

SHORT COMMUNICATION

First Record of the Epizoic *Octolasmis angulata* (Cirripedia) on *Maja squinado* (Herbst, 1788) (Majoidea, Crustacea) from Çanakkale, Türkiye

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Abstract: Some morphometric and biological characteristics of a European spider crab, *Maja squinado* (Herbst, 1788) caught off Aksaz region, (Biga, Çanakkale, Türkiye) were investigated. In addition, an epizoic species infesting this *M. squinado* specimen has been identified. The crab specimen was caught by a commercial fisherman using trammel nets. Carapace length, carapace width and weight of the crab were 15.9 cm, 14.5 cm, and 1109 g respectively. The specimen was an ovigerous female with a calculated fecundity of 3.48×10^4 eggs. Eggs were in stage 4th of development and covered the whole carapace region. Additionally, it was observed that the specimen was infested with the epixoic barnacle *Octolasmis angulata* (Aurivillius, 1894). A total of 46 *O. angulata* individuals were observed; 32 from the gill lamellae, and 14 from the carapace. This study reports the existence of the epizoic *O. angulata* on *Maja squinado* for the first time in Türkiye.

Anahtar kelimeler:

Örümcek yengeç
Epizoik
Barnacle
Çanakkale

***Maja squinado* (Herbst, 1788) (Majoidea, Crustacea) Üzerinde Epizoik *Octolasmis angulata* (Cirripedia) Türünün Çanakkale, Türkiye'den İlk Kaydı**

Öz: Çanakkale Aksaz kıyılarında gerçekleştirdiğimiz çalışmada, *Maja squinado* (Herbst, 1788)'nin bazı morfolojik ve biyolojik özellikleri ile *M. squinado* üzerinde konakçı olarak yaşayan epizoik tür incelenmiştir. Ticari balıkçılar tarafından fanyalı uzatma ağları yakalanan yengecin karapas uzunluğu 15.9 cm, karapaks genişliği 14.5 cm ve ağırlığı 1109 g olarak ölçülmüştür. Yengeç dişi olup üzerinde yumurta taşıdığı tespit edilmiştir. Yengecin abdomen bölgesinde toplam 348×10^4 yumurta olduğu hesaplanmıştır. Yengecin yumurtalarının 4. evrede olduğu ve tüm abdomen bölgesini kapladığı belirlenmiştir. Ayrıca yengeç bireyinin üzerinde konakçı epizoik *Octolasmis angulata* (Aurivillius, 1894) taşıdığı görülmüştür. Yengecin solungaç lamellerinden 32 adet ve karapaks altından 14 adet olmak üzere toplamda 46 adet *O. angulata* örneklenmiştir. Bu çalışma ile *M. squinado* türü üzerinde epizoik tür *O. angulata*, ülkemiz denizlerinden ilk kez kaydedilmiştir.

Introduction

Crustaceans have a significant contribution to world fisheries production (Karadurmuş and Aydın, 2016). The European spider crab *Maja squinado* (Majoidea, Decapoda, Crustacea) is a species of great commercial importance distributed in the northwest Atlantic and Mediterranean at depths of up to 90 m (Kergariou, 1976; Bernardez, 2005). However, environmental degradation and inappropriate fisheries management have resulted in declining stocks of this species (Born et al., 2004). This species is exploited by several countries; in the north-eastern Atlantic, intensive spider crab fisheries are operated by the United Kingdom, Ireland, France, the Channel Islands, Spain, Portugal, Morocco, and in the

Mediterranean, Turkey (Brosnan, 1981). *M. squinado* was caught commercially in Turkey until 2006 (Harlıoğlu et al., 2018), but this species has been a rare occurrence recently. In Turkey, information on *M. squinado* has been limited to biodiversity studies (Kocatas et al., 2005; Harlıoğlu et al., 2018; Çiftçi et al., 2019).

Epibiosis involves mutualistic and commensal relationships with the most critical factor for colonization being the availability of a suitable substratum (Ross, 1983; Parapar et al., 1997). Epizoic species like stalked barnacles of the genus *Octolasmis* Gray, 1825 (Poecilasmatidae) are sessile invertebrates frequently found attached to the branchial chairs of crabs (Jeffries and Voris, 1996; Chan et

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al. 2009; Ihwan et al., 2014). When *Octolamis* inhabit branchial chambers of the crabs, they occupy space on the surface of the gills normally available for oxygen exchange and can therefore, severely impair host respiration (Hudson and Lester, 1994).

Since the underlying reasons for the decline of *M. squinado* stocks are not known, information on the biology of this species and its interaction with the environment may help to shed some light on their abundance in this area. In this study, the epizoic species *Octolamis angulata*

infesting *M. squinado* was recorded for the first time in Turkey.

Material and Methods

The specimen of *M. squinado* was caught incidentally from a depth of 70 m by commercial fishermen using trammel nets on the southern coasts of the Marmara Sea on April 27, 2021 (Coordinates of sampling area: 40° 29' N - 27° 13' E). The specimen was identified according to Ng and Richer de Forges (2015) (Figure 1).

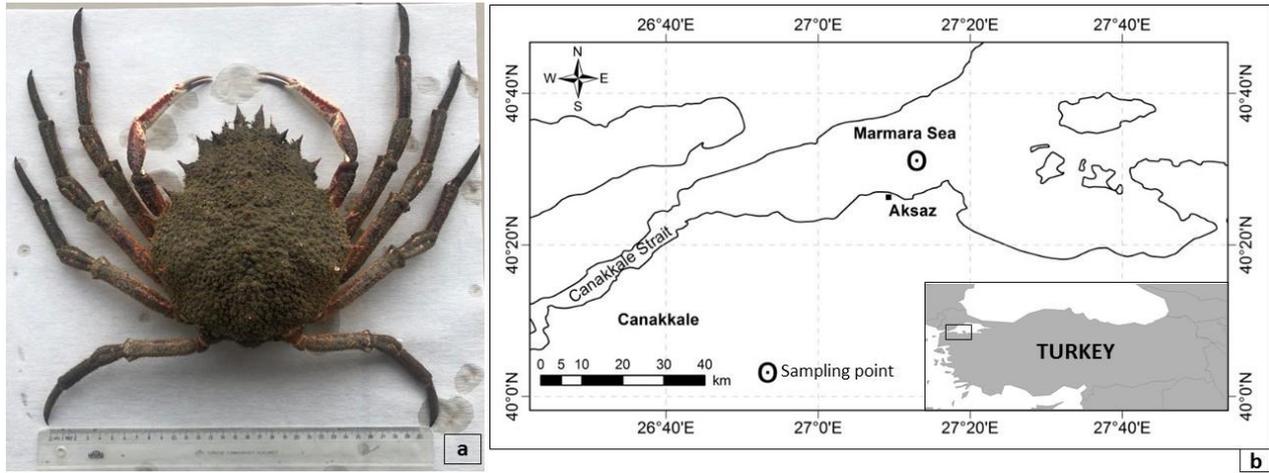


Figure 1. a: The sampled ovigerous female of *M. squinado* b: Sampling location of *M. squinado* in the present study.

The specimen was transferred to the laboratory in a cooler and the morphometric characteristics were measured with a digital caliper according to Neumann 1996. Total weight and gonad weight were measured using a digital scale. Development and color changes of gonads were determined macroscopically according to Carmona-Suárez (2003). Maturity stages of the eggs were identified according to the 4-staged maturity scale as follows: Stage I: almost absent, very small, transparent; Stage II: milky white, thin, soft; Stage III: light orange, covers a great part of the internal organs; Stage IV: orange-red, covers entire abdomen region. Fecundity was determined based on a 0.05 g sub-sample with 3 replicates taken from the egg mass and counting the number of eggs under a stereomicroscope. The minimum, maximum, and average egg sizes were also calculated by measuring the diameters of 70 sub-samples. *M. squinado* specimen was then dissected and epizoic barnacles were carefully removed. Species identification was carried out according to Jefferies et al., 2005 and Chan et al. 2009, and the number of epizoics was recorded.

Results

Morphological measurements of *M. squinado* caught in trammel nets from Çanakkale Aksaz Region are given in Table 1. The carapace length of *M. squinado* was 15.9 cm and the carapace width was 14.5 cm. The abdominal length of the crab was 9.6 cm and the abdomen width was 7.7 cm. The total weight of of the crab was 1109 g.

The eggs of the ovigerous female crab were red in color and in the 4th stage of development. The total egg mass of this crab was recorded as 104.68 g. The total number of eggs was calculated as 348×10^4 . The diameter of the crab eggs ranged between 0.6039 - 0,7951 mm, , with a mean diameter of 0.7200 ± 0.038 mm.

O. angulata was identified as the epizoic species on the crab's gill lamellae and carapace margins. A total of 46 *O. angulata* were found on the crab; 32 from the gill lamellae and 14 from the carapace. Photographs of *O. angulata* are presented in Figure 2.

Discussion

This study provides information on the morphological characteristics of the spider crab *M. squinado* in Çanakkale. Our findings were compared with those of other studies. In a study conducted on the Tunisian coast, the mean CL was found to range between 22.5 and 87 mm and a mean CL of 52 mm was measured in adult females (Baklouti et al., 2015). Authors in this study, stated that there were ovigerous females in April-May but the gonads reached peak maturation in December-March. In a different study conducted on northwest Spain, an individual with eggs were found in December (Bernardez et al., 2003). In the present study, an ovigerous female was caught in April and similar results were obtained in other studies.

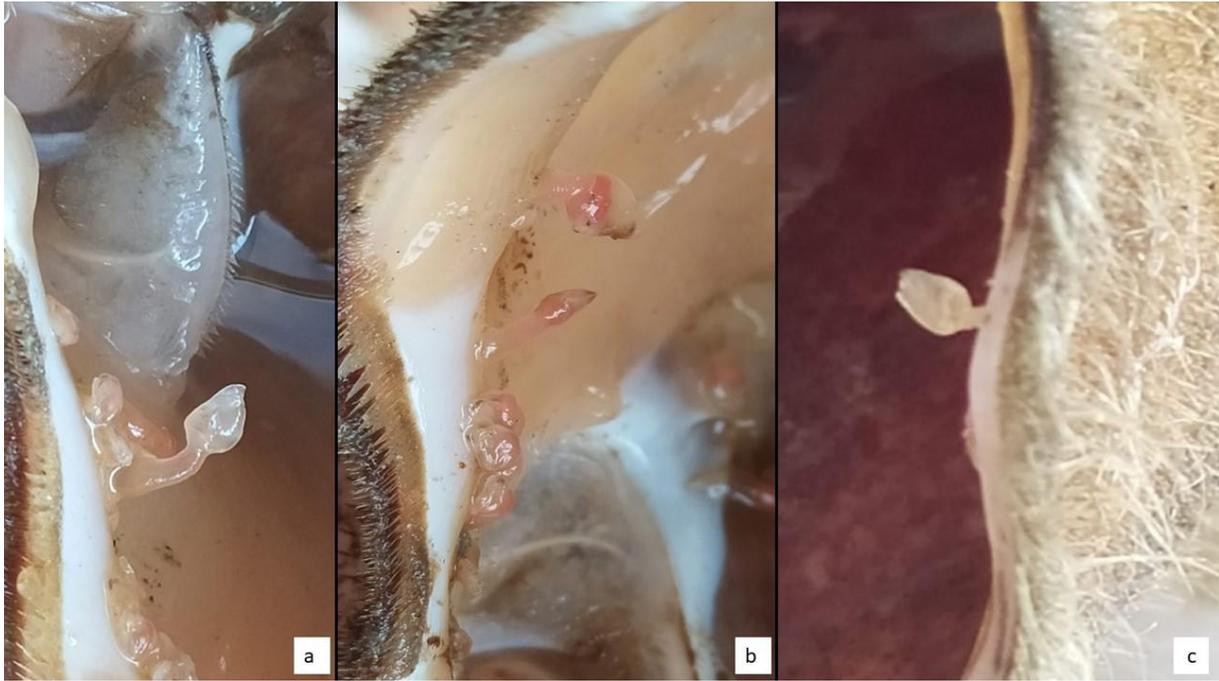


Figure 2. Location of epizoic species *O. angulata* on *M. squinado* (a, b: Gills filament; c: Under the carapace)

Host species and availability vary according to the characteristics of the organism, the type of host, and maturity stages (Dudgeon 1980; Maldonado & Uriz 1992; Woods & McLay 1994; Woods & Page 1999; Cruz-Rivera 2001; Berke & Woodin 2008; Hultgren & Stachowicz 2008; Martinelli et al., 2011). A range of organisms including algae, sponges, hydroids, bryozoans, amphipods, cirripedes, polychaetes, etc. have been recorded on crabs (Sato & Wada 2000) and their intensity of infestation appear to differ chemically/mechanically. In addition to the phenomenon of epibiosis on their exoskeleton, *M. squinado* crabs display a distinctive masking behavior that creates a complex camouflage system to ward off predators. *Octolasmis* sp. has been reported in different studies on the gills of different crustaceans such as Palinuridae, Scyllaridae, and Portunidae, especially *O. angulata*, inhibiting the respiratory process, thus preventing oxygen uptake by these crustacean hosts (Irvansyah et al., 2012; Jeffries et al., 1996; Schejter & Spivak, 2005; Ihwan et al., 2014; Hassan et al., 2019). This study shows features similar to other studies and the individuals of *O. angulata* show a dense distribution, especially in the gill lamellae of the crab.

Earlier studies on biodiversity have confirmed the presence of *M. squinado* in the Çanakkale Strait and the Sea of Marmara. In this study, morphometric characteristics of an ovigerous female and its infestation by the epizoic species *O. angulata* are reported for the first time.

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Conflict of Interest

There is no conflict of interest between the authors.

Author Contributions

All authors contributed equally to the paper.

Ethics Approval

The material used in this article is invertebrate species therefore ethics committee approval is not required for this study.

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