipod *Cymadusa filosa* Savigny (Crustacea: Ampithoidae). *Journal of Natural History* 37, 2151–2164.
- Audouin J. (1826) Explication sommaire des planches de crustacés de l'Égypte et de la Syrie, Publiées par Jules-Cesar Savigny, membre de l'institut; offrant un exposé des caractères naturels des genres, avec la distinction des espèces, Description de l'Égypte. *Histoire Naturelle* 1, 77–98.
- Boeck A. (1871) Crustacea Amphipoda Borealia et Arctica. *Forhandlingar i videnskabs-Selskabet i Christiania*, 1870, 83–280.
- Grosse D.J., Pauley G.B. and Moran D. (1986) Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Northwest) amphipods. *United States Fish and Wildlife Service Biological Report*, 82, 11–69.
- Horton T., Lowry J., De Broyer C., Bellan-Santini D., Coleman C.O., Daneliya M., Dauvin J.C., Fiser C., Gasca R., Grabowski M., Guerra-García J.M., Hendrycks E., Holsinger J., Hughes L., Jaime D., Jazdzewski K., Just J., Kamal'tynov R.M., Kim Y.H., King R., Krapp-Schickel T., LeCroy S., Lörz A.N., Senna A.R., Serejo C., Sket B., Tandberg A.H., Thomas J., Thurston M., Vader W., Väinölä R., Vonk R., White K. and Zeidler W. (2016) World

- Amphipoda Database. Accessed at <http://www.marinespecies.org/amphipoda> on 8 October 2016.
- Jones D.A.** (1986) *A field guide to the sea shores of Kuwait and the Arabian Gulf*, 1st edition. Kuwait: University of Kuwait. 188 pp.
- Klumpp D.W., Salita-Espinosa J.T. and Fortes M.D.** (1992) The role of epiphytic periphyton and macroinvertebrate grazers in the trophic flux of a tropical seagrass community. *Aquatic Botany* 43, 327–349.
- Latreille P.A.** (1816) Amphipoda. In *Nouveau Dictionnaire d'histoire naturelle, appliquée aux Arts, à l'Agriculture, à l'Économie rurale et domestique, à la Médecine, etc. Par une société de Naturalistes et d'Agriculteurs*, Volume 1, 2nd edition. Paris: Deterville, 467–469 pp.
- Leach W.E.** (1814) Crustaceology. *The Edinburgh Encyclopaedia* 7, 383–434.
- Myers A.A.** (1985) Shallow-water, coral reef and mangrove Amphipoda (Gammaridea) of Fiji. *Records of the Australian Museum* (Supplement) 5, 1–143.
- Myers A.A. and Nithyanandan M.** (2016) The Amphipoda of Sea City, Kuwait. The Senticaudata (Crustacea). *Zootaxa* 4072, 401–429.
- Pearl R.A.** (2007) A review of Australian species of *Ampithoe* Leach, 1814 (Crustacea: Amphipoda: Ampithoidae) with descriptions of seventeen new species. *Zootaxa* 1566, 1–95.
- Poore A.G.B. and Lowry J.K.** (1997) New ampithoid amphipods from Port Jackson, New South Wales, Australia (Crustacea; Amphipoda: Ampithoidae). *Invertebrate Taxonomy* 11, 897–941.
- and
- Sivaprakasam T.E.** (1970) Amphipods on the Family Ampithoidae from the Madras Coast. *Journal of the Marine Biological Association of India* 12, 64–80.
- Correspondence should be addressed to:**
F. Momtazi
Iranian National Institute for Oceanography and Atmospheric Science, Tehran, Iran
email: momtazi.f@gmail.com