



## -SHORT COMMUNICATION-

### Some Brachyuran Crab Records from Coastal Waters of the Mersin Bay, Turkey (Northeastern Mediterranean Sea)

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#### Abstract

Eight crab species (*Eriphia verrucosa*, *Maja squinado*, *Calappa granulata*, *Charybdis (Goniohellenus) longicollis*, *Callinectes sapidus*, *Atergatis roseus*, *Portunus segnis*, *Maja crispata*) were sampled from Mersin Bay (Northeastern Mediterranean) between September 2017 and April 2018. Three species belong to the family of Portunidae while two *Maja* species represent Majidae. The other crabs represent the families of Calappidae, Xanthidae, and Eriphidae. All specimens were preserved in ethanol and were deposited in the Museum of the Systematic, Faculty of Fisheries, Mersin University (catalogue number: MEUDC-17-12-002 - MEUDC-18-12-009). Previous records of these crabs in the Mediterranean Sea were determined as their distributions were compared. All crab specimens in the study are widely distributed in the Northeastern Mediterranean Sea.

#### Keywords:

Brachyuran crab, coastal waters, Mersin Bay, Turkey.

#### Article history:

Received 26 March 2019, Accepted 15 May 2019, Available online 16 May 2019

#### Introduction

The Turkish coast of Northeastern Mediterranean is an important fishing area of due to nutrient rich freshwater inputs (Bingel et al., 1993; Polat, 2002). Muddy sandy seabed and productive environment provide convenient living bio-habitat for coastal decapods. For this reasons migratory

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non-indigenous species were attracted by this area to establish population. Main part of the non-indigenous species has arrived from Red Sea by Suez Canal and due to lessepsian migration while the others comes from the Atlantic Ocean by the ballast water (Katsanevakis et al., 2013; Zenetos et al., 2015; Moussa et al., 2016). It was reported that the most of non-indigenous species of the Northeastern Mediterranean coasts are lessepsian species (Katsanevakis et al., 2014).

Brachyuran crabs are more abundant in warm, shallow tropical waters and they have wide distribution range along Pacific and Indian Oceans. A few of them have an Atlantic origin. The crustacean researches in Turkish marine waters have begun since the 18<sup>th</sup> century. In 1965, there were determined ninety-four Brachyuran species reported in this region (Kocataş & Katağan, 2003). Later studies showed that the number of brachyurans in Turkish coasts were reached one hundred-two species (Ateş et al., 2010; Bakır et al., 2014).

*C. sapidus* (Rathbun, 1896) is a brachyuran crab of Atlantic origin and is admitted to enter in the Eastern Mediterranean by ballast water. It has inhabited in Mediterranean Sea since 1935 (Artüz, 1990). It represents a high economic importance by making contribution to fishing (Kennedy & Cronin, 2007; Ayas & Özoğul, 2011).

*E. verrucosa* (Forskål, 1775) is an Atlanto-Mediterranean crab. It distributes along Turkish Coastal waters (Holthuis, 1961; Bakır et al., 2014). Although *E. verrucosa* is an economically important species in European Countries, consumption by the Turkish people is not so significant (Karadurmuş and Aydın, 2016). The first records of *E. verrucosa* was reported in Iskenderun Bay by Özcan et al. (2005).

*M. crispata* (Risso, 1827) and *M. squinado* (Herbst, 1788) belongs to the Majidae family and they have almost a similar biological and morpho-anatomical properties. However, *M. crispata* has been reported to have a smaller maximum carapace length than *M. squinado* (Şen & Özatalay, 2013). *M. squinado* and *M. crispata*, which inhabit Atlantic Oceans both of them are found in whole Mediterranean coastal waters. The first record of *M. squinado* in Iskenderun Gulf was informed with reported (Özcan et al., 2005).

*C. granulata* (Linnaeus, 1758) is a brachyuran crab, which inhabits Atlantic and Mediterranean Sea. It lives both coastal and deep waters (from 13 to 700 m depth), on muddy sandy bottoms of Atlantic and Mediterranean, mostly subtropical waters. (Manning & Holthuis, 1981; Abelló et al., 1988). The species were reported from Aegean Sea, Turkish Strait Systems and Marmara Sea (Kocataş & Katağan, 2003; Artüz, 2006; Çelik et al., 2007; Balkis & Kurun, 2008; Ateş et al., 2010) as on Gökçeada region (Gönülal & Güreşen, 2014) in Turkish coasts.

*A. roseus* (Lamarck, 1818) is naturally found through Indo-West Pacific areas. There are limited information about biology and distribution of this species. It is expected to enter the Mediterranean from the Red Sea (Enzenross & Enzenross, 1987).

*P. segnis* (Forskål, 1775) inhabits the Western Indian Ocean. It migrated from the Red Sea to the Mediterranean waters after the opening of the Suez Channel in 1898. The species was recorded from Egypt, Western Aegean Sea, Eastern Sicilian waters, Northern Tyrrhenian Sea and Turkey. *P. segnis* has been the first invader lessepsian species for Egypt and the first record of its was reported in 1924 (Fox, 1924) and then reported from Turkey in 1928 (Gruvel, 1928). It is an important economic species for fishing (Ramadan & Dowider, 1972).

*C. longicollis* (Leene, 1938) is an Indo-Pacific brachyuran crabs. It reached the Northeastern Mediterranean from Red Sea through the Suez Cannel (Holthuis & Gottlieb, 1958) and has been mostly abundant in along the Levantine Basin coasts (Galil & Kevrekidis, 2002). The first records of this species from Mersin Bay was enounced by Holthuis (1961) in 1954. The species was reported in Aegean Sea by Yokeş et al., (2007) and Frogli, (2012).

The aim of present study to determine the main and more abundant coastal decapod species in Mersin Bay. Also compared with previous records of these decapod species which are distributed in the Northeastern Mediterranean Sea commonly.

### Material and Methods

The sampling took place in the Mersin Bay between September 2017 and April 2018 (Figure 1). The sampling depth ranged between 5 m and 100 m. The crab samples obtained from the trawl and trammel fishing nets. During the sampling, eight crab species were caught. All specimens were preserved in ethanol before they were deposited in the Museum of Mersin University Fisheries Faculty (catalogue number: MEUDC-17-12-002 - MEUDC-18-12-009) (Figure 2). Identification keys were used to identify of species (Carpenter & Niem, 1998).

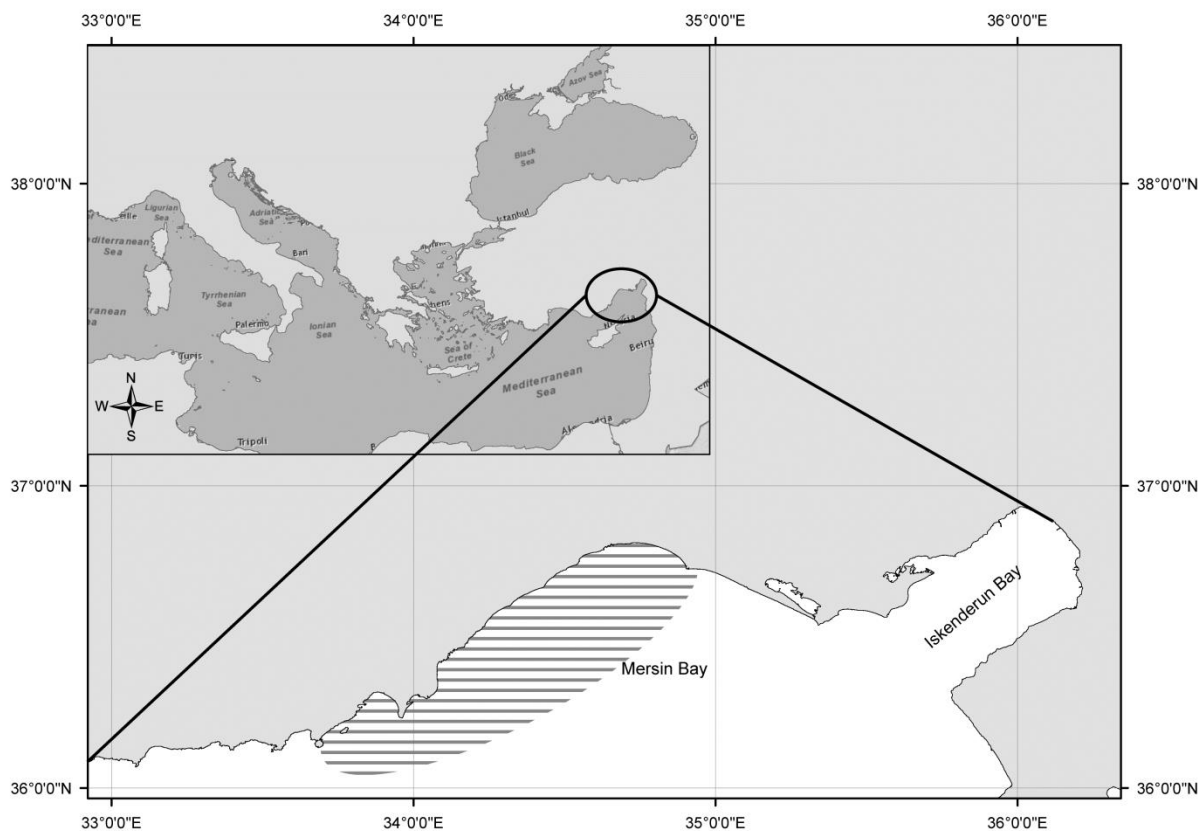


Figure 1. The shaded area indicates the locations where the species was caught from Mersin Bay.

**Results**

In this study, eight brachyuran crab species, *EE. verrucosa*, *M. squinado*, *C. granulata*, *C. longicollis*, *C. sapidus*, *A. roseus*, *P. segnis*, *M. crispata*, were found in Mersin Bay (Figure 2).



Figure 2. Some brachyuran crabs from the coastal waters of Mersin Bay. *E. verrucosa*<sup>1</sup>, *M. squinado*<sup>2</sup>, *C. granulata*<sup>3</sup>, *C. longicollis*<sup>4</sup>, *C. sapidus*<sup>5</sup>, *A. roseus*<sup>6</sup>, *P. segnis*<sup>7</sup>, *M. crispata*<sup>8</sup>

Table 1. Some records of brachyuran crabs from Mediterranean Sea

Species	Location	First Records in the Mediterranean Sea
Infra-order Brachyura		
Section Eubrachyura		
Sub-section Heterotremata		
Family Eriphiidae		
<i>Eriphia verrucosa</i> (Forskål, 1775)	Iskenderun Bay	Özcan et al., 2005
Family Majidae		
<i>Maja squinado</i> (Herbst, 1788)	Iskenderun Bay	Özcan et al., 2005
<i>Maja crispata</i> (Risso, 1827)		
Family Calappidae		
<i>Calappa granulata</i> (Linnaeus, 1758)	Aegean Sea, Marmara Sea and Turkish Systems	Kocataş and Katağan, 2003
Family Portunidae		
<i>Charybdis longicollis</i> (Leene, 1938)	Mersin Bay	Holthuis, 1961

<i>Callinectes sapidus</i> (Rathbun, 1896)	Mediterranean	Artüz, 1990
<i>Portunus segnis</i> (Forskål, 1775)	Egypt	Fox, 1924
Family Xanthidae		
<i>Atergatis roseus</i> (Lamarck, 1818)	Tel-Aviv	Lewinsohn and Holthuis, 1964

There are some records of *A. roseus* and *C. granulata* from the Turkish coastal waters among these species sampled on Mersin Bay. There was a record of *A. roseus* from the Gulf of Iskenderun by Özcan et al., (2005). *C. granulata* was recorded from Aegean Sea, Marmara Sea and Turkish Strait Systems (Kocataş & Katağan, 2003; Artüz, 2006; Çelik et al., 2007; Balkis & Kurun, 2008; Ateş et al., 2010). Some hypotheses can explain the presence of *C. granulata* in Mersin Bay. The species might be reached this coastal area by means of fouling or ballast waters. It is accepted that this species came into the Mediterranean by two ways: These are transported by ballast waters, which was the mainly Atlantic migration species, and through the Suez Cannel, which was the principal source for Indian invaders. However, it was reported that *C. longicollis*, which inhabits Indo-Pacific waters, were reached the Mediterranean waters doubtlessly through the commercial shipping ballast waters (Frogliia, 2012).

Indeed, the Mediterranean Sea is continually under pressure from non-indigenous species transported by fouling and ballast waters due to the fact that it has important ports like those of Greece, Turkey, Malta, Tunisia or Morocco. In Turkey, the ports of Mersin or the maritime straits systems of the Bosphorus represents an important hotspots for the coming and the establishment of non-indigenous species, especially the invaders one. On the other hand, the extending of the lessepsian species through the Suez Cannel is hardly confirmed. The combination of these origins makes the Mediterranean biodiversity very dynamic (Moussa et al., 2016). While some species like *C. sapidus* forms locally a large population, others as *P. segnis* has spread out westward (Zenetos et al., 2012). Migrant species an especially the invaders ones, can be cause damages on local biodiversity especially for the native species. However, species with economic importance like *C. sapidus* may contribute to fishing in the region (Ayas & Özoğul, 2011). Among the sampled species of Mersin Bay, *C. sapidus*, *E. verrucosa* and *P. segnis* are species with economic importance.

Except for *C. granulata*, all crabs collected in Mersin Bay were reported previously in Iskenderun Bay. It was reported that *C. sapidus*, *C. longicollis* and *P. pelagicus* were more abundant, while *M. squinado* and *E. verrucosa* were recorded firstly in Iskenderun Bay (Özcan et al., 2005). Similarly, *C. sapidus*, *P. segnis* and *C. longicollis* were recorded from the Iskenderun Bay by Yeşilyurt & Türeli (2018).

The previous studies showed that the Northeastern Mediterranean Sea was quite rich in terms of crustaceans, especially on non-indigenous crab species (Galil et al., 2015). Brachyuran crabs occur more than 50 % on the records of the all decapod species observed in Mediterranean (Brockerhoff & Melay, 2011). It was reported that 17.44 % of all brachyurans found in Turkish coast were non-indigenous (Bakır et al., 2014). Even if the main way of biodiversity of Mediterranean Sea is lessepsian migration, non-indigenous species contribution rate with ballast waters to Mediterranean Sea is very important (Zenetos et al., 2012). *C. sapidus*, *C. granulata*, *E.*

*verricosa*, *M. squinado* and *M. crispate* were recorded from Gökçeada (Gönülal & Güreşen, 2014). *C. sapidus* was also recorded from Black Sea (Yağlıoğlu et al., 2014).

### Conclusions

Consequently, due to its ever-changing spatiotemporal structure, the Mediterranean should be deeply examined in terms of biodiversity, food chains and ecosystems. For those goals, crabs and especially the coastal ones, represent valuable taxa to well understanding ecosystems, their ecological state and even their ecological and trophic function.

### Acknowledgements

This study was supported by the Research Fund of Mersin University in Turkey with Project Number: 2017-2-AP2-2353.

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