Article

A new record of *Aretes indicus* (Coutière 1903)(Alpheidae : Caridea) from northern Arabian Sea

Farhana Shafiq Ghory, **Quddusi Bashir Kazmi**
Marine Reference Collection and Resource Centre, University of Karachi, Karachi, Pakistan
E-mail: qbkazmi@yahoo.com

Received 15 June 2021; *Accepted 20 July 2021*; *Published 1 December 2021*

Abstract
The alpheid shrimp, *Aretes indicus* Coutiere, 1903 is reported for the first time at the northern Arabian Sea. The species is known to have a symbiotic relationship with the rock boring intertidal dwelling sea urchins. The present shrimps were found in an old undated sample which contained sea urchin *Echinometra mathaei*. Apparently the shrimp was dislodged while transferring the sample from coast to the lab and during handling in preservation.

Keywords new record; *Aretes indicus*; northern Arabian Sea.

Arthropods
ISSN 2224-4255
URL: http://www.iaees.org/publications/journals/arthropods/online-version.asp
RSS: http://www.iaees.org/publications/journals/arthropods/rss.xml
E-mail: arthropods@iaees.org
Editor-in-Chief: WenJun Zhang
Publisher: International Academy of Ecology and Environmental Sciences

1 Introduction

The present genus *Aretes* (Leach, 1814) is being reported from Pakistan for the first time adding to the number of alpheid genera (5) from Pakistan (Kazmi and Kazmi, 2012). Six alpheids were reported to be symbiotic with other organisms (Kazmi and Khatoon, 2016) including *Alpheus splendid* from a sea urchin. Recently Ghory et al. (2018) reported *Athanas* sp. from Karachi coast associated with a sea urchin. Alpheid shrimp of genus *Aretes* (Leach, 1814) is found as commensal on sea urchins: *Aretes indicus* Coutiere, 1903 commonly found, if not always, among the spines of the sea urchin *Echinometra mathaei* (see Gherardi, 1991), although Grave (2007) does not mention of any commensalism while reporting *Aretes indicus* from the Persian Gulf; *Aretes indicus* also lives in *Anthocidaris crassispina* and Diadema. However, other commensal shrimps, *Athanas areteformi, Tulearіocaris holthuisi* and *Aretes acanthocarpus* also live among the spines of urchin *Echinometra mathaei*.

2 Material examined: 2, near *A.indicus* 7mm; other is 6.8mm, locality Buleji.

2.1 Genus *Arete* Stimpson, 1860

2.2 Diagnosis: Body relatively stout. Carapace smooth, not setose. Frontal margin with long, straight

rostrum, bearing acute tip, without subdistal tooth on ventral margin. Extra-corneal teeth acute, not protruding beyond anterior margin of eye; supra-corneal teeth absent or feebly developed; infra-corneal teeth absent. Orbital hoods absent; eyes exposed in dorsal and lateral views. Pterygostomial margin usually rounded or angular, sometimes subacute. Cardiac notch well-developed. Sixth abdominal segment with articulated plate at posteroventral angle. Antennules with finely serrated distal margin of 1st segment; ventromesial carina of 1st segment with strong tooth; lateral flagellum with well-developed secondary ramus. Antenna with normal, not particularly stout basicerite, distolateral tooth always present; scaphocerite broadly oval or rounded. Mandible with palp, incisor process slightly expanded, distally with no more than 12 small teeth. Maxillule with bilobed palp, both ventral and dorsal lobes with setae. Labrum not swollen or protruding. Third maxilliped with distally projecting dorsal margin of antepenultimate segment; penultimate segment rectangular, about as long as or slightly longer than wide; ultimate segment with short spines on tip. First pereiopods (chelipeds) feebly sexually dimorphic, equal or subequal, usually subsymmetrical, sometimes asymmetrical (major cheliped situated on either side), stout, carried extended with dactylus in lateral or ventrolateral position; coxa unarmed mesially; ischium usually with strong tooth mesially and with lobes or teeth furnished with spines on dorsal margin; basis with rudimentary exopod; merusrobust, flattened ventrally; carpus swollen, cup-shaped, embracing proximal portion of palm distally, ventral side somewhat flattened, not deeply excavated; chela smooth, without sculpturing, compressed; palm sometimes with acute distal projection on mesial side proximal to articulation with dactylus, without or with feebly marked lineaimpressa; fingers armed with teeth, sometimes interrupted by large hiatus, without cavity-tooth system. Carpus of 2nd pereiopod bearing 4 segments. Third pereiopod with ischium unarmed or bearing 1 spine on ventrolateral margin; merus without spines, sometimes with distoventral margin ending in angular or acute projection; carpus unarmed; propodus armed with spines; dactylus stout, biunguiculate. Fifth pereiopod with poorly developed propodal brush (at most 3 rows of setae). Second pleopod with appendix interna and appendix masculina in males and sometimes in females. Telson with 2 pairs of dorsal spines and 2 pairs of posterolateral spines; anal tubercles lacking (taken from Anker and Jeng, 2007).

3 *Aretes indicus* Coutière, 1903

Synonymised names:

Aretedorsalis var. *indicus* Coutière, 1903: 3:84, figs. 25-29

Areteindicus Coutière, 1905: 863, figs. 134, 135; Nobili, 1906a: 24; Balss, 1915: 21; Coutière, 1921: 413; Barnard, 1956: 7; Banner, 1959: 130; De Grave, 2007: 147; De Grave and Ashelby, 2011: 3; Dabbagh et al., 2019: 248.

Arete intermedius Yu, 1931:513, fig. 1

Arete iphianassa De Man, 1910: 312; De Man, 1911: 164; De Man, 1915: pls. 3,4, fig. 11; De Man, 1922: 22, pl.3, fig. 11; Banner, 1956: 325; Holthuis, 1958 : 17.

Athanas kominatoensis Kubo, 1942:

Athanas indicus Banner and Banner, 1960: 149; Banner and Banner, 1964: 85; Miya and Miyake, 1968: 129-162, figs. 9, 10 A–C, E–G, I. 11 A, B, D. 12 A–D, F–H (part.?); Suzuki, 1970: 5, figs. 4-7; Banner and Banner 1973: 327, fig. 11; 1981: 42; Sastry, 1981: 22, fig. 2; Titgen, 1982: 79; Gherardi, 2012: 111, fig. 2; George, 2012: 285; Naderloo and Turkey, 2012: 11; Naderloo et al., 2015: 400.

3.1 Description

A small shrimp. The carapace is smooth, the rostrum is lanceolate and forms a low ridge terminating behind the eyes. The rostrum overreaches 2nd antennular segment; orbit is without supracorneal tooth, butwith extracorneal tooth, and without infracorneal tooth. Thetelson is shorter than the uropod. The first pereiopods

aremissing in the specimen. The second pereiopod is rather slender and bears only a minute chela, has 4 carpal articles.In the ambulatory pereiopods, the dactylii are provided with biunguiculate processes, and the lower margin of the propodus with short spines.

3.2 Colour

The body is deep purple, with an orange mid-dorsal band extending laterally to the inner edge of the eyestalk and from the rostrum back to the fifth abdominal segment. A thin blue stripe runs the length of this band along each side, and meets posteriorly where the band disappears. The chelipeds have four bands, aligned between the mobile and immobile dactyli, from the fingers to the external edge, which are yellow (the tips only), chalk white, deep purple, and chalk white again. The last stripe is aligned with a lateral band which ends at the last abdominal segment as it narrows. The fourth abdominal segment is marked with two dark eye spots on the dorsal surface, surrounded by two blue semi-circumferences which are symmetrical to the mid-dorsal band (after Gherardi, 2012).

3.3 Variation

In specimen total length is 7mm, the extra corneal tooth of carapace differs in sizes on both right and left side (Fig. 1).

3.4 Range

Indo-West Pacific: Madagascar, Red Sea, Persian Gulf, Gulf of Oman, China, Japan, Australia, Tuamotus, Marshall Islands, Mozambique, Indian Ocean, Indonesia and Philippines.

3.5 Habitat

Rocky/sandy intertidal to shallow subtidal; symbiotic with sea urchin *Echinometra mathaei.*

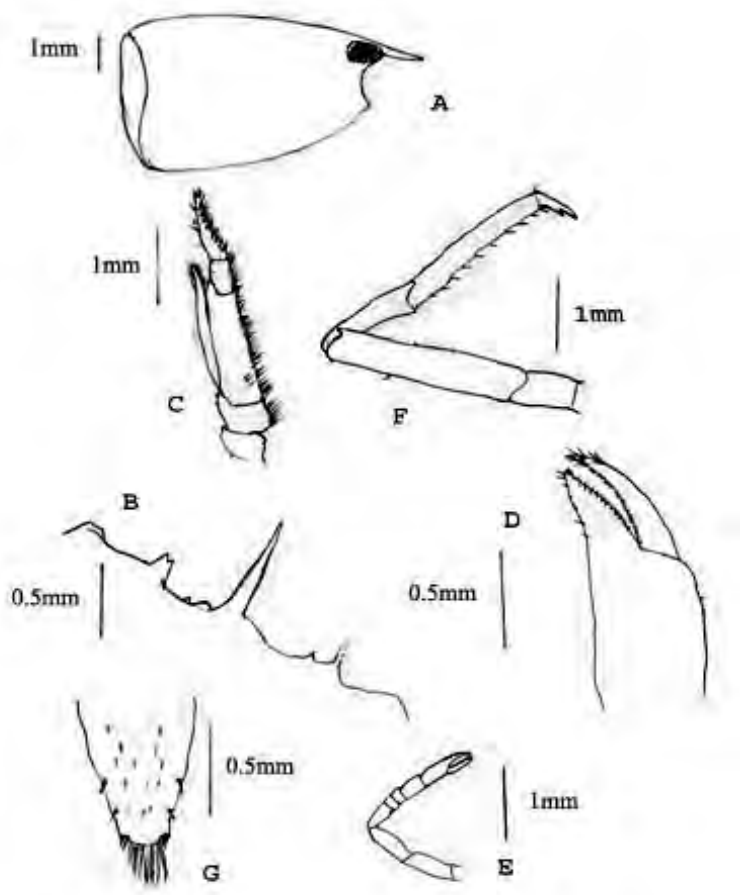

Fig. 1 *Aretes indicus* Coutière, 1903. ♀ (TL=7mm)**.** A: carapace (lateral view); B: anterior part of carapace with rostrum (dorsal view); C: III maxilliped; D: chela of first pereiopod; E: II leg; F: IV leg.

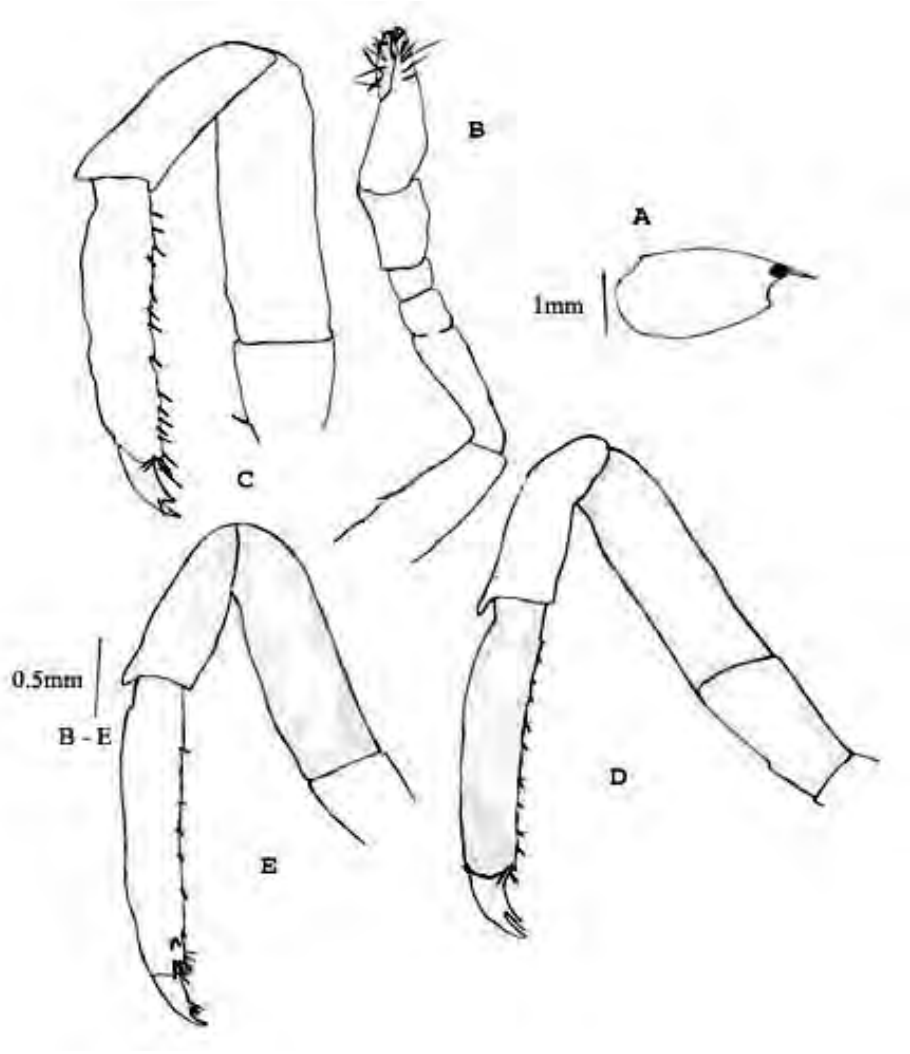

Fig. 2 *Aretes indicus* Coutière, 1903. ♀ (TL=6.8 mm). A: carapace (lateral view); B–E: II-V legs.

4 Remarks

The genus *Arete* needs a thorough taxonomic revision using traditional morphology, host records and DNA analyses. We don't really know what *Arete*cf. *indicus* = *Arete indicussensu* Suzuki, 1970 represents, maybe a synonym of something else, maybe an undescribed species (Anker, personal correspondence, second author).

The rostrum in the present material is narrower than described by earlier authors, all legs are biunguiculate; the merus of third leg resembles Japanese specimens described by Miya and Miyake (1968) in having distally a slight tooth not like that of type specimen where it is strong.

References

Anker A, Jeng MS. 2007. Establishment of a New Genus for *Arete borradailei* Coutière, 1903 and *Athanas verrucosus* Banner and Banner, 1960, with Redefinitions of *Arete* Stimpson, 1860 and *Athanas* Leach, 1814 (Crustacea: Decapoda: Alpheidae). Zoological Studies, 46(4): 454-472

Coutière H. 1903. Note surquelques Alpheidae des Maldives et Laquedives. Bulletin de la Société Philomatique de Paris, sér 9, 5: 72-90

Coutière H. 1905. Les Alpheidae. In: The Fauna and Geography of the Maldive and Laccadive Archipelagoes (Gardiner JS, ed), 2: 852-921, pls. 70-87. Cambridge University Press, Cambridge, UK

Balss H. 1915. Expeditionen S.M. Schiff, Pola" in das Rote Meer Nördliche und Südlichehälfte 1895/96 1897/88. Zoolo-gischeergebnisse. XXX. Die decapoden des Roten Meeres. I. Die Macruren. Denkschriften Der Kaiserlichen Akademie Der Wissenschaften. Mathematisch-Naturwis senschaftliche Classe, 91: 1-38

Banner AH. 1956. Contributions to the knowledge of the alpheid shrimp of the Pacific Ocean, part I: collections from the Mariana Archipelago. Pacific Science, 10: 318-373

Banner AH. 1959. Contributions to the knowledge of the alpheid shrimp of the Pacific Ocean, part IV: Various small collections from the central Pacific area, including supplementary notes on alpheids from Hawaii. Pacific Science, 13: 130-155

Banner AH, Banner DM. 1960. Contributions to the knowledge of the alpheid shrimp of the Pacific Ocean, part V: the Indo-Pacific members of the genus *Athanas*. Pacific Science, 14: 129-155

Banner AH., Banner DM. 1964. Contributions to the knowledge of the alpheid shrimp of the Pacific Ocean, IX. Collections from the Phoenix and Line Islands. Pacific Science, 18: 83-99

Banner DM, Banner AH. 1973. The alpheid shrimp of Australia, part I: the lower genera. Records of the Australian Museum, 28: 291-382

Dabbagh AR, Kamrani E, Taherizadeh MR, Jahromi MS, Naderloo R. 2019. Mating system in the shrimp *Arete indicus*, a symbiont of *Echinometra mathaei*. Indian Journal of Geo Marine Sciences, 48: 248-252

De Grave S, Ashelby CW. 2011. Notes on some shrimp species (Decapoda: Caridea) from Qatar, with an annotated check-list of marine caridean species known from the Persian Gulf. Marine Biodiversity Records, 4(e20): 1-7.

De Man JG. 1910. Diagnoses of new species of macrurous decapod Crustacea from the"Siboga-Expedition". Tijdsch. Nederl. Dierk, Ver. II 11: 287-319

De Man JG. 1911. The Decapoda of the Siboga Expedition. Part II. Family Alpheidae. Siboga Expeditie, 39a1: 133-465.

De Man JG. 1922. The Decapoda of the Siboga Expedition. On a collection of macrurous decapod Crustacea of the Siboga Expedition, chiefly Penaeidae and Alpheidae. IN: Siboga Expeditie, 39a 4 (5): 1-51, pis. 1-4

De Man JG. 1915. The Decapoda of the Siboga Expedition. Part II. Family Alpheidae. Siboga Expeditie, 39a1 (Supplement): pls. 1-23

George JD. 2012. Reef-associated macro invertebrates of the SE Gulf. In: Coral reefs of the Gulf: Adaptation to Climatic Extremes (Riegl BM, Purkis SJ, eds). Coral Reefs of the World, 3: 253-308

Gherardi F. 2012. Eco-ethological aspects of the symbiosis between the shrimp *Athanas indicus* (Coutière 1903) and the sea urchin *Echinometra mathaei* (de Blainville 1825). Tropical Zoology, 1970-9528

Ghory FS, Ahmed Q, Ali QM. 2018. Symbiotic association between *Echinometra mathaei* (Echinoidea: Echinometridae) and *Athanas* sp. (Caridea: Alpheidae) from Sunhera beach, Karachi (northern Arabian Sea). Pakistan Journal of Marine Sciences, 27(1): 73-77

Grave S. 2007. Notes on some shrimp species (Decapoda: Caridea) from the Persian Gulf. Annalen Des Naturhistorischen Museums in Wien, 108 B: 145-152

Holthuis LB. 1958. Crustacea Decapoda from the northern Red Sea (Gulf of Aqaba and Sinai Peninsula). I. Macrura. Bulletin of the Sea Fisheries Research Station, Haifa 17: 1- 40

Kazmi QB, Kazmi MA. 2012. Biodiversity and Biogeography of Caridean Shrimps of Pakistan. MRC and HEC Publication, Pakistan

Kazmi QB, Khatoon N. 2016. A Compendium of Crustaceans of Pakistani Waters Living in Partnership: Concise compilation of symbiotic crustaceans of Pakistan with all necessary information (with a chapter on

IIOE samples). LAP LAMBERT Academic Publishing, Germany

Kubo I. 1942. On a snapping shrimp, *Athanas kominatoensis*. Dobutsugaku Zasshi. Zoological Magazine, Tokyo, 54: 82-85

Leach WE. 1814. Crustaceology. The Edinburgh Encyclopaedia (Brewster D, ed), 7: 383-437

Miya Y, Miyake S. 1968. Revision of the genus *Athanas* of Japan and the Ryukyu Islands, with description of a new species (Crustacea: Decapoda: Alpheidae). Publ. Amakusa Marine Biological Laboratory, Kyushu University, 1: 129-162

Naderloo R, Türkay M. 2012. Decapod crustaceans of the littoral and shallow sublittoral Iranian coast of the Persian Gulf: faunistics, biodiversity and zoogeography. Zootaxa, 3374(1): 1-67

Naderloo R, Ebrahimnejad S, Sari A. 2015. Annotated checklist of the decapod crustaceans of the Gulf of Oman, northwestern Indian Ocean. Zootaxa, 4028(3): 397-412

Nobili G. 1906. Mission J. Bonnier er Ch. Perez (GolfePersique, 1901). Crustaces Decapodeset Stomatopodes. Bulletin Scientifique de La France et de La Belgique, 90: 13-159

Sastry DRK. 1981. On some crustacean associates of Echinodermata from the Bay of Bengal. Records of the Zoological Survey of India, 79: 19-30

Suzuki H. 1970. Taxonomic review of four alpheid shrimps belonging to the genus *Athanas*, with reference to their sexual phenomena. Science reports of the Yokohama National University, Section 217: 1-38, pls. 1- 4

Titgen RH. 1982. The systematic and ecology of the decapods of Dubai, and their Zoogeo-graphie relationships to the Arabian Gulf of the western Indian Ocean. PhD Thesis. Texas A and M University, USA

Yu SC. 1931. Description de deuxnouvellescrevettes de Chine. Bulletin du Muséum National d'Histoire Naturelle, sér 2, 3: 513-516