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Article

First record of the crab, *Dorippe quadridens* (Fabricius, 1793) (Brachyura: Dorippidae), from the Iraqi coastal waters of the NW Arabian Gulf, with notes on the occurrence of seven species of crabs in the region

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Abstract

The present study is important in concerning the ecological and classification of the native and invasive species to the Iraqi coast in the north-west of the Arabian Gulf. It has been noted that there is a recent trend to record many decapod crustaceans species in general and marine crabs in particular. The aim of the present article is to find out diversity and distribution of the dorippid crabs (family: Dorippidae) in addition to other brachyuran crabs species in the subtidal zone along the Iraqi coast. The present study was conducted in summer and winter months from April 2016 to March 2017. Three sites for collection of samples along the Iraqi coast were selected, site 1 in Khor Abudallah canal, site 2 in the coastal region around south Al-Fao town, and site 3 in Rass Al-Besha area. Sampling was carried out using a shrimp's trawler nets. One of the important results of this study is that specimens of the crab *Dorippe quadridens* (Fabricius, 1793) were recorded for the first time along the Iraqi coasts. During this survey, seven species of other Brachyuran crabs were identified; belonging to the seven families. The study recommended continuous monitoring of the brachyuran crabs and other invertebrates species that inhabiting the Iraqi coast in order to provide basic information on the species diversity and distribution of marine crabs inhabiting this harsh environment.

Keywords Khor Abudallah; Rass Al-Besha; crab; *Dorippe quadridens*; diversity; distribution.

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1 Introduction

Most of research about the taxonomic diversity of decapod crustaceans have increased considerably during the last decades (Ng et al., 2008; Clores and Ramos, 2013; Varadharajan et al., 2013; Al-Maliky et al., 2016; Al-Khafaji et al., 2017). Many of these researches focused on decapod crustaceans inhabiting marine ecosystems,

whereas the diversity, distribution and abundance of marine crab species are one among the issues (Zairion et al., 2018).

Several previous articles on *D. quadridens* which is belonging to the family Dorippidae were focused on the occurrence and distribution of this species and other dorippid crabs in their habitats including the coasts of Australia (Davie, 2002); coastal waters of Madagascar, New Caledonia, Indonesia and the Philippines (Chen, 1987, 1993); coastal waters of Cambodia (Jensen et al., 2011).

The main cause of change in biodiversity may be the occurrence of climate change phenomena, such as high temperatures and low rainfall, and thus migration of these invasive species from their original environments to our environments (Zhang and Chen, 2011).

The specimens of this species were found and recorded in previous studies in the west, east and south coasts of the Arabian Gulf. However, there are limited information on the dorippid crabs and other brachyuran crabs in the Arabian Gulf waters, including their diversity, distribution and notes on the occurrence of these species in Arabian Gulf waters (Stephensen, 1946; Naderloo and Sari, 2007; Naderloo and Turkey, 2012; Naderloo et al., 2015).

The aim of the present study is to increase the knowledge on the marine fauna of the Iraqi coasts, northwest the Arabian Gulf, which remains incomplete. To increase our understanding of the fauna of this area and to determine the diversity and distribution of the dorippid crabs: *D. quadridens* (Fabricius, 1793) in the subtidal zone along the Iraqi coast, NW Arabian Gulf, Iraq.

2 Materials and Methods

Specimens of the dorippid species and some other Brachyuran crabs species from the subtidal zone were collected from three main sites during the summer and winter months at the period from April 2016 to March 2017. Three stations were selected and sampled once by shrimps trawl net, each trawl lasted for a maximum of 30 min. Three stations in Iraqi coastal waters at south of Al-Basrah city, were sampled: (1) site 1, Khor Abdullah coast; (2) site 2, in coastal waters around the south of Al-Fao town, and (3) site 3, from the shallow subtidal zone at Rass Al-Bessha coastal region at the southern end of the Shatt Al-Arab at Al-Fao town (Fig. 1). The depth at these stations was ranging from 5-25 m.

Samples of the crabs were brought to the laboratory at the Marine Biology Dep. of the Marine Science Center. The species were identified with the aid of the following: Stephensen (1946), Naderloo and Sari (2007), and Naderloo and Turkey (2012).

Specimens of each species were placed in a plastic container with label and preserved by 70-80% alcohol. The “winter” season included December through February while the “summer” season included May through July 2016.

3 Results and Discussion

Systematic Account

Family Dorippidae MacLeay, 1838

Subfamily Dorippinae MacLeay, 1838

Genus *Dorippe* Weber, 1795

Species *Dorippe quadridens* (Fabricius, 1793)

3.1 First record of *Dorippe quadridens* (Fabricius, 1793) (Crustacea, Decapoda, Dorippidae)

Dorippoides nudipes (Manning and Holthuis, 1986) is a common species in the subtidal zones of the Arabian Gulf. It is found in variety of habitats including sandy, muddy and rocky substrate, but it was not collected during the present study. The present paper deals with as new records for the Iraqi coast from the subtidal

zones, along the Iraqi coasts, NW-Arabian Gulf. Moreover, it is the first record of *D. quadridens* (Fabricius, 1793) in the Arabian Gulf.

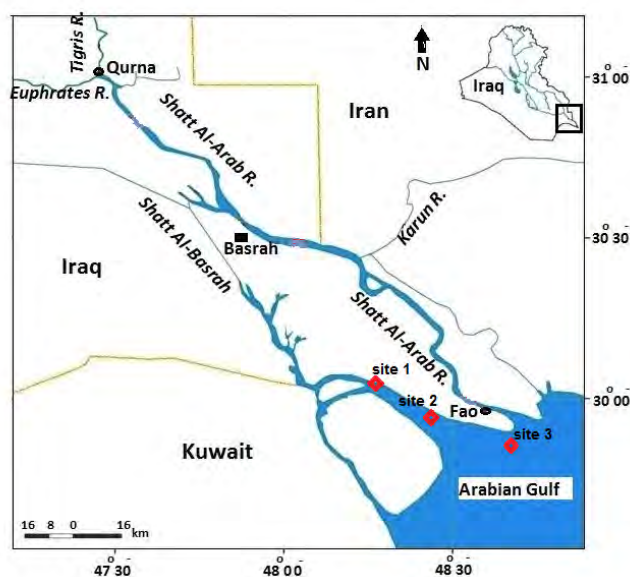


Fig. 1 Sampling sites along the Iraqi coasts.

The specimens of *D. quadridens* (Fabricius, 1793) were collected by bottom trawl net in the Iraqi coastal of water, NW Arabian Gulf in winter 2016 and summer 2017, from the three sites at depths of 5 - 25 m. The specimen of *D. quadridens* (Fig. 1, a) fits the description of Holthuis and Manning (1990) as: carapace strongly sculptured, granulated, bearing pubescence and grooves evident. Tubercles usually well indicated, sometimes low. Surface covered by long, flexible hairs, worn off in old individuals. Two lateral tubercles on cardiac area. Antero-lateral margin of carapace, between base of exorbital tooth and cervical groove, with few to many (3-9) sharp denticles. Front teeth flat, with narrowly rounded apices, separated by a deep but open V. Lower orbital margin with row of 4-7 spines but without additional row of denticles. Carpus of cheliped with distinct spinules and hairs on upper surface; palm of chela smooth, except for granules in extreme proximal part. P2-P3: merus compressed, distinctly higher than wide, covered with pubescence; merus of P3 less than six times as long as high.

Measurements: carapace length 3.2 cm; carapace width 2.9 cm; length of cheliped 3.4 cm; body depth 1.7 cm. Colour: carapace brownish-grey. Fingers of chelas yellowish brown. Weight: 18 g.

3.2 Habitat

D. quadridens is found in the sublittoral, shallow water, substrate shelly sand or mud to sand bottoms (Holthuis and Manning, 1990; Thoma, 2007).

Dorippid crabs commonly live in sandy, muddy and rocky substrate at shallow coastal water.

D. quadridens was caught in depths of 5 to 40 m (Thoma, 2007), varies from 1 to 73 m and most commonly occurs in 1 to 30 m and ever found (1 individual) in 415 m (Holthuis and Manning, 1990). In this study, we found *D. quadridens* at a depth of 5 to 25 m.

3.3 Distribution

D. quadridens has a wide distribution within the Indo-West Pacific region, extending from the Arabian Gulf to the Red Sea, Suez Canal and eastern Africa.

D. quadridens (Fabricius, 1793) is known from Iran (Stephensen 1946, Naderloo and Sari 2007), Kuwait and UAE (Apel, 2001), Saudi Arabia [Basson et al, (1977) as *Dorippe dorsipes*, Apel (2001)], Bahrain (Stephensen, 1946), Gulf of Oman (Naderloo et al, 2015), Red sea, Pakistan, southern India, southern China, Vietnam, Thailand, Malaysia, Indonesia (Holthuis and Manning, 1990), Cambodia, Madagascar (Chen, 1987), Australia (Manning, 1993; Thoma, 2007), Thailand (Ng and Davie, 2002), New Caledonia, Philippines (Chen, 1993) and now in the subtidal zone of the NW Arabian Gulf Iraqi coasts.

The dorippid crabs are a macro-benthos, mostly found in tropical waters, and have no economic value and consumption. Family Dorippidae consists of nine genera, two of which are *Dorippe* and *Dorippoides*. There are seven species of the genus *Dorippe* (Manning, 1993) and 2 species of the genus *Dorippoides* (Holthuis and Manning, 1990) are known from the Indo-West Pacific region.

Specimens from other species of brachyuran crabs were collected and identified during the present survey (Fig. 2) (Table 1), shows a list of the recorded species at the three stations. Other brachyuran were represented by seven genera, seven families Epialtidae, Leucosiidae, Galenidae, Portunidae, Xanthidae, Varunidae and Matutidae, each comprised of only one species.

Table 1 List of the other brachyuran crab species recorded in the present survey with details of records by earlier workers.

Family	Species list	Record by
1-Xanthidae	<i>Atergatis roseus</i> (Rüppell, 1830)	Al-Khafaji et al. (2017)
2-Matutidae	<i>Matuta planipes</i> Fabricius, 1798	Al-Khafaji et al. (2017)
3- Varunidae	<i>Metaplex indica</i> (H. Milne Edwards, 1852)	Al Maliky et al. (2016)
4- Portunidae	<i>Portunus pelagicus</i> (Linnaeus, 1758)	Al-Khafaji et al. (2017)
5-Leucosiidae	<i>Hiplyra sagitta</i> (Galil, 2009)	Al-Khafaji et al. (2017)
6-Galenidae	<i>Halimedetyche</i> (Herbst, 1801)	Al-Khafaji et al. (2017)
7-Epialtidae	<i>Hyastenus hilgendorfi</i> (De Man, 1887)	Al-Khafaji et al. (2017)

Table 2 The presence and absence of the species recorded at each site during the survey in the present study (+: present, -: absent, S: summer, W: winter).

No	Family	Species list	Site 1		Site 2		Site 3	
			S	W	S	W	S	W
1	1-Xanthidae	<i>Atergatis roseus</i>	+	+	-	-	-	-
2	2-Matutidae	<i>Matuta planipes</i>	+	+	-	+	-	+
3	3-Dorippidae	<i>Dorippe quadridens</i> (Fabricius, 1793)	-	-	+	-	+	+
4	4- Varunidae	<i>Metaplex indica</i>	-	-	+	+	+	+
5	5- Portunidae	<i>Portunus pelagicus</i>	+	+	+	+	+	+
6	6-Leucosiidae	<i>Hiplyra sagitta</i>	-	+	-	+	-	+
7	7-Galenidae	<i>Halimedetyche</i>	+	+	+	+	+	-
8	8-Epialtidae	<i>Hyastenus hilgendorfi</i>	-	+	+	+	+	+
Total	8	8						

The presence and absence of the species in winter and summer were recorded at each site during the survey period (Table 2). The blue swimming crab, *Portunus pelagicus* (Linnaeus, 1758) was the most commonly distributed species caught by shrimp's trawlers in the subtidal zone from the three sites at the two seasons along the Iraqi coastal waters, NW Arabian Gulf. The spider crabs *Hyastenus hilgendorfi* De Man, 1887 and *Halimedetyche* (Herbst, 1801) were the second common species.

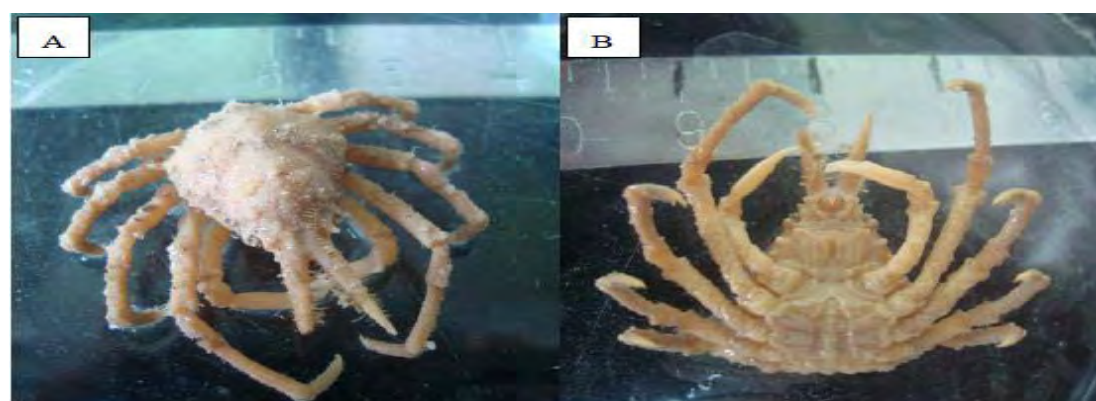
Hyastenus hilgendorfi was absent only in site 1 in summer, while *Halimedetyche* was absent only in site 3, *Atergatis roseus* (Rüppell, 1830) was the least present species caught and recorded only in site 1.



a. *Dorippe quadridens* (Fabricius, 1793)



b. *Atergatis roseus* (Rüppell, 1830)



c. *Hyastenus hilgendorfi* (De Man, 1887)



d. *Hiplyra sagitta* (Galil, 2009)



e. *Halimedetyche* (Herbst, 1801)



f. *Metaplox indica* (H. Milne Edwards, 1852)



g. *Matuta planipes* (Fabricius, 1798)



h. *Portunus pelagicus* (Linnaeus, 1758)

Fig. 2 a, b, c, d, e, f, g and h: (Left image -dorsal view, right image - ventral view). Crab species collected from the Iraqi coastal waters of the NW Arabian Gulf.

4 Conclusion

The finding of *D. quadridens* (Fabricius, 1793) where the species is widely distributed in the east, west and south of Arabian Gulf, is not surprising in the subtidal zone along of Iraqi coastal waters, NW of Arabian gulf, because this species can easily distributed by a migration to another areas. One more reason, the climate and environmental conditions in the Arabian Gulf waters is similar to that in Iraqi coastal waters. In addition, the present study adds to the brachyuran crabs, one as new species recorded in Iraqi coastal waters.

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