

First record of sergestid shrimp, *Challengerosergia umitakae* (Hashizume et Omori, 1995) (Decapoda Sergestidae) collected from the Arabian Sea of Oman

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ABSTRACT

Sergestid shrimps (Decapoda Sergestidae) are considered to be a benthic-pelagic shrimps. They basically feed on macrofauna and appear as an essential component of the deep-sea ecosystem. Such species are usually distributed in the deep sea. We report about a sergestid shrimp of the genus *Challengerosergia* Vereshchaka, Olesen et Lunina, 2014, *C. umitakae* (Hashizume et Omori, 1995) collected for the first time from the Arabian Sea of Oman. *Challengerosergia umitakae* has been identified based on male clasping organ, petasma, and photophores. Also, we provide a detail description of other distinctive body parts (e.g., carapace, scaphocerite and europods) of the recorded *C. umitakae*.

KEY WORDS

Crustacea; Sergestidae; first records; Arabian Sea; Oman.

Received 15.03.2021; accepted 27.08.2021; published online 04.11.2021

INTRODUCTION

A family of Sergestidae (Crustacea Decapoda) comprises species that are among the most common in many marine ecosystems (Vereshchaka, 1994). The former two genera *Sergestes* H. Milne Edwards, 1830 and *Sergia* have been included under the family Sergestidae (Vereshchaka et al., 2014). Both genera cover almost two-third of identified present sergestids, i.e. ~71 species. At present, 21 genera belong to the Sergestidae family (WoRMS, 2021). Presence of dermal photophores and a copulatory organ forms the two genera as a monophyletic group. Over two decades, the comprehensive studies of the genus *Sergia* received a morphological and phylogenetic revision (Vereshchaka, 2000). Moreover, eight new genera have recently been found under the old genus *Ser-*

gia (Vereshchaka et al., 2014): *Sergia* Stimpson, 1860, *Gardinerosergia* Vereshchaka, Olesen et Lunina, 2014, *Phorcosergia* Vereshchaka, Olesen et Lunina, 2014, *Prehensilosergia* Vereshchaka, Olesen et Lunina, 2014, *Robustosergia* Vereshchaka, Olesen et Lunina, 2014, *Scintillosergia* Vereshchaka, Olesen et Lunina, 2014, *Challengerosergia* Vereshchaka, Olesen et Lunina, 2014, and *Lucensosergia* Vereshchaka, Olesen et Lunina, 2014.

Furthermore, eight species belong to the genus *Challengerosergia*: *C. challengerii* (Hansen, 1903), *C. fulgens* (Hansen, 1919), *C. hansjacobi* (Vereshchaka, 1994), *C. jeppeseni* (Vereshchaka, 2000), *C. oksanae* (Vereshchaka, 2000), *Challengerosergia stellata* (Burkenroad, 1940), *C. talismani* (Barnard, 1947) and *C. umitakae* (Hashizume et Omori, 1995) (Vereshchaka et al.,

2014). Each species was classified based on the presence of hepatic tubercle spine and the number and position of dermal photophores.

Challengerosergia umitakae is considered to be benthopelagic shrimp species. Benthopelagic shrimp basically feed on macrofauna and appear as an essential component of the deep-sea ecosystem (Papiol et al., 2014). Such species are usually distributed in the deep sea. *C. umitakae* originates from the Indian Ocean (Hashizume & Omori, 1995). Availability of *C. umitakae* includes the Western Pacific Ocean and Fiji Island, Northwestern part off Sokotra, Madagascar, over Saya-damalya Bank, South of Sri Lanka (Vereshchaka et al., 2014; Yousuf & Kazmi, 2008).

In addition, the final confirmation of *C. umitakae* identification has been made with the presence of endopod of maxilliped I, ocular papilla, a posterior brachial lobe of somite XII, and the morphology and structure of petasma of the inner antennular flagellum (Vereshchaka, 2000).

MATERIAL AND METHODS

In February 2019, we collected 150 small shrimps from the seashore of Welayiat Rakiot in Dofar Provenance, in Arabian Sea of Oman (Fig. 1). Then we brought those specimens to the Crustaceans and Mollusks laboratory (Marine Science and Fisheries Centre, Ministry of Agriculture and Fisheries Wealth, Sultanate of Oman), for identifi-

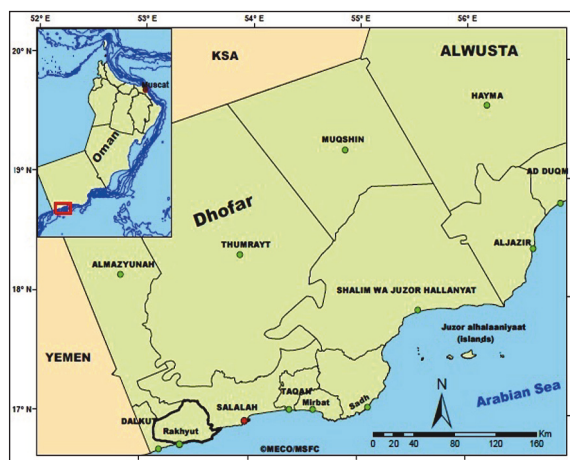


Figure 1. Location of the study area (Welayiat Rakiot in Dofar Provenance, in Arabian Sea of Oman).

cation. Shrimp samples were kept frozen, and 50 samples were dried. We performed identification and description of those shrimp samples, according to Vereshchaka (2000). We mainly focused following characters, i.e. (i) the morphology of rostrum, (ii) the number and position of dermal photophore bearing lens, (iii) inner flagellum of the antennular peduncle of male and the anatomy of the body part involved in reproduction, namely male petasma, which allow us to identify closely related species and give the most distinct characters for confirmation and identification of the studied species. The illustrations were made with the aid of Leica DMS300.

The following abbreviations were used: LA = lobus armatus, LAc = lobus accessories, LC = lobus connectens, LI = lobus inermis, LT = lobus terminalis, PU = processus unicifer, PV = processus ventralis

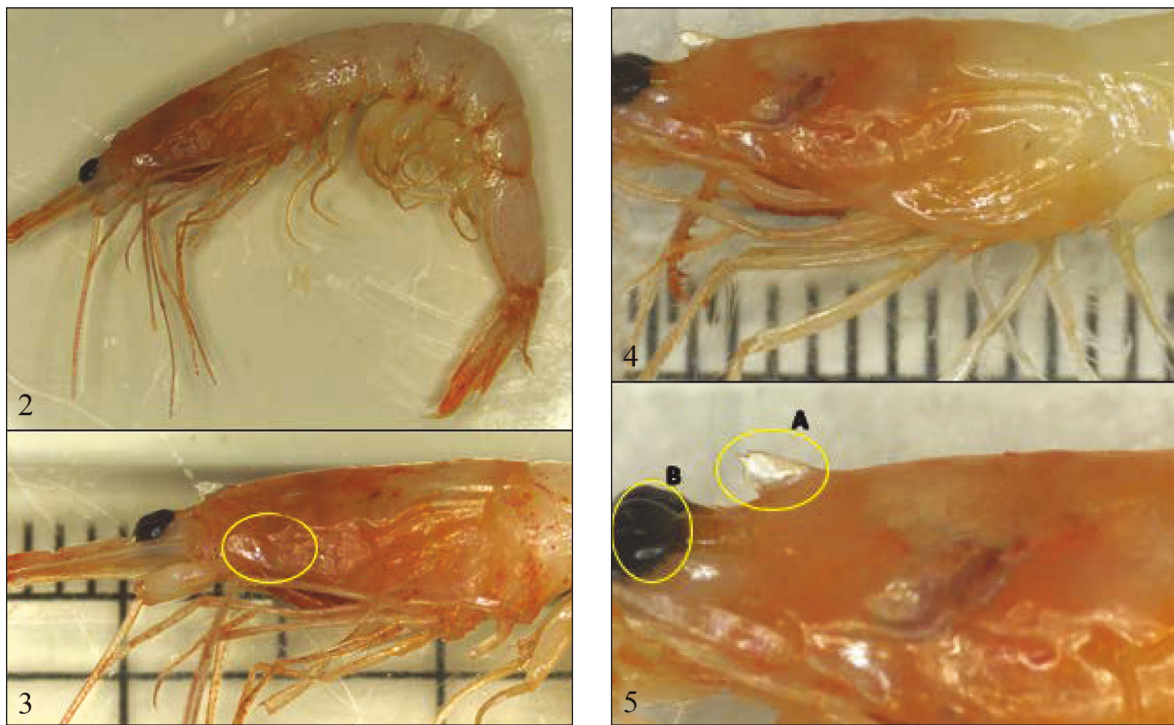
RESULTS

The identification of *C. umitakae* was confirmed by the following characters.

Body slender, elongated with a blunt hepatic spine (Figs. 2, 3). Carapace integument firm with short bidentate rostrum, and black cornea well pigmented, wider than eyestalk (Fig. 4, 5). There are four dermal photophores exist on scaphocerite, two photophores on exopod (1 medial and 1 distal) and one photophore on the basal uropodal endopod (Figs. 6, 7).

Dermal photophores with lenses are present. The male antennular flagellum is present with peduncle, which does not bear sharp stout setae on the terminal segment. It has fully developed clasping organ, tubercle on section three of male outer antennular flagellum overlapping segment four of the flagellum and segment four bearing five serrated bristles on the dorsal surface (Figs. 8-10).

Scaphocerite with sharp distal tooth exists at the end of the blade (Fig. 11). Structure of male petasma (Figs. 12-14), which consist of three pars, i.e. (i) pars astrigens (innermost), (ii) pars media and (iii) pars externa (with processus unicifer). All processes and lobes exist, processus unicifer (PU), processus ventralis (PV), lobus armatus (LA), lobus accessories (Lac), lobus connectens (LC), lobus terminalis (LT), lobus inermis (LI). PV curved and ta-



Figures 2, 3. *Challengerosergia umitakae*: body slender and elongated (Fig. 2) with a blunt hepatic spine (Fig. 3). Figures 4, 5. The carapace of *Challengerosergia umitakae* integument firm. Fig. 4: the carapace. Fig. 5: short bidentate rostrum (A) and well pigmented black cornea, more extensive than eyestalk (B).

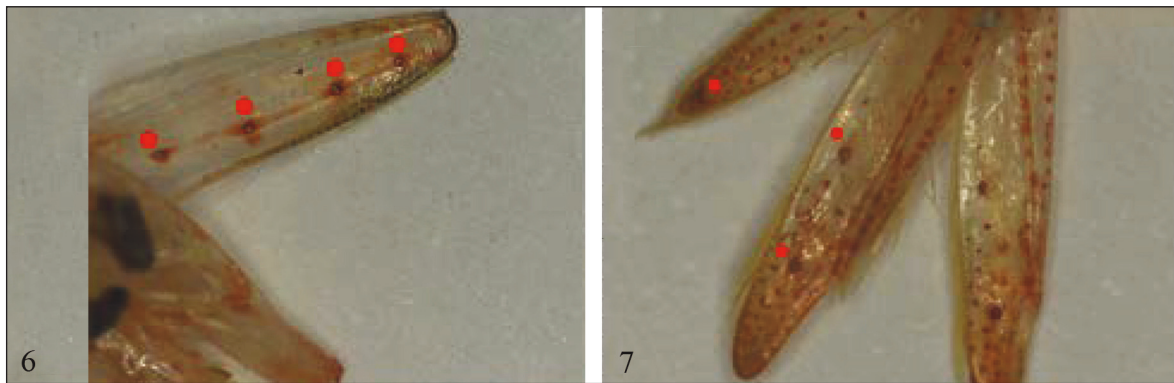


Figure 6. Lens-bearing dermal photophores four photophores on scaphocerite.
 Figure 7. Two photophores on exopod (1 medial and 1 distal), and one on the basal uropodal endopod.

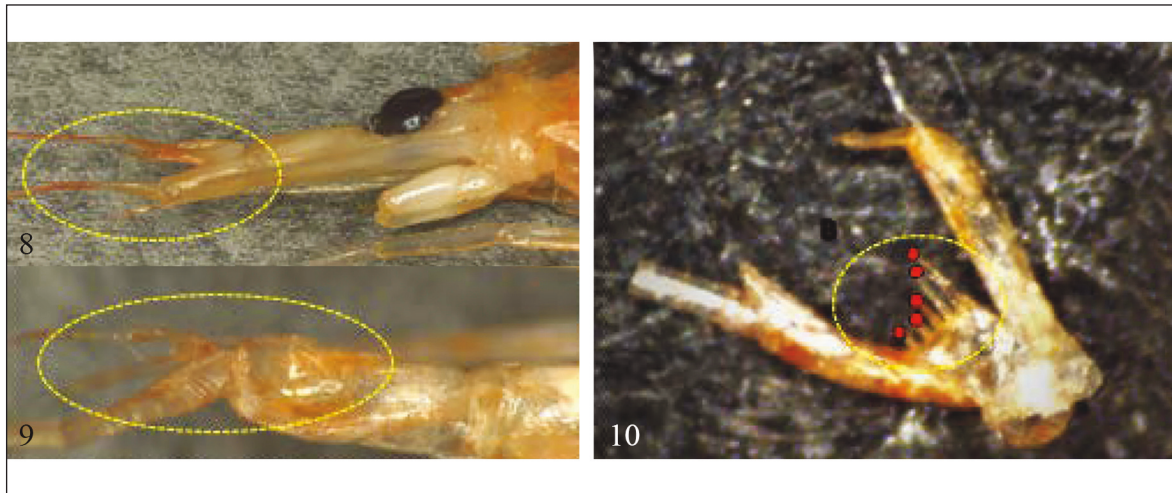
pering into a sharp point, overreaching LT and directed laterally. LI of petasma strongly curved and overlapping LT, LA thick, broad, overlapping Lac. LT undivided. LC overlapping LT and reaching the end of PV and LI. Telson apically rounded (Figure 2). Exopod of uropod longer than endopod.

Hashizume & Omori (1995) and Vershchaka (2000) shows that the habitat of *C. umitakae* is the

Indian Ocean. However, our study reports about *C. umitakae* for the first time, which was collected from the Arabian Sea of Oman.

DISCUSSION AND CONCLUSIONS

The investigated species is considered to be *C.*



Figures 8-10. Male antennular flagellum with peduncle. The clasp organ (Figs. 8, 9), tubercle on segment three of male outer antennular flagellum overlapping segment four of the flagellum and segment four bearing five serrated bristles on the dorsal surface (Fig. 10).

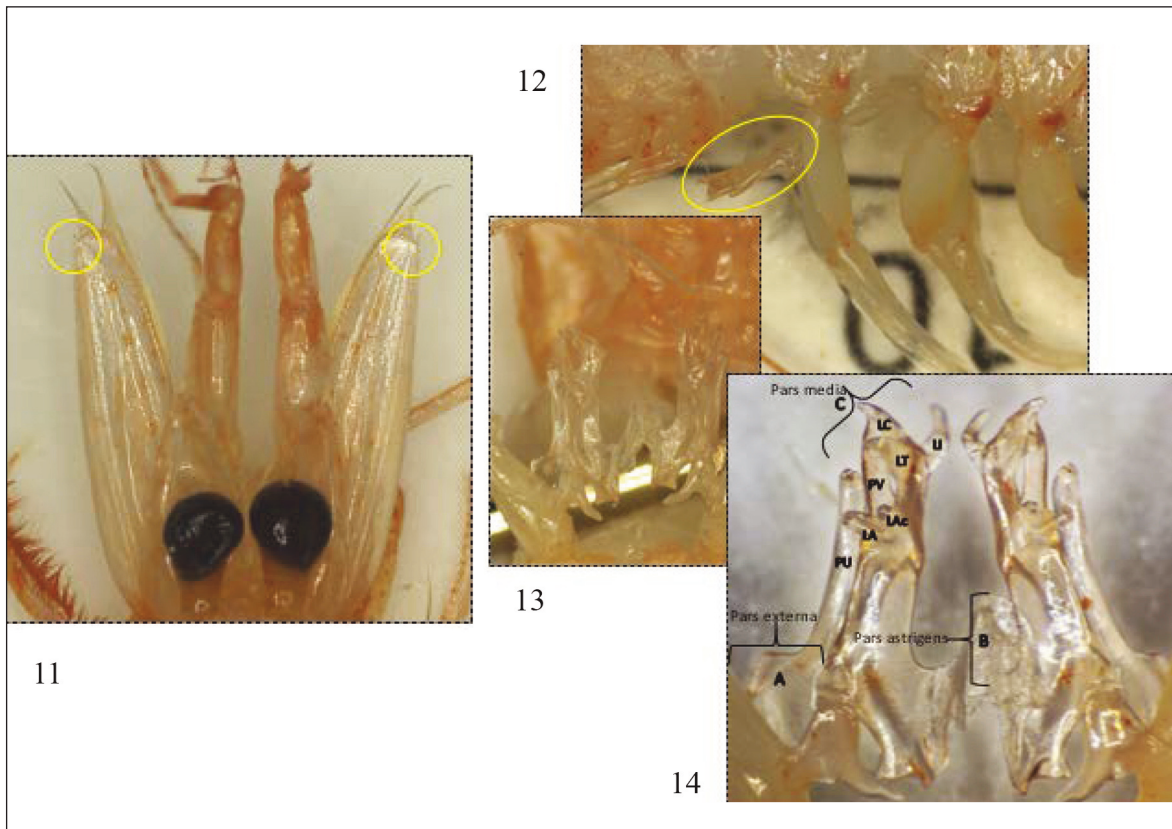


Figure 11. Scaphocerite of *Challengerosergia umitakae* with sharp distal tooth reaching the end 133 of the blade. Figures 12-14. Three parts of Petasma in male *Challengerosergia umitakae*: pars astrigens (innermost) (Fig. 12), pars media (Fig. 13), and pars externa (Fig. 14). All processes and lobes exist e.g., processus unifer (PU), processus ventralis (PV), lobus armatus (LA), lobus accessories (Lac), lobus connectens (LC), lobus terminalis (LT), lobus inermis (LI). PV overreaching LT and directed laterally. LI overlapping LT, LA thick, broad, overlapping Lac. LT undivided. LC overlapping LT and reaching the end of PV and LI.

umitakae, which belongs to *Challengerosergia* species group. Within the *Challengerosergia* species group, *C. umitakae* can be distinguished from other species as they have (i) lobus terminalis (LT) of petasma that is not bilobed, (ii) tubercle on segment 3 of male outer antennular flagellum overlapping segment 4 of the flagellum and (iii) LI strongly curved. Besides, Hashizume & Omori (1995) and Vereshchaka (2000) show eight serrated bristles in clasping organ on the dorsal surface of segment four of the flagellum. However, in our specimens, numbers of serrated bristles were 5.

ACKNOWLEDGEMENTS

We are grateful to Dr. A.L. Vereshchaka, P.P. Shirshov Institute of Oceanology, and Professor Maa-mun from Noakhali Science and Technology University for providing detailed comments and valuable suggestions for proper identification of the species. Thanks to Dr. Abdullah Alnahdi Director of Oman Marine Science and Fisheries Center for follow-up and encouragement. We are also thankful to Mr. Said Al-Shugaibi, Dhofar Fisheries research Centre, for providing the specimens, and Mr. Yahyaa Alwahaibi for designing the map.

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