



## Rapid Communication

## First occurrence of *Erugosquilla massavensis* (Kossmann, 1880) in Italian waters (Ionian Sea)

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Received: 14 June 2017 / Accepted: 16 July 2017 / Published online: 31 July 2017

Handling editor: Stelios Katsanevakis

### Abstract

The Red Sea stomatopod *Erugosquilla massavensis* was detected for the first time in Italian waters, along the eastern coast of Sicily, in the western Ionian Sea. This finding suggests that a further population expansion, from the Tunisian coasts to a wider area within the central Mediterranean, of one of the most successful Lessepsian migrants is ongoing.

**Key words:** Stomatopoda, Lessepsian migrant, range expansion

### Introduction

The native range of the stomatopod *Erugosquilla massavensis* (Kossmann, 1880) (Crustacea: Squillidae) includes the Red Sea and the Persian Gulf (Froglia and Manning 1989). Introduced during the 1930s, it was the first Red Sea stomatopod species entering the Mediterranean Sea via the Suez Canal (Steuer 1936, 1938; Galil et al. 2002), followed by *Clorida albolitura* Ah Yong and Naiyanetr, 2000 (Ah Yong and Galil 2006). Successively, the species colonized the eastern and south-central Mediterranean coasts and *E. massavensis* is now widely distributed along the Levantine coasts; the south, eastern and western Aegean Sea; the Marmara Sea; westwards toward Egypt; and the central Mediterranean. The species more recently was recorded from the eastern region of the Libyan coast and then from Tunisian waters (Shakman and Kinzelbach 2007; Abdelsalam 2014; Ounifi Ben Amor et al. 2015; ELNAIS 2017) (Figure 1).

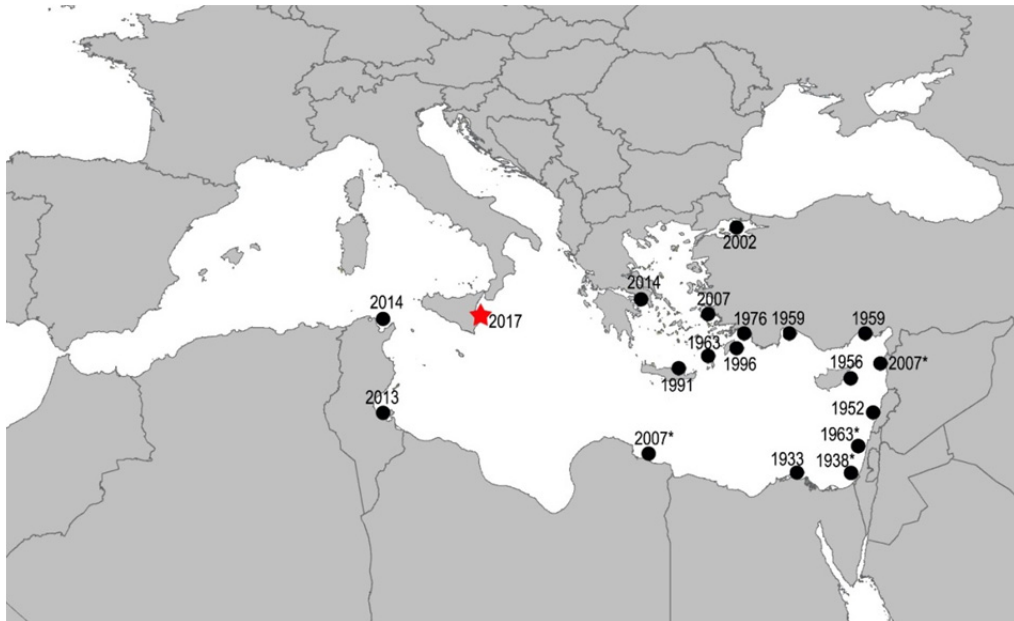
The Red Sea mantis shrimp is currently the dominant stomatopod species in the eastern Levantine,

abundant at depths ranging between 20 m and 40 m (Gökoğlu et al. 2008), although it can be found up to 150–200 m of depth (Özcan et al. 2008). The species prefers soft bottoms in coastal areas, but tolerates also open waters and sheltered brackish areas (Ounifi Ben Amor et al. 2015, 2016).

In this work, the first record of *E. massavensis* in Italian waters is reported from a coastal region off the island of Sicily, in the western Ionian Sea, and considerations on the possible enlargement of its colonization area are briefly discussed.

### Material and methods

A single specimen of the Red Sea mantis shrimp *Erugosquilla massavensis* was captured on 23 May 2017 by means of a trawl net, at a depth of 20 m, between Punta Castelluzzo and Punta Bonico off the city of Brucoli (Siracusa), along the eastern coast of Sicily, within the western Ionian Sea (approximate coordinates 37.310122°N; 15.146615°E). The sampling location is in close proximity to the mouths of the rivers Simeto, Gornalunga and San Leonardo.



**Figure 1.** Years and localities of 1<sup>st</sup> collection of *Erugosquilla massavensis* in Mediterranean Sea. 1933, Alexandria, Egypt (Steuer 1936); 1938\*, Khan Yunis, Palestine (Steuer 1938; Lewinsohn and Manning 1980); 1952, Beirut, Lebanon (Holthuis 1961; Lewinsohn and Manning 1980); 1963\*, Israel (Ingle 1963); 1959, Antalya and Mersin, Turkey (Holthuis 1961); 1956, Famagusta, Cyprus (Lewinsohn and Manning 1980); 1963, Karpathos Isl., Greece (Corsini and Kondilatos 2006); 1976, Fethiye, Turkey (Kocataş 1981); 1991, North Crete Isl., Greece (Dounas and Steudel 1994); 1996, Rhodes Isl., Greece (Galil and Kevrekidis 2002); 2002, Off Çakılıköy (east of Kapıdağ peninsula) Marmara Sea (Katağan et al. 2004); 2007, Sigacik Bay, Turkey (Özcan et al. 2008); 2007\*, Tubruk, Libya (Shakman and Kinzelbach 2007); 2007\*, Syria (Hassan and Noël 2007); 2013, Gulf of Gabès, Tunisia (Ounifi Ben Amor et al. 2015); 2014, Saronikos Gulf, Greece (ELNAIS 2017); 2014, Tunis Southern Lagoon, Tunisia (Ounifi Ben Amor et al. 2015); 2017, Off Bruccoli, East Sicily Isl., Italy (Present work). \* Date of publication (for details see Supplementary Table S1).

The surface-water temperature was 21 °C and surface-water salinity was 35.8. The sea bottom was a mixture of sand and mud. Species caught in the same trawl as *E. massavensis* included *Squilla mantis* (Linnaeus, 1758), *Mullus surmuletus* Linnaeus, 1758, *Boops boops* (Linnaeus, 1758), *Diplodus vulgaris* (Geoffroy Saint-Hilaire, 1817), and *Lithognathus mormyrus* (Linnaeus, 1758).

The specimen was immediately photographed by the fishing crew but, by mistake, it was placed in with the *S. mantis* shrimps caught in the same trawl and sold at the Catania fish market.

Identification of the specimen was based on Lewinsohn and Manning (1980) and Galil et al. (2002).

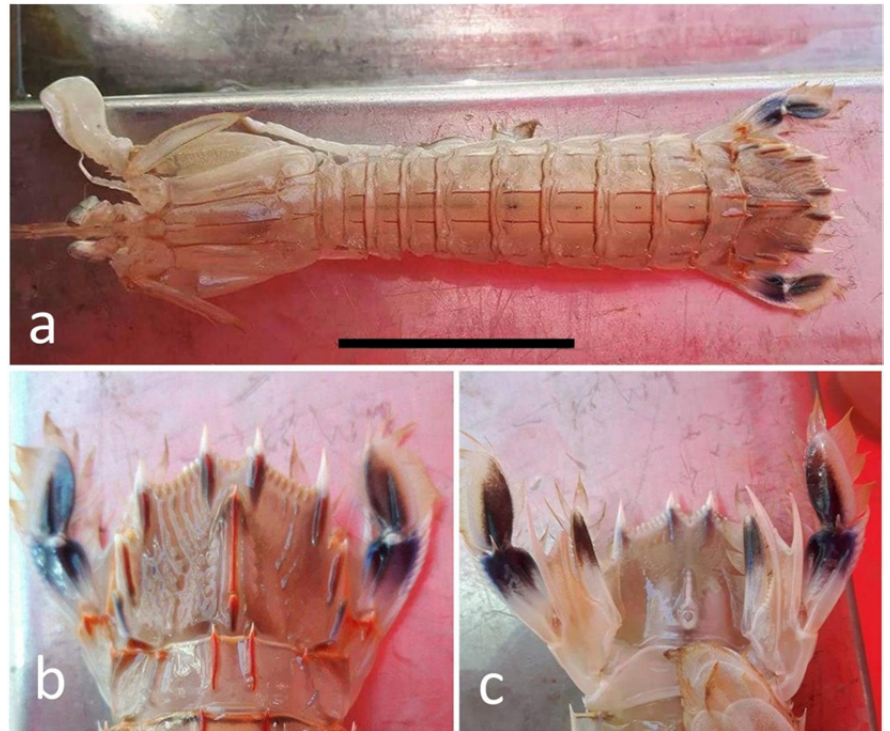
## Results and discussion

*Erugosquilla massavensis* reaches a maximum total length (TL) of 200 mm (Galil et al. 2002). The specimen in this study was 145 mm TL (Figure 2) and within the size range of individuals measured in other Mediterranean areas (Lewinsohn and Manning 1980; Katağan et al. 2004; Ounifi Ben Amor et al. 2015). The species is easily distinguished from

*Squilla mantis* due to the lack of the paired dark spots on the dorsal part of the telson (Figure 2, detail). The colour of fresh individual was: light grey-orange dotted with very small dark spots; the rostral plate margins, abdominal crests and margins were reddish (Figure 2); tubercles on telson reddish shaded of blue, with whitish tips; uropod dark blue; and basal prolongation of uropod bright orange (Figure 2, detail). The raptorial claw was whitish; and the merus, propodus yellowish.

The present finding suggests the Red Sea *E. massavensis* shares the same habitat and depth range as the native *Squilla mantis*. This has also been observed in many cases within Mediterranean waters colonised by this new arrival; but, it appears that the native *S. mantis* has been displaced to deeper waters by *E. massavensis* along the Levantine coast of Turkey and off the Israeli coast (Por 1978; Özcan et al. 2008 and references therein).

At this preliminary stage, nothing is known about the state of establishment of the species off the coast of Sicily, and further monitoring of benthic fishing catches and landings is required. Nevertheless, interviews with local fishermen indicate that they have



**Figure 2.** (a) The fresh specimen of *Erugosquilla massavensis* (Kossmann, 1880) from Sicily, Ionian Sea (TL 145 mm) (Detail: telson, (b) dorsal and (c) ventral view). Scale bar in (a), 5 cm. Photographs by Lorenzo and Salvatore Molino.

already noted a sporadic presence of the species in the specific region (coastal waters off the city of Catania) in the two-years prior to the collection recorded in this study.

Larval pelagic stages of *E. massavensis* have been observed (Gohar and Al-Kholy 1957; Lewinsohn and Manning 1980; Palomares and Pauly 2017) and larval drift could have promoted the expansion of the species' range throughout the eastern and central Mediterranean, up to waters off the northern Tunisian coastline, where it was first detected in 2014 (Ounifi Ben Amor et al. 2015) and over to Sicily. To date, three crustaceans of Indo-West Pacific origin have been reported from coastal waters off the island of Sicily, namely *E. massavensis*, *Trachysalambria palaestinensis* (Steinitz, 1932) (Insacco et al. 2017) and the brachyuran *Portunus pelagicus* (Linnaeus, 1758) [today *Portunus segnis* (Forsskål, 1775)] (Crocetta 2006).

Nevertheless, besides a passive increase in its distribution range, shipping as a vector of introduction cannot be completely discounted, especially given the intense maritime traffic involving ports and harbours in the region, including that of Catania (Deidun et al. 2016). The importance of the shipping introduction pathway has also been underscored in the case of the recently recorded Lessepsian crustacean *T. palaestinensis* (Insacco et al. 2017).

## Acknowledgements

Authors warmly thank Lorenzo and Salvatore Molino, crew of the vessel *Marialucia*, SR248L, for providing photos of the fresh-caught specimen of *Erugosquilla massavensis* soon after capture. Authors are grateful also to anonymous reviewers for helpful comments on the first version of the manuscript.

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### Supplementary material

The following supplementary material is available for this article:

**Table S1.** Records of *Erugosquilla massavensis* in Mediterranean Sea.

This material is available as part of online article from:

[http://www.reabic.net/journals/bir/2017/Supplements/BIR\\_2017\\_Corsini-Foka\\_et\\_al\\_Table\\_S1.xlsx](http://www.reabic.net/journals/bir/2017/Supplements/BIR_2017_Corsini-Foka_et_al_Table_S1.xlsx)