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First Documented Occurrence of the Marbled Crab *Pachygrapsus marmoratus* (Fabricius, 1787) in Mersin Bay, Northeastern Mediterranean

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Research Article

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Abstract

This study aims to document the first observation of the marbled crab *Pachygrapsus marmoratus* (Fabricius, 1787) in Mersin Bay and to determine its biotope preference in this region. In March 2025, benthic sampling was conducted from a single male specimen in a rocky coastal habitat with photophilous algae. The species was identified based on the presence of characteristic morphological features. The specimen was subsequently preserved and stored at the Mersin University Marine Life Museum. This finding suggests that *P. marmoratus* has expanded its distribution along the eastern Mediterranean coast. In this study, the marbled crab was observed only in a rocky biotope characterized by sunlight and microbial algal cover, exposed to wave action. This study contributes to future studies on monitoring benthic biodiversity and protecting coastal habitats along the northeastern Mediterranean coast.

Keywords: *Marbled crab, Pachygrapsus marmoratus, occurrence, Mersin Bay, northeastern Mediterranean, Türkiye.*

Introduction

The marbled crab *Pachygrapsus marmoratus* (Fabricius, 1787) is a native species of crab belonging to the family Grapsidae. It is commonly found in stony coastal habitats and occupies a significant role in benthic ecosystems. This species is widely distributed, extending from the Northeast Atlantic

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Ocean (including the Bay of Biscay) to the Mediterranean, Black Sea, and Sea of Azov (Froglia and Speranza, 1993; Guerao and Abello, 1999; d'Udekem d'Acoz, 1999; Ingle and Clark, 2008; Dauvin, 2009). This species is frequently observed on photophilic rocky shorelines exposed to high wave energy, where it plays significant biological roles (Cannicci et al., 2002).

Although the presence of *P. marmoratus* has been previously documented in the Black Sea (Gönlügür-Demirci, 2006; Aydın et al., 2013, 2014), Marmara Sea (Çelik et al., 2007; Balkıs et al., 2016), Aegean Sea (Ergen et al., 1994; Balkıs et al., 2001), and Mediterranean Sea (Özcan et al., 2005), there are no records in the literature for Mersin Bay. This observation indicates that the distribution limits of the species in the eastern Mediterranean remain to be fully delineated. Distribution studies, particularly in ecological transition zones such as the eastern Mediterranean, offer significant insights into species' habitat preferences and environmental tolerances (Bianchi and Morri, 2000; Coll et al., 2010).

The geographical distribution of marine species is often influenced by a wide range of parameters, including environmental factors (e.g., seawater temperature, salinity, substrate type), human impacts (e.g., port structures, ballast water transport), and climate change (Occhipinti-Ambrogi, 2007; Katsanevakis et al., 2014). Indeed, euryhaline and eurythermic species such as *P. marmoratus* exhibit high tolerance to these environmental changes and can readily adapt to new habitats (Fratini et al., 2001).

In this study, the initial detection of *P. marmoratus* in Mersin Bay (northeastern Mediterranean) not only underscores the ecological plasticity of the species but also contributes to the biogeographic dynamics of the Mediterranean coast of Türkiye. The present study aims to document the presence of this species in Mersin Bay and provide a basis for future population monitoring and conservation strategies.

Material and Methods

The study was carried out in March 2025 in Mersin Bay, specifically along the Erdemli coast (Akkum), at the coordinates 36.27254° N and 34.08095° E (Figure 1). The sample was observed in a rocky area during scuba observation at a sandy-muddy bottom at a depth of 3 m.

The manually collected sample was preserved in 70% ethanol. Species identification was based on morphological features such as shell structure and pereiopod morphology (Zariquiey-Alvarez, 1968; d'Udekem d'Acoz, 1999).

Photographic documentation was conducted, and the specimen's primary morphological characteristics were meticulously measured to the nearest millimeter (Figure 2). Following this, the decapod specimen was archived at the Mersin University Marine Life Museum under catalog number MEUDC-25-13-019.

Figure 1. Map showing the sampling site (●) of *Pachygrapsus marmoratus* in Akkum, Erdemli coast (northeastern Mediterranean).

Figure 2. Ventral (a) and dorsal (b) views of a male *Pachygrapsus marmoratus*.

Result and Discussion

In the present study, a male specimen of *P. marmoratus* was identified during coastal and nearshore benthic sampling in Erdemli coast, Mersin Bay. The morphological identification of this specimen was based on distinctive features, including a carapace width of 23 millimeters, as well as prominent transversal lines, short antennal stalks, and five post-orbital teeth. The species diagnosis was confirmed using the morphological keys described by Zariquiey-Alvarez (1968) and d'Udekem d'Acoz (1999).

During the scuba diving observation, the marbled crab specimen was observed in a rocky coastal habitat covered with photophilous algae and exposed to wave action. This observation is consistent with findings documented in studies by Fratini et al. (2001) and Cannicci et al. (2002). No other individuals of this species were observed during the dive in an area of muddy, sandy, or artificial substrates, although it was observed in the rocky coastal biotope.

The findings suggest that the distribution of *P. marmoratus* along the eastern Mediterranean coast is expanding eastward. Previous reports on the species include the Iskenderun Bay (Özcan et al., 2005), Tunisia (Deli et al., 2015; Shaiek et al., 2017), Malta (Crocetta et al., 2011), and Egypt (Nour et al., 2025). The record obtained from Mersin Bay is important as it contributes significantly to the current distribution map of the species and provides valuable information about the benthic biodiversity in the northeastern Mediterranean. Coll et al. (2010) suggested that increasing seawater temperatures and increased substrate availability are among the factors contributing to the expansion of this species. Occhipinti-Ambrogi (2007) and Katsanevakis et al. (2014) mentioned that, in addition to these two factors, habitat change as a result of climate change may be a contributing factor. Fratini et al. (2001) reported that *P. marmoratus* can exhibit a remarkable degree of environmental stress tolerance, which can be attributed to its euryhaline and eurythermic properties that facilitate its successful establishment in new areas.

In conclusion, the present study provides a basis for monitoring the species' potential distribution areas and determining its habitat preferences. This finding suggests that *P. marmoratus* has expanded its distribution along the eastern Mediterranean coast. The species' commitment to specific biotopes is critical for the conservation of coastal habitats. This record is also important for contributing to the conservation of coastal ecosystems and the development of habitat-based management strategies.

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Conflict of Interest

The authors declare that for this article they have no actual, potential or perceived conflict of interest.

Author Contributions

D.A. prepared the original draft, sample, and methodology, and conducted the review and editing process. S.A.E. performed the conceptualization, research, visualization and editing. D.E. contributed to drafting, reviewing, and editing, and conducted the final verification.

Ethical Approval Statements

No ethics committee permissions are required for this study.

Data Availability

The visual data used in the present study are available upon request from the corresponding author.

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