

Rapid Communication**The first confirmed record of the Atlantic blue crab *Callinectes sapidus* Rathbun, 1896 (Decapoda, Brachyura) from Maltese waters**

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OPEN ACCESS**Abstract**

The invasive portunid species *Callinectes sapidus* is hereby recorded for the first time from Maltese waters, thus updating the known distribution of this decapod of Atlantic origin within the Mediterranean. Potential introduction pathways of the species to Maltese waters are discussed.

Key words: invasive alien species, Portunidae, central Mediterranean, citizen science

Introduction

Marine invasive alien species (IAS) in the Mediterranean are often construed to be exclusively of eastern origin, the so-called “Lessepsian” species (Zenetos and Galinidi 2020), that enter the Mediterranean through the world’s largest shipping canal – the Suez Canal. Whilst this is broadly true, given that marine species native of contiguous Atlantic regions are technically not considered “alien” to the Mediterranean but rather range-expanding ones (e.g. Deidun et al. 2021), a number of IAS of Atlantic origin are known from the Mediterranean, with the Atlantic blue crab *Callinectes sapidus* Rathbun, 1896 being a prime example.

The Atlantic blue crab *C. sapidus* is listed among the worst invasive species introduced into the Mediterranean (Streftaris and Zenetos 2006). This species was first detected in the north Adriatic Sea at the end of the 1940s, introduced probably via ballast waters and/or for aquaculture purposes (Galil 2011; Nehring 2011; Mancinelli et al. 2017a; Kampouris et al. 2020). To date, this crab has been recorded from almost the entire Mediterranean basin (Mancinelli et al. 2021; Shaiek et al. 2021; Corsini-Foka et al. 2021), except for a few regions, including the Maltese Islands.

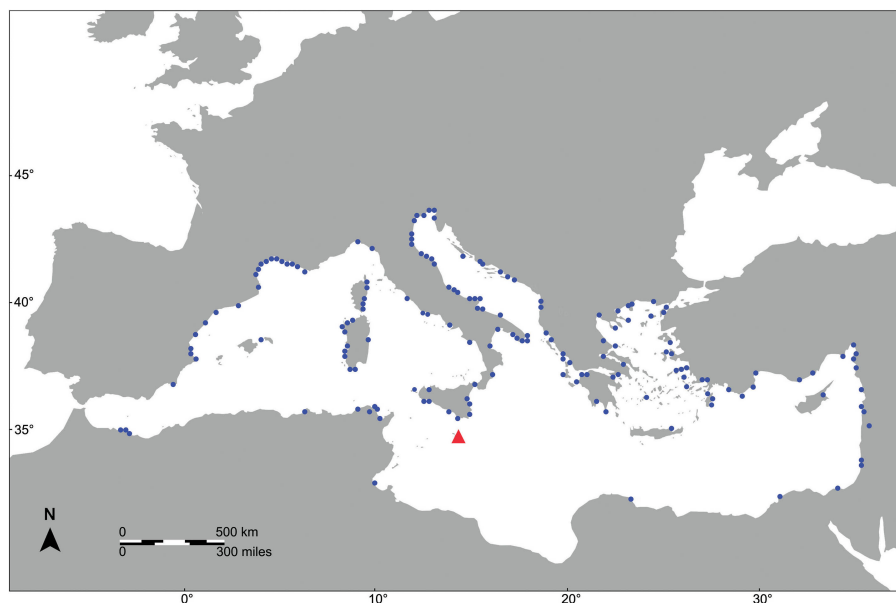


Figure 1. Distribution map of *Callinectes sapidus* in the Mediterranean Sea [based on Shaiek et al. (2021 and references cited therein); ELNAIS (2018); Sercia and Innocenti (2020); Di Martino and Stancanelli 2021; Gaglioti (2021); Gaglioti and Mancini (2021); Gaglioti et al. (2021); Tiralongo et al. 2021; Corsini-Foka et al. (2021), MCF personal communication] (blue dots), and updated with the present record from Malta (red triangle).

Due to its abundance, edible nature and sheer dimensions, *C. sapidus* already represents an exploitable fisheries resource in many Mediterranean countries (Mancinelli et al. 2017b; Kampouris et al. 2020).

In the present study, the occurrence of *C. sapidus* is reported for the first time from Maltese waters, bridging a knowledge gap on its distribution range along the Mediterranean coastline. Furthermore, the potential introduction pathway/s responsible for the species' entry into Maltese waters are discussed.

Materials and methods

The “Spot the Alien” citizen science campaign, implemented since 2017 within the Department of Geosciences at the University of Malta, was contacted over social media by a recreational fisherman in connection with an interesting catch he had made. This find consisted of a *Callinectes sapidus* individual, captured by manual spearfishing on the 1st July 2021, at a depth of 3 m, over a prevalently sandy seabed along the south-eastern extremity of the island of Malta, within the bay of Marsaxlokk (35.829672°N; 14.544146°E). The *C. sapidus* specimen was caught concurrently with ten individuals of the swimming blue crabs *Portunus segnis*. The sampling location is renowned for the abundance of *P. segnis* it supports. Figure 1 summarizes the current distribution of *C. sapidus* in the Mediterranean Sea, including the present record from Malta.

The individual was photographed (Figure 2), weighed and characterised in terms of its morphometric and morphological attributes. The sample is currently preserved within the collection of the Department of Geosciences at the University of Malta under catalogue number UM/GEO/21/1.



Figure 2. Dorsal and ventral view of the male specimen of *Callinectes sapidus* collected in Malta (Black bar = 10 mm) (Photo by J. Galdies).

Results

The crab that was caught was taxonomically attributed to *Callinectes sapidus*, male (Figure 2), on the basis of the description of the species provided by Holthuis (1987) and Galil et al. (2002). It presented a slightly convex carapace, with an apparently smooth surface, but bearing very small tubercles. Its front edge was armed with two obtuse teeth, rounded between the medial orbital angles; a median epistomal spine, placed under the frontal edge; nine anterolateral teeth (including lateral orbital angle), the last having a length more than twice that of the preceding tooth and directed laterally. Its chelipeds were longer than the following legs; the carpus had an obtuse, rounded medial angle with its lateral edge bearing a small indistinct tooth. Swimming legs with a dactyl of width equal to or greater than half of its length; merus without thorns. The carapace length and width (including the 9th anterior-lateral tooth) were 70.46 mm and 166.06 mm respectively, the weight was 282 g. The specimen had a greenish carapace, blue pincers and bluish-green legs.

Discussion

Crocetta et al. (2015) have revisited the taxonomic identity of a non-indigenous decapod crab recorded in Maltese waters over thirty years ago by Schembri and Lanfranco (1984), identified at the time as *Callinectes sapidus*, and ascribed it to *Portunus segnis* (Forskål, 1775) following a re-examination. The finding of *C. sapidus* in Maltese waters reported in the present study documents definitively the occurrence of the species in the area.

The Atlantic blue crab *C. sapidus* is known as an euryhaline species, tolerant of a broad range of salinities (Nehring 2011), occurring in both marine, estuarine/brackish and freshwater environments. For instance, within the Mediterranean, this invasive portunid crab has colonised extensive swathes of the Ebro River (Prado et al. 2020) and inhabits many

coastal lagoons of the basin, such as lagoons in Tunisia (Shaiek et al. 2021), Greece (Kampouris et al. 2020), Italy (Di Martino and Stancanelli 2021), Egypt (Abdel Razek et al. 2006), while it has also been recently reported for the first time from a Libyan coastal lagoon (Corsini-Foka et al. 2021).

It is interesting to note that the *C. sapidus* individual reported in the current study was caught concomitantly with numerous individuals of another invasive portunid species, *P. segnis*, which was first recorded from Maltese waters within Marsaxlokk Bay in 1972 (Crocetta et al. 2015; Deidun and Sciberras 2016) and which is currently well-established around the island (Katsanevakis et al. 2020). Whether this represents an incidence of sympatry between the two invasive portunid species is still too early to decipher given the current non-established nature of *C. sapidus* within Maltese waters. Given the highly seasonal nature of precipitation in the semi-arid Maltese Islands and the relative paucity of permanent watercourses which discharge into the sea, the eventual establishment by *C. sapidus* of viable populations within Maltese waters is uncertain. This is especially relevant considering the species' reliance on freshwater or brackish water in order to complete its life cycle (Rady et al. 2018).

The fact that *C. sapidus* was caught in close proximity to the Freeport, one of the largest cargo transshipment ports in the Mediterranean, is hardly surprising, given the sheer volume of cargo vessels which make port calls at the Freeport. Marsaxlokk Bay, which hosts the Freeport, in fact supports established populations of a number of marine IAS, including *Halophila stipulacea* and *Pinctada radiata imbricata*, besides the already mentioned *P. segnis* (Environment and Resources Authority 2020). Transport of eggs and/or of larval stages within a ship's ballast waters is hypothesized as the most probable introduction pathway for *C. sapidus* in the area under study, as suggested for other invaded Mediterranean regions (e.g. Shaiek et al. 2021).

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