

The first report of *Asterodiscides fourmanoiri* (Echinodermata: Asteroidea) from the North Coast of Oman Sea, Iran

Mirzaei M.R.^{1*}; Vahabnezhad A.²; Owfi F.²

Received: November 2018

Accepted: January 2019

1-Offshore Fisheries Research Center, Iranian Fisheries Science Research Institute (IFSRI), Agricultural Research Education and Extension Organization (AREEO), Chabahar, Iran.

2-Iranian Fisheries Science Research Institute (IFSRI), Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran.

*Corresponding author's Email: mirzaei.mr@gmail.com

Keywords: First record, Echinodermata, Asteroidea, *Asterodiscides fourmanoiri*, Oman Sea

Introduction

Echinoderms with around 7,000 species can be found at all depths of the marine ecosystems. Body shape is radially symmetrical, covered by calcareous plates and five body parts are around a central axis. The class of Asteroidea (also known as starfish or sea star) is one of the most diverse groups within the phylum Echinodermata, including nearly 1900 extant species grouped into 36 families, and approximately 370 extant genera (Blake and Mah, 2014). They generally have a central disc from which radiate five arms. The aboral disk surface (the top surface opposite the mouth) could be smooth and leathery, granular, spiny, and is coated with different plates (Lambert, 2000). Many species found in a variety of colors such

as red, orange, blue, grey or brown (O'Loughlin *et al.*, 2003).

The family of Asterodiscididae including three genera, *Asterodiscides* Clark, 1974, *Paulia* Gray, 1840, and *Amphiaster* Verrill, 1868, was founded by Rowe in 1977. *Asterodiscides* exist in deep waters and include about 18 existing species. All of these species are widely distributed in the Indo-West Pacific and temperate areas of Australia and New Zealand (Rowe, 1985). Rowe (1985) reported Asteroidea could be found from mid- to deep-water in the eastern Indo-Malay/tropical west Pacific.

Asterodiscides fourmanoiri is a species, which belongs to Asterodiscididae. This species had been observed for the first time in the Sainte Luce Reserve, in southeast Madagascar in 1958 at 55

m depth. This species is named for Fourmanoir based on one of its collectors (Rowe, 1985). Some scientists believe that *Asterodiscides culcitulus* and *A. fourmanoiri* can be located in the tuberculosus group due to their common characteristics. They can be identified from juvenile specimens based on their four-superomarginal plates and it is not possible to observe proximal plates easily in their adult species. In fact, the relative size of distalmost superomarginal in *A. fourmanoiri* is much larger than proximal superomarginal plates. Shape of abactinal tubercles is subspherical. The origin of this species is from Sainte-Lucie, southeast coast, Madagascar.

Materials and methods

The specimen *A. fourmanoiri* was collected during a study on demersal resources in the northern region of the Oman Sea along the Iranian coasts (by trawl net) close to Gwadar Bay; (24°53'22.13"N, 61°15'30.55"E) at October 10, 2016 on board the R.V.Ferdows-1. The collected specimen was preserved in 90% ethanol and sent to the Offshore Fisheries Research Center (OFRC) laboratory for identification. The specimen was photographed with a digital camera in two postures (actinal and abactinal plates). The morphological characteristics such as R (major radius from disc center to arm tip); r, (minor radius from disc center to edge of disc); br, (breadth of arm at base) were measured (mm). Identification and morphological description of the

specimen followed the taxonomic characters described by Hartley (1986) and then checked against World Register of Marine Species (WoRMS).

Material examined

A. fourmanoiri, one adult specimen, Oman Sea, demersal fish resources expedition, from RV Ferdows trawl near Gwadar Bay; 24°53'22.13"N, 61°15'30.55"E, rock, sand, depth 83-85m, Mohammad Reza Mirzaei, 10 October 2016.

Systematics

Family Asterodiscididae Rowe, 1977

Genus *Asterodiscides* Clark, 1974

Species *A. fourmanoiri* Rowe, 1985

Results and Description

Star-shaped body or stellate pattern with conical extensive arms which are rounded in the tip, the length of the arm from the center of the animal to the tip of the arm (R) is 94 mm and the radius of the disk which measured from the center to a notch between the arms (r) is 52 mm, $R/r=1.8$. The arms are wider basally than high (Br=48 mm), and match to a rounded tip. The narrow ambulacral furrow run along the middle of each arm in oral surface, recurved and just can be observed in abactinal outlook. Abactinal tubercles are of three sizes and are subspherical, packed on the arms with more space to the center of the disc and do not create any detectable order. The largest tubercles can be found to $hd=2.2$ mm and larger tubercles are surrounded on the base by a ring of small granules. Interstitial granules presence between the

tubercles. The circular madreporite interradially from the anus to notch between the arms. Merely the distalmost superomarginal plates are visible. Superomarginal plates are discreetly convex, ovate, and scarcely adjacent above the terminal plate and involve a peripheral ring containing the small granules (Fig. 1).

There are almost 12 inferomarginal plates, which five of small inferomarginal plates are below each of the distalmost superomarginal plates. The proximal inferomarginals are only scarcely distinct, following denuding the arm of tubercles, since they are a bit larger than the nearby plates (diameter 1.6 mm). Each tolerates a dome-shaped tubercle, which develops conically on plates towards the arm tip. The actinal edge of each plate involves three

smaller prismatic tuberculiform granules as well. Around the periphery of the plates, a ring of small granules occurs, irregularly. Conical tubercle, an unequal peripheral ring and prismatic granules occurs on the actinal plates. Regularly, one or two prismatic granules may be considered as large enough to be known tubercles. Almost 57 adambulacral plates exist each of which tolerating four furrow spines that forming along the arm, number of furrow sub-equal spines reduce to 3 then 2 distally. The proximalmost are smaller and thin and the distalmost are the wider. The subambulacral spines forming in two sets. Each adambulacral plate an inner and outer thick spine. The inner spine distally develops slender and tapering.

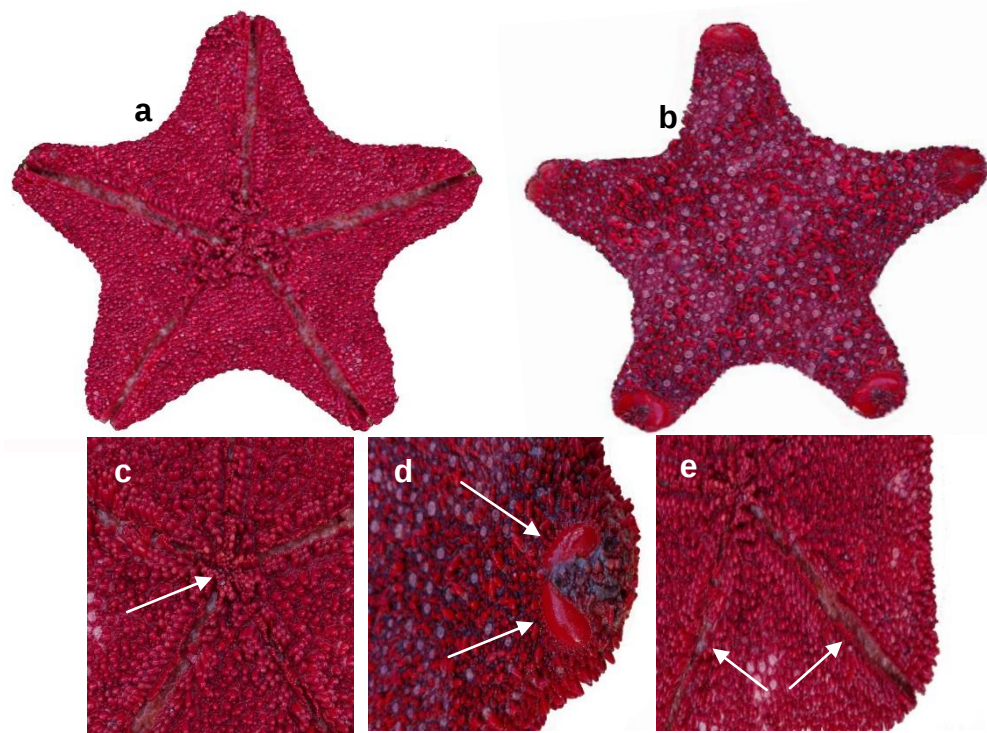


Figure 1: a: actinal view, b: abactinal view, R = 94 mm, c: oral center, d: dorsal view of recurved arm apex showing the large pair of tear-shaped, terminal superomarginals, e: ambulacral furrow.

This study provides a new record of class Asteroidea, *A. fourmanoiri*, from the North Coast of Oman Sea, which has not been noted earlier from this coastal area. *A. fourmanoiri* is a very rare species, which is only recorded from Sainte Luce, in southeast Madagascar. This study expanded the range distribution of *M. persica* from temperate water of Southwest Indian Ocean- Sainte Luce, in southeast Madagascar - and to Arabian and Oman Seas. Therefore, a new record of species from a new area expands its variety of distribution and presents important details for the biodiversity conservation management. Lately, taxonomic descriptions have much significance with higher attention in biodiversity, simply because worldwide biodiversity is being lost at an unprecedented rate due to climate change and human activities. Therefore, recording a new species from a new area is essential to biodiversity conservation.

References

- Alvarado, J.J. and Solis-Marin, F.A., 2013.** Echinoderm research and diversity in Latin America. Echinoderm Research and Diversity in Latin America. Springer, Berlin, pp.301-344.
- Blake, D.B. and Mah, C.L., 2014.** Comments on "The phylogeny of post-Palaeozoic Asteroidea (Neoasteroidea, Echinodermata)" by as Gale and perspectives on the systematics of the Asteroidea. *Zootaxa*, 3779, 177-194.
- Clark, A.M., 1974.** Notes on some echinoderms from southern Africa. British Museum (Natural History).
- GRAY, J.E., 1840.** XXXII.—A synopsis of the genera and species of the class Hypostoma (Asterias, Linnæus). *Journal of Natural History*, 6, 275-290.
- Hartley, T., 1986.** Bulletin du museum Nnational d'histoire naturelle. *Adansonia*, 8, 183-189.
- Lambert, P., 2000.** Sea stars of British Columbia, Southeast Alaska, and Puget Sound. Royal British Columbia Museum Handbook. Vancouver, CA: University of British Columbia Press, 186 P.
- O'Loughlin, P.M., Waters, J.M. and ROY, M.S., 2003.** A molecular and morphological review of the asterinid, *Patiriella gunnii* (Gray) (Echinodermata: Asteroidea). *Memoirs of Museum Victoria*, 60, 181-195.
- ROWE, F., 1985.** Six new species of *Asterodiscides* AM Clark (Echinodermata, Asteroidea), with a discussion of the origin and discussion of the origin and distribution of the *Asterodiscididae* and other «amphi-Pacific» echinoderms. *Bulletin du Muséum National d'histoire Naturelle. Section A, Zoologie, Biologie et écologie Animales*, 7, 531-577.
- Rowe, F.W., 1977.** A new family of Asteroidea (Echinodermata), with the description of five new secies and one new subspecies of *Asterodiscides* . Records of the Australian Museum 31, 187–233.

Verrill, A.E., 1868. Notes on the radiata in the museum of Yale College, with descriptions of new genera and species, Connecticut Academy of Arts and Sciences. 1, 247-351.