



# The westernmost recorded location of the *Liomera rugipes* (Brachyura: Xanthidae: Liomerinae) in Antalya Bay, Mediterranean Sea, Türkiye

Tahir Özcan <sup>1\*</sup>

<sup>1</sup> Iskenderun Technical University, Faculty of Marine Sciences and Technology 31200 Iskenderun, Hatay, Türkiye

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## ABSTRACT

The Mediterranean Sea is being increasingly affected by biological invasions due to the Suez Canal and rising seawater temperatures associated with climate change. In 2023, the non-native crab species *Liomera rugipes* was recorded in the Mediterranean ecosystem. In 2025, the species was sighted again in Turkish waters, specifically in the Iskenderun Bay, and approximately 700 km west of there, in the Antalya Bay. This record is the result of research conducted through marine citizen science. This confirms the species' second occurrence in Turkish waters and its westernmost distribution in the Mediterranean Sea. Our findings emphasise the importance of citizen science in the early detection and monitoring of marine biological invasions.

## Introduction

The Mediterranean is one of the world's most biologically diverse regions. Although it covers just 0.7% of the world's oceans, it is home to 7.5% of the world's marine fauna and 18% of its marine flora, hosting around 11% of all marine species. Furthermore, around 20–30% of these species are endemic. The Mediterranean is one of the world's most important reservoirs of marine and coastal biodiversity (Bianchi and Morri, 2000; Coll et al., 2010; Rodríguez-Rodríguez and Abdul Malak, 2022; Unep, 2026).

Nevertheless, the increasing number of marine biological invasions poses a significant environmental problem today, particularly in the Mediterranean. The eastern sub-region of the Mediterranean is particularly affected by biological invasions, with most exotic species originating from the Indo-Pacific/Red Sea and entering the basin via the Suez Canal, either with or without assistance (Özcan et al., 2010; Galil et al., 2021). Scientific studies show that the number of exotic species has increased in recent years due to climate change and increased maritime traffic. The increased use of the internet and social media since the turn of the millennium has also led to a rise in citizen science initiatives. Recent developments in social media and citizen science initiatives have enabled the detection of some new exotic species. It has been suggested that the lack of previously reported species, or limited distribution information, may largely be due to insufficient research efforts (Kleitou et al., 2019).

*Liomera rugipes* was first described by Heller (1861) as *Actaeodes rugipes*, based on specimens collected in the Red Sea. This species is found across a wide area of the western Indian and Pacific islands, stretching from the Gulf of Suez and the Red Sea through the Gulf of Aden, Somalia, Mayotte, Madagascar, the Seychelles and the Amirante Islands to Vietnam (Heller, 1861; Guinot, 1958; Serène, 1984; Garth, 1984; Galil and Vannini, 1990; Neumann and Spiridonov, 1999; Poupin et al., 2018). The first recorded instance of the species entering the Mediterranean Sea via the Suez Canal occurred in 2023 in the waters off

Alexandria, Egypt (Nour et al., 2023). Following this, one record was reported in 2024 from the Lebanese coast (Fatfat et al., 2024), and another from the Israeli coast (Galil et al., 2024). The most recent record, from the coasts of Dörtyol and Karataş (Iskenderun Bay), was reported in 2025 (Özcan and Özcan, 2025).

The Mediterranean ecosystem has been exposed to the introduction of numerous tropical species via the Suez Canal as a result of human activities such as shipping and aquaculture. The coasts of Egypt, Palestine, Israel, Lebanon, Syria, Türkiye and Greece have particularly become areas where these species have formed dense populations. Shortly after the first record of *L. rugipes* in Turkish waters (Iskenderun Bay) was reported, citizen science data based on social media revealed the presence of the species in Antalya Bay, showing that its distribution area was much wider than previously thought.

## Material and Methods

On 04 January 2026, a dead female crab was found on the beach in Kemer-Kindıl Antalya Bay (Türkiye) (36°37'35.70" N, 30°33'26.26" E) (Fig. 1). During a trip to the beach for sports and recreation, local residents found a dead female specimen on a pebbly stretch of coastline. After seeing reports in the Turkish national press that same week, Ms Emine Kuzey contacted Dr Tahir Özcan via social media on 6 January 2026. Following identification of the species, it was determined that the individual belonged to the exotic *L. rugipes* species (Fig. 2).

## Results and Discussion

Photographs were taken of the dead individual found on the beach by a member of the public, and a sample was collected. Examinations revealed brown pigmentation on the claw tips and granules covering the shell and legs. Thanks to the distinctive colouration of *L. rugipes*, the deceased individual was identified as female through citizen science. While previous studies have reported that this

\* Corresponding author

E-mail address: [tahozcan@gmail.com](mailto:tahozcan@gmail.com) (Tahir ÖZCAN)

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**Figure 1** Map showing the localities where *Liomera rugipes* was found in Kemer-Antalya Bay, Türkiye.

species typically inhabits rocky or stony areas at depths of 15–25 metres, it is noteworthy that this specimen was a dead individual that had been washed up on a sandy beach.

*L. rugipes*, recorded as an alien species in the Mediterranean in 2023, is a crab species that is expanding its distribution range rapidly. Following the most recent report of the species in the Iskenderun Bay, national Turkish press coverage revealed its presence in a new distribution area, approximately 700 km away in the Antalya Bay, thanks to contributions from citizen scientists. This clearly demonstrates the effectiveness of marine citizen science in generating information for marine research and establishing early warning mechanisms.

The current findings reveal that the species is rapidly expanding its geographical distribution in newly colonised areas of the eastern Mediterranean. This record confirms the second occurrence of *L. rugipes* in Turkish Mediterranean waters, representing the westernmost known distribution point in the Mediterranean Basin.

Based on these data, it is clear that the species has become established in the Mediterranean ecosystem and has expanded its distribution range within just three years. Therefore, its impact on the ecosystem and potential for interspecific invasion must be monitored closely.

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**Figure 2** Ventral and Dorsal view of *Liomera rugipes* (Heller, 1861) (CW = 22.4 mm) collected from Kemer-Antalya Bay, Türkiye. [Photo by E. Kuzey]

## Statements and Declarations

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### Declarations

#### Conflict of interest

The authors declare no conflict of interest.

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