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Research article

Exotic crab, *Liomera rugipes* (Brachyura: Xanthidae: Liomerinae) from the Turkish Seas

Tahir ÖZCAN*, Gülnaz ÖZCAN

İskenderun Technical University, Faculty of Marine Sciences and Technology 31200 İskenderun, Hatay, Türkiye
*Corresponding author email: tahozcan@gmail.com

Abstract: This paper is on first presence of exotic crab, *Liomera rugipes* (Heller, 1861) in Turkish Seas. A total of two male specimens was found in a fishing net off Dörtyol and Karataş coasts (the eastern Turkish Mediterranean Sea). This record indicates an expansion of the species' range in the Mediterranean, with the total number of exotic decapods known from the Turkish coast reaching 45 species.

Keywords: Exotic, *Liomera rugipes*, crustacea decapoda, Türkiye

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Introduction

Marine biological invasions represent a significant environmental concern on a global scale in the present era, especially for the Mediterranean Sea. The Mediterranean ecosystem is particularly impacted by biological invasions in the eastern sub-region, where the majority of exotics originate from the Indo-Pacific/Red Sea and enter, aided or unaided, into the basin via the Suez Canal (Özcan et al., 2010; Galil et al., 2021). The human-made Suez Canal is therefore an important factor that contributes to the substantial changes in the biodiversity, composition and function of the Mediterranean biocommunities (Zenetos et al., 2022; Galanidi et al., 2023). Particularly, many exotics of Indo-Pacific/Red Sea origin introduced via the Suez Canal has resulted in the formation of dense populations along the coastlines of Egypt, Israel, Lebanon, Syria, and Türkiye. Exotics has been exacerbated by the recent climate change and the increased maritime traffic (Çınar et al., 2021). Numerous species of exotic decapod crustaceans introduced into the Mediterranean Sea and with several of these species establishing breeding populations and thereby becoming a factor contributing to the local fisheries (Froglia & Speranza, 1993).

To date, five exotic species from the family Xanthidae were recorded in the Mediterranean. The following species are hereby enumerated: *Liomera rugipes* (Heller, 1861), *Atergatis roseus* (Rüppell, 1830), *Actaea savignii* (H. Milne Edwards, 1834), *Xanthias lamarckii* (H. Milne Edwards, 1834) and *Actaeodes tomentosus* (H. Milne Edwards, 1834) (Lewinsohn & Holthuis, 1964; Karhan et al., 2013; Corsini-Foka et al., 2013; Corsini-Foka & Kondylatos, 2015; Nour et al., 2023; Galil et al., 2024). It is evident that four of the exotic species (*L. rugipes, A. roseus, A. savignii* and *X. lamarckii*) entered the Mediterranean via the Suez Canal, while other species (*A. tomentosus*) probably entered the Mediterranean via shipping, as larvae in water ballast or, more improbably, as adults among organisms fouling a ship's hull (Corsini-Foka & Kondylatos, 2015). To date, two species of exotic Xanthidae, namely *A. roseus* and *Actaea savignii* were reported along the Turkish coastline.

Liomera rugipes was first described by Heller (1861) as *Actaeodes rugipes*, based on specimens collectedfrom the Red Sea. Its distribution is extensive throughout the Indo-West Pacific oceans, extending from the Gulf of Suez and the Red Sea, through the Gulf of Aden, Somalia, Mayotte, the Madagascar,

Seychelles and the Amirante Islands, to Vietnam (Heller, 1961; Guinot, 1958, Serène 1984; Gart, 1984; Galil & Vannini, 1990; Neumann & Spiridonov, 1999; Poupin et al., 2018). The first documented instance of this species entering the Mediterranean Sea via the Suez Canal occurred in 2023 along the Egyptian coast (Nour et al., 2023). Subsequent records in 2024 included one along the Lebanese coast (Fatfat et al., 2024) and another along the Israeli coast (Galil et al., 2024).

It is evident that, as a consequence of anthropogenic activities (e.g. shipping, trade, aquaculture), numerous species of decapod crustaceans have been accidentally introduced into the Mediterranean Sea over the past century. The establishment of many of these species has been proven to be possible through the formation of breeding populations (Froglia and Speranza, 1993). The introduction of exotics species into the Mediterranean ecosystem via the Suez Canal has resulted in the formation of dense populations along the coastlines of Egypt, Israel, Lebanon, Syria, Türkiye and Greece. This paper reports the first finding of *L. rugipes* in the Turkish waters and also provides the fourth documented record for the entire Mediterranean region.

Materials and Method

On 4 April 2025, a male crab unknown provenance was collected off the coast of Dörtyol Iskenderun Bay (Türkiye) (36°46'37.8" N, 36°10'17.4" E) at a depth of approximately 22-23 m using a fishing net. On 14 June 2025, a dried male xanthid crab was collected from a fisherman's stall in the Iskenderun Bay (Türkiye) in the Karataş district (Fig. 1). The fisherman expeditiously transmitted both a photograph and the specimen to relevant fisheries authorities. Consequently, the aforementioned authorities transmitted a photograph to the author. The geographical area in which the specimen was captured was characterised by a prevalence of stone formations and proximity to substantial industrial infrastructure. The specimens were subjected to photography, examination by naked eye and stereo microscope, preservation in 4% formaldehyde and depositon in the collection of Dr Tahir Özcan at Iskenderun Technical University, Faculty of Marine Sciences and Technology. The specimen examined (Fig. 2) corresponds to the original description of *L. rugipes* as established by Heller (1861), Guinot (1958), Serène (1984) and Nour et al. (2023). Consequently, it is concluded that no further description is required. The carapace width (CW) and carapace length (CL) of the specimens were measured to the nearest 0.05 mm using a Vernier calliper.

Figure 1. Map showing the locatilies where *Liomera rugipes* was found in Iskenderun Bay, Türkiye

Figure 2. Dorsal view of *Liomera rugipes* (Heller, 1861) (CW = 22.4 mm) collected from Iskenderun Bay, Türkiye [Photo by T. Özcan]

Results and Discussions

The carapace length (CL) of the crab specimens was found to range from 13.7 mm to 13.9 mm (Dörtyol) and from 22.4 mm to 22.5 mm (Karataş), respectively. The fisherman then proceeded to break and discard the chelipeds of the individual caught in Dörtyol upon its removal from the net.

As it was documented that the dactylus of the chelipeds was characterised by brown pigmentation. The carapace and legs were covered with granules.

The general aspect of the specimens collected at Dörtyol and Karataş, in particular the disposition of the furrows separating the carapace regions, the antero-lateral teeth and G1, corresponded to the original description of *L. rugipes* by Heller (1861) and to Guinot (1958), Serène (1984) and Nour et al. (2023), particularly with regard to the disposition of the furrows separating the carapace regions, the antero-lateral teeth and G1. The size of our male crabs was found to be smaller than that reported for the male *L. rugipes* from the Mediterranean by Nour et al. (2023), but larger than that reported for the species by Serène (1984).

The total number of confirmed exotic species in the Mediterranean ecosystem is approaching 1000. Of these, 751 are established taxa, 242 are accidental and 23 species are considered to be unsuccessful introductions (Zenetos et al., 2022). A total of 539 marine exotic species belonging to eight taxonomic groups have been identified along the Turkish coast, of which 404 species are established in the region, while 135 species are accidental (Çınar et al., 2021). The majority of the alien species reported from the Turkish coast entered the Mediterranean ecosystem from the Red Sea (58%) via the Suez Canal (Çınar et al., 2021).

The present paper constitutes the first documentation of *L. rugipes* from the Levantine coast of Türkiye and the fourth in the Mediterranean Sea, subsequent to the findings in Egypt (Nour et al., 2023), Lebanon (Fatfat et al., 2024) and Israel (Galil et al., 2024). As in our case, this species is typically found in areas of stony or hard bottoms at depths between 15 and 25 m., It is undergoing a rapid expansion of its geographical distribution in the new region it is colonizing, the eastern Mediterranean. The present record of *L. rugipes* has increased the total number of non-indigenous decapod species known to occur along the Turkish coast to 45.

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Ethical Approval

No need to ethical approval for this study.

Conflicts of Interest

The authors declare that they have no conflict of interest.

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