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New record and range expansion of a rare spatangoid species, *Metalia persica* (Mortensen, 1940) (Echinoidea, Brissidae) from the Oman Sea

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Introduction

Spatangoida, or heart urchins, usually live as infaunal species which can be observed in all types of sediments. They are the most diverse group of sea urchins (Clark and Row, 1971; Ghiold, 1988; Ghiold and Hoffman, 1989; Villier *et al.*, 2004).

Metalia persica (Mortensen, 1940) is a rare Spatangoid species that is restricted to the Persian Gulf. It's a medium to large sized spatangoid that can be distinguished from the closest species *M. sternalis* (Lamarck, 1816) and *M. towensendi* (Bell, 1904) by dorsoventrally more flatten test and lack of anal fasciole (Mortensen, 1940; Price, 1983; Coopard, 2008).

Placement of *M. persica* in the Brissidae family has always been debated. Mortensen (1940) stated that due to absence of an anal fasciole, *M. persica* cannot be referred to the genus *Metalia* (Gray, 1855). Furthermore, Coopard (2008) mentioned that due to the absence of specialized funnel-building tube feet in ambulacra III within the peripetalous fasciole, *M. persica* cannot be considered as a species of genus *Brissopsis* (L. Agassiz, 1840). He indicated that based on the divergent posterior petals, simple (non-lobed) anterior aboral tube feet, enlarged tubercles along the anterior ambulacrum, no anal fasciole, and lack of both globiferous and ophicephalous pedicellariae, this species belongs to the genus *Metalia*. This study was a part of a comprehensive research aiming to investigate the echinoderms in the Iranian coasts of the Oman Sea. I herein report the first record of occurrence of *M. persica* in the Oman Sea and provide a morphological description of the specimens supporting such record.

Materials and methods

During the study on biodiversity of the Iranian echinoderms in Oman Sea, six buried specimens of *M. persica* were collected (by hand) at low tide along

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the Chabahar Bay in December 2015. Chabahar Bay (25°16′66.5″ N, 060°39′94.6″ E) is located at the north part of the Oman Sea along the Iranian coasts (Fig. 1). The live specimens were photographed with a digital camera in three postures (aboral, adoral and lateral views). Then, the spines were removed from the samples after keeping them in deep freezer (-20 °C) for 24 hours. Individuals were photographed by digital camera, and transferred to 96% ethanol for long time preservation. Subsequently, the specimens were identified according to the most important literatures (Mortensen, 1940; Price, 1983; Coopard, 2008). Specimens are deposited in the Zoology Museum of the University of Hormozgan (Bandar-Abbas – Iran) under voucher numbers ZUHPY 24-29.

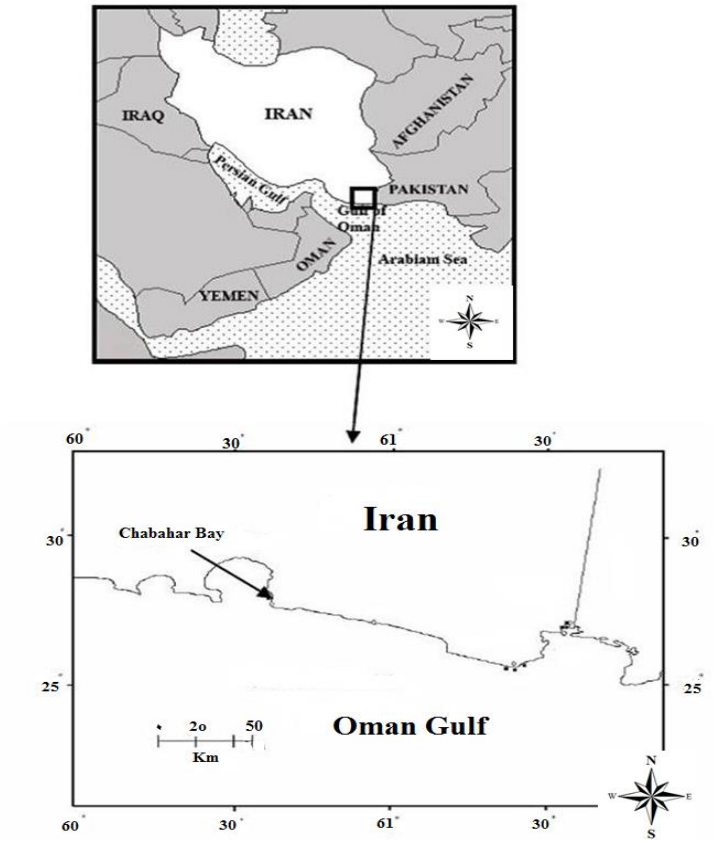

Figure 1: Map of the sampling site.

Results

Material examined

M. persica, ZUHPY 24-29, 6, adult specimens, Chabahar Bay, Sistan and Baluchestan Province, Iran (25°16′66.5″ N, 060°39′94.6″ E) (Fatemi, 2015).

Primarily, Mortensen (1940), Price (1983) and Coopard (2008) followed for identification of the species of genus *Metalia* and subsequently the collected individuals were identified as *M. persica* (Fig. 2) by analyzing the following morphological characters:

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The specimens range from 42-48 mm long, 39-43 mm wide and 29-35 mm height and thus, can be considered as medium to large sized spatangoid species. It has a shield-shaped subanal fasciole. Test is broadly-ovate and flattened aborally. The apical system is placed in anterior of center. Anterior petals are slightly longer than posterior pair. Posterior petals are divergent. Five to six pore-pairs can be seen on subanal fasciole. There are no anal fasciole. There are some enlarged tubercles along the frontal ambulacrum and frontal ambulacrum is rather sunken. Four genital pores are present. The shape of the peristome is semilunar and placed distinctly at anterior part of the test. Periproct is located posterior and enlarged upward (Fig. 2).

Figure 2: *Metalia persica*. A: Live specimen, B: Dorsal and ventral view, C: Lateral view, D: Frontal and distal view. Chabahar Bay, Iran. Photo by Yaser Fatemi.

Discussion

Studies on the echinoderms of the Oman Sea are limited to a few local studies in Iran and Oman. To date, six echinoid species have been recorded from the Oman Sea: *Clypeaster humilis* Leske, 1778; *Diadema setosum* Leske, 1778; *Echinometra mathaei* Blainville, 1825; *Stomopneustes variolaris* Lamarck, 1816; *Sculpsitechinus iraniensis* and *M. townsendi* Bell, 1904 (Bell, 1904; Khaleghi and Oofi 2010; Fatemi *et al.*, 2015). The low diversity of echinoderms in the Oman Sea compared to the Persian Gulf may be due to low habitat diversity, sharp slope and extreme waves in the shorelines of the Oman Sea, as well as lack of comprehensive studies in this region (Fatemi *et al.*, 2015; Owfi *et al*., 2016; Salarpouri *et al*., 2018). In comparison with other orders of echinoderms,

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echinoids exhibit a moderate degree of endemism in the Iranian waters which might be due to the specific environmental conditions such as high salinity and temperature (Naderloo, 2017).

M. persica is a very rare species which has been recorded only from the Persian Gulf. It has been previously recorded from the Khark Island (Mortensen, 1940), the Manifa, Abu Ali and Tarut Bay (Price, 1983), Kuwait (Al-Yamani *et al.*, 2012) and Iraq (Ahmed and Ali, 2017) (Fig. 3). This study expanded the distribution range of *M. persica* about 1000 km eastward.

It inhabits the subtidal mud and sand at the depth of 5-40 m. However, we found a well-established population of *M. persics* in the intertidal zone of sandy shores in Chabahar Bay. This is the first records of *M. persica* in the Oman Sea and Chabahar Bay. It is necessary to have more comprehensive studies to record the other echinoderm species in this region.

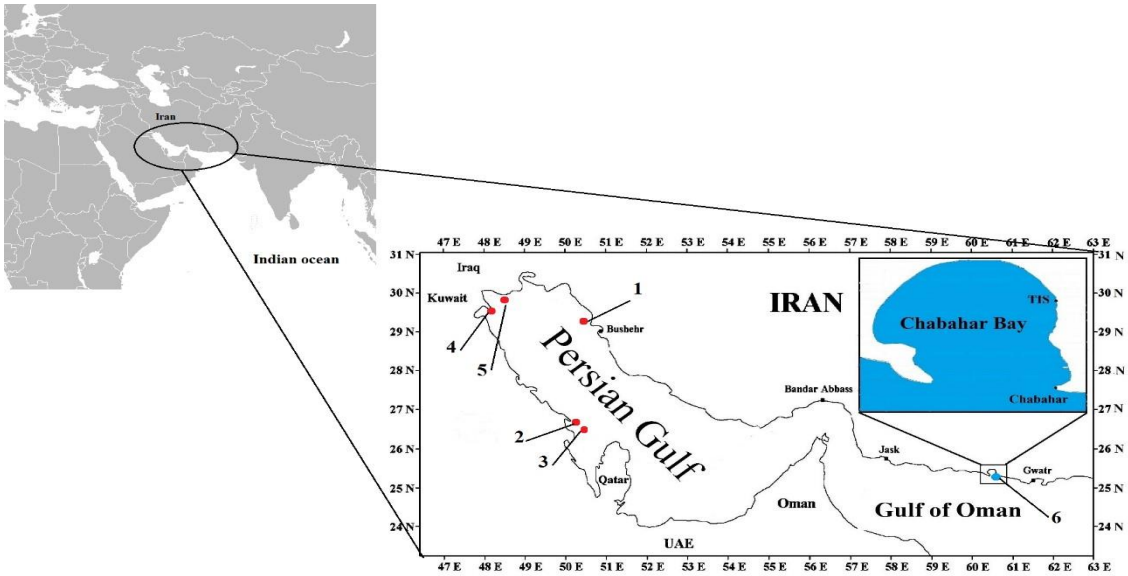

Figure 3: World distribution map of *Metalia persica*. Iran-Khark Island (Mortensen, 1940), 2 & 3: Saudi Arabia- Abu Ali and Tarut Bay (Price, 1983), 4: Kuwait (Al-Yamani *et al.*, 2012), 5: Iraq (Ahmed and Ali, 2017), 6: Iran-Chabahar (Present study).

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