



# First Record of Two Species of Echinodermata for Libyan Waters

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## Article Info

Volume 6, Issue 8, April 2024

Received: 12 Feb 2024

Accepted: 23 March 2024

Published: 26 April 2024

## Abstract

Two species of echinodermata were reported for the first time from the deep Libyan waters. *Tripneustes gratilla* (Linnaeus, 1758) and *Lovenia cordiformis* (Agassiz, 1872) were observed in Tobruk, Libyan waters, the species of Sea urchins were collected during a diving trip in Tobruk, Libya. This report discusses the details of these new observations.

**Keywords:** *Tripneustes gratilla*, *Lovenia cordiformis*, Sea urchins, Libyan Waters

## INTRODUCTION

In the waters of Libya, not enough is known about the benthic macrofauna, particularly that which is related to the phylum Echinodermata. As a result, there is a knowledge gap and insufficient information about this subject. This is because there aren't many thorough investigations and research projects pertaining to this type of marine branch. However, the existence of common Echinodermata species in Libyan waters has already been shown (Shakman et al., 2019). Compared to many other Mediterranean places, the biodiversity of the Libyan coast has not yet received much attention. By monitoring a variety of habitats and ecosystems and finding new aquatic records (Mahdy et al., 2020, Fitori et al., 2021, Fitori et al., 2022). Two new species of Sea urchins have been discovered in deep Libyan waters, according to this note.

Sea urchins are major components of marine communities including 900 known species (Pearse, 2006). They are keystone species of the shallow coastal ecosystems (Steneck, 2013). *Tripneustes gratillais* (Linnaeus, 1758) is belonging to Toxopneustidae family (Kroh, 2013), and it is widespread in

the tropical Indo-Pacific and Indian Oceans in shallow water locations. (Chen & Chang, 1981; Shokita et al., 1991; Lison de Loma et al., 2002; Lessios et al., 2003; Juinio-Meñes et al., 2008; Kasim, 2009). *Tripneustes gratilla* is known to inhabit different habitats (Lyimo et al., 2011) including: seagrass, algae, microalgae and macro algae (Ogden et al. 1989, Lyimo et al., 2011), *Tripneustes gratilla* observed at depth of 75 m (Lawrence and Agatsuma, 2013), and is most common in very shallow water on a variety of hard substrates between depths of 2 and 30 meters but according to (Lawrence,2007). *Tripneustes gratilla* have important economic value and have ecological importance for the seas (Toha, 2006; Toha et al., 2013).

*Lovenia cordiformis* (Agassiz, 1872) Sea urchins with a heart-shaped body is a member of a genus that includes less than 20 extant species. This genus, along with five other extant genera (including *Echinocardium*). Since its description by Agassiz in 1872, *Lovenia cordiformis* has been considered native to the Eastern Pacific, and it is recorded in a coral reef of an island on the continental shelf the Pacific coast of Colombia (Muñoz et al.,2016). *Lovenia cordiformis*, sometimes referred to as sea porcupines are irregular echinoids distinguished by their secondary bilateral symmetry. The mouth and anus of the Loveniidae are positioned ventrally and distally on an oval-shaped horizontal plane, in contrast to the majority of sea urchins, which have similar anterior-posterior ends. Infaunal burrowers, sea porcupines are small to medium-sized eaters of detritus that are typically confined to living in sand and rough debris (Kanazawa, 1992).

## MATERIALS AND METHODS

In May 2023, one individual of both species *Tripneustes gratilla* and *Lovenia cordiformis* were collected by Libyan fishers during a diving trip at 30 m, and 45 m depth, of a muddy sandy bottom with fragments of mollusk in the Libyan waters. respectively, in Lido resort that is situated at 32°.50'.40"N,24°.00'.45"E in Tobruk, Libyan waters (Figure 1). Accordingly, the collected specimens were shared with one of us (AF) for identification. The two specimens were preserved in alcohol.

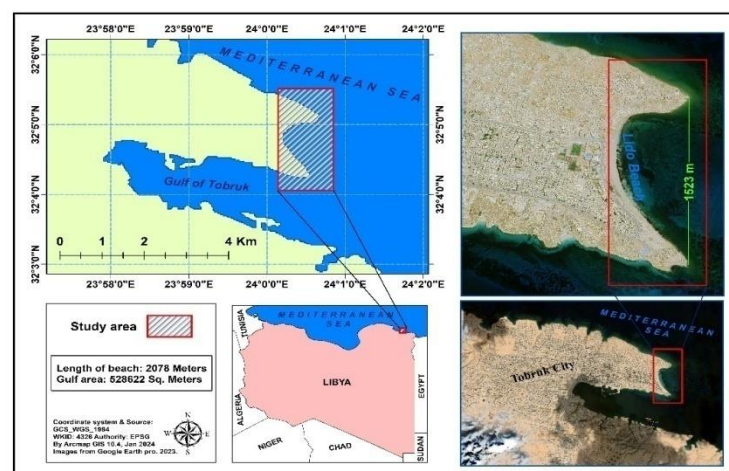


Figure 1: Location where the two species were collected in Tobruk, Libyan waters.

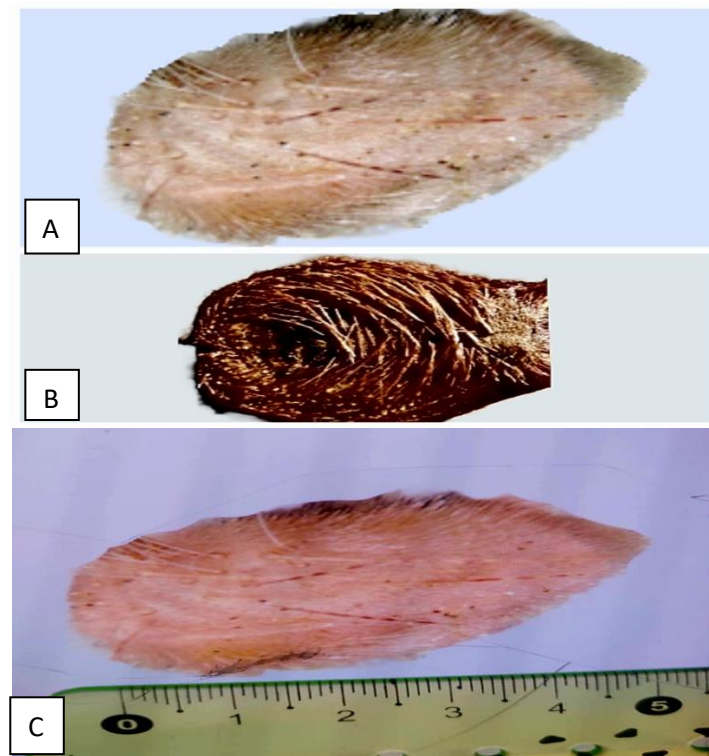
## RESULTS AND DISCUSSION

For the first time, two species of Echinodermata were reported for the first time from the deep Libyan waters. *Tripneustes gratilla* (Linnaeus, 1758), (Figure,2) is similar to Several specimens that collected on Timor Island in Indonesia (Nomleni et al.,2020). *Tripneustes gratilla* sea urchin that is classified into kingdom Animalia, phylum Echinodermata, subphylum Echinozoa, class Echinoidea, subclass Euechinoidea, infraclass Carinacea, superordo Echinacea, ordo Camarodonta, infraordo Echinidae, superfamily Odontophora, family Toxopneustidae and genus *Tripneustes* (L. Agassiz 1841) (Kroh, 2013). the specimen described in has a somewhat flattened and round shape and measured 53 mm of diameter, with a hard, calcareous exoskeleton. The spines cream-colored and have distinctive darker bands. The corona, also known as the test, is made up of two surfaces: the aboral and the oral. The body surface features colourful short spines and tube feet. The ambitus, a large horizontal circle, divides the surfaces. Each surface ends in a circular opening that is covered in flat structures.

*Lovenia cordiformis* the specimen had the typical shape of heart urchins, with length (33.9 mm) than width (18.2 mm) and it is similar to irregular specimen that collected on Colombia (Muñoz et al.,2016),(Figure,3). that is classified into Class Echinoidea, Order Spatangoida, Suborder Micrasterina, Family Lovenidae, Genus *Lovenia*, *Lovenia cordiformis* Agassiz, 1872. The oral surface, is the bottom side of the urchin, is flattened, while the aboral surface, or the top side, is more convex, contributing to the overall heart shape. The spines are extensions of the test plates and are covered with small, tube-like structures called pedicellariae, the spines clean and free from debris. The spines vary in size and densely distributed over the surface of the test. The body color of *Lovenia cordiformis*, the heart urchin, is reddish to purplish.



Figure 3: The collected specimen of *Tripneustes gratilla* from Tobruk, Libyan waters



**Figure 3: A .The collected specimen of *Lovenia cordiformis* from Tobruk, Libyan water**

**B. Ventral view of the specimen; C. Dorsal view of the specimen**

It is advised in this regard to develop citizen science as a useful monitoring technique to find new marine species in Libyan waters. Furthermore, strengthening the connection between Libyan fishermen and research is essential for citizen science and improved outcomes. because citizen-sciences is a powerful tool to report new marine species. (Fitori et al.,2022) Additional research on the variety of Echinodermata in Libyan waters is necessary from the perspectives of preservation and conservation in order to track the status of the species as it already exists and look into the possibility of new records, particularly those that are non-indigenous. Completing an updated inventory of the species of echinoderms found in Libyan seas is also crucial (Fitori et al.,2022). To increase the distribution and richness of species in the future, it is imperative to regularly monitor the environmental factors and climatic shifts in the nearby waters and to step up scientific efforts along the North African coast. Improving our understanding of regional biodiversity is also a top priority, and reporting exotic species is one way to do this (Said et al.,2023).

## CONCLUSION

Geographically, climate change is currently occurring in the Mediterranean Sea, which is known to encourage biological invasion and the extinction of

species.. In the current study, Two new species of Sea urchins have been discovered in deep Libyan waters for the first time along the Libyan coast.

## CONCLUSION

Geographically speaking, biological invasion and biodiversity loss are known to be facilitated by climate change, which is currently occurring in the Mediterranean Sea. In the current study, two new species of Sea urchins were discovered and addressed for the first time along the Libyan coast.

## ACKNOWLEDGMENTS

We would like to express our gratitude to Mr. Salem Mansour for obtaining the specimens when he was diving. We also value the efforts that our colleagues made to aid in the identification of the specimen.

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