



Report of the Red-Toothed Triggerfish *Odonus niger* (Rüppell, 1836) from the North-East Region of the Arabian Gulf

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Received: 1 August 2022 / Revised: 13 October 2022 / Accepted: 22 October 2022
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Abstract

A new record of the Red-toothed triggerfish *Odonus niger* from the northeast region of the Arabian Gulf is reported. The three specimens of *O. niger* were obtained from a fish market in Khorramshahr City, south of Iran, on 10th December 2021. The sampling done during routine sampling in the northern part of the Arabian Gulf represents a significant contribution to the fish diversity in this part of the world as this species has been reported from the Arabian Gulf from Iraq before but has not been reported in the coastal waters of Iran. Reasons for the presence of this species in its new environments were given and discussed.

Keywords Balistidae · Arabian Gulf · New range extension · Ballast water · Invasion

Introduction

The Red-toothed triggerfish *Odonus niger* (Rüppell 1836) is a marine fish species that live in association with coral reefs and is non-migratory (Riede 2004) at a depth range between 5 and 40 m (Matsuura 2001). Individuals of this species reach a maximum total length of 500 mm (Smith and Heemstra 1986), with a common total length of 300 mm (Hutchins 1984).

This species is found in reef channels or along slopes subjected to strong currents (Kuitert and Tonozuka 2001). Individuals of this species usually form large aggregations in midwater where they feed on zooplankton and sometimes on sponges on coral reefs (Matsuura 2001), while the juveniles use the rubbles or crevices as a shelter (Myers 1991). Females of this species are oviparous (Breder and Rosen 1966). This species has a commercial value when marketed fresh or dried-salted. It is also essential as an aquarium species (Myers 1999).

The Red-toothed triggerfish is distributed in the Indo-Pacific region from the Red Sea and the eastern African

coast extending eastwards through northern Australia to Marquesas and Society Islands and north to Japan (Matsuura 2015). In the north-western region of the Indian Ocean, this species is reported on the northern coasts of the Arabian Sea and the Gulf of Oman (Randall 1995). Despite being common in the Gulf of Oman, it is not reported in the Arabian Gulf (Hutchins 1984; Randall 1995; Eagderi et al. 2019; GBIF 2022; Froese and Pauly 2022) except for the record from Iraq (Jawad et al. 2018).

The present distribution of species on earth is a result of global warming (Parmesan and Yohe 2003; Poloczanska et al. 2016) and such change in the distribution of the species can be a serious issue for the health of both, natural ecosystems and human populations worldwide (Pecl et al. 2017). These fluctuations are frequently larger for marine environments, because of their high environmental connectivity (Burrows et al. 2011) and because of the fundamental role of water temperatures, which powerfully affecting the growth, survival and reproduction in marine animals (Crozier and Hutchings 2014). Actually, even deceptively moderate changes in water temperature might cause a rapid cascade of multiple pressures over marine organisms. Certain species, incapable to manage these environmental modifications, or profiting from them, may change their abundances therefore. Nevertheless, mobile marine organisms, also have another option: they can move to new areas where they were formerly absent (Cheung et al. 2009; Fogarty et al. 2017). These two dynamics are not mutually exclusive, as

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they can be considered as different behavioural and demographic responses that might co-exist in the same species or population.

In the present study, *O. niger* is reported from the marine waters of Iran. This study is essential as it adds a significant range extension for the available zoogeographical information about this species. It is considered a new record for Iranian marine waters and a second for the Arabian Gulf.

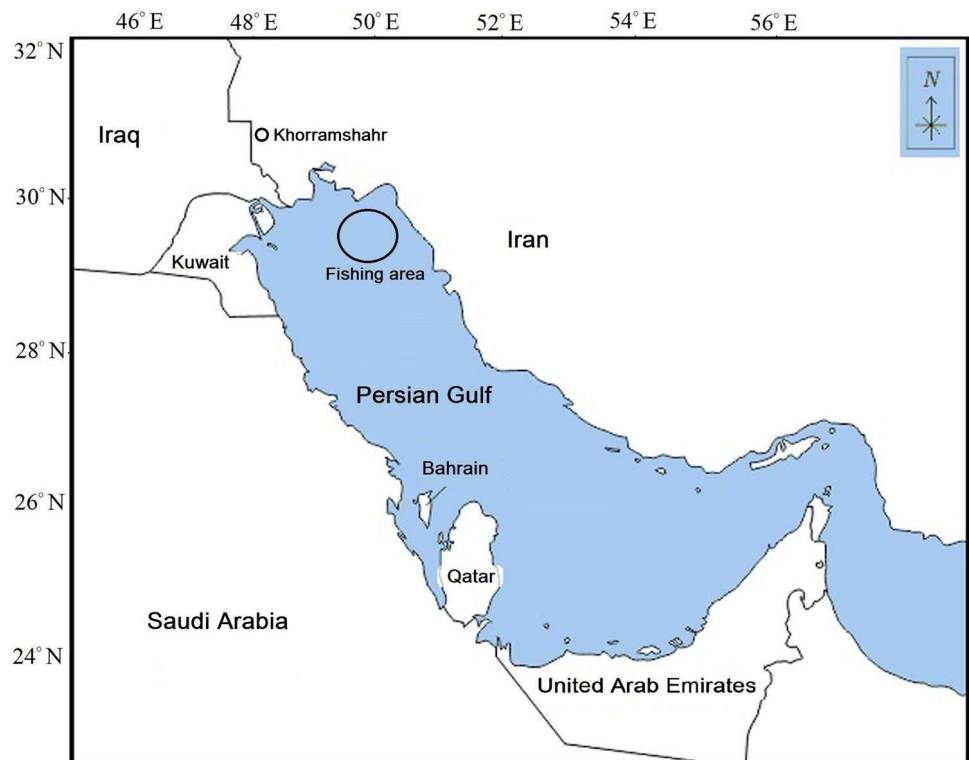
Materials and Methods

Three fish specimens were obtained on 10th December 2021 from a commercial catch offered for sale at Khorramshahr city fish market, Iran. The marine fish species presented in this market are usually originated from the northeast part of the Arabian Gulf, where fish are typically caught by either gill net or small trawlers (Fig. 1). Morphometric and meristic data were recorded following Hubbs and Lagler (1958) and Hutchins (1984) and are shown in Table 1. Total length (TL) was measured from the tip of the snout to the posterior margin of the caudal fin and standard length (SL) measured from the tip of the snout to the base of the caudal fin was used for proportional measurements. The gonads of the fish specimen showed were in final stage of maturity. Fish specimens were fixed in 10% formalin and stored in 70% ethanol. Measurements were made with dial calipers to the nearest 0.1 mm. The specimens were deposited in the fish collection of the Marine Science centre, University of Basrah.

Table 1 *Odonus niger*. Morphometric and meristic characteristics in the Persian Gulf waters of Iran (SD, standard deviation; SL, standard length; TL, total)

Morphometric characters	range	mean	SD
Total length (mm)	343–383	363.7	16.36
Fork length (mm)	253–282	264.0	12.83
Standard length (mm) [SL]	215–243	225.0	12.75
Body depth % in SL	51.4–55.3	53.4	1.58
Body width % in SL	14.2–17.2	16.0	1.29
Head length % in SL	33.7–35.3	34.58	0.66
Head depth % in SL	38.0–41.6	39.9	1.49
Head width % in SL	14.3–15.3	14.9	0.44
Snout length % in SL	26.1–28.8	27.6	1.14
Eye diameter % in SL	4.6–5.1	4.8	0.20
Predorsal length % in SL	33.9–35.7	35.0	0.80
Postdorsal length % in SL	5.4–5.9	5.7	0.22
2 nd Dorsal fin length % in SL	47.3–48.8	47.9	0.68
Anal fin length % in SL	40.5–41.9	41.2	0.60
Pectoral fin length % in SL	11.7–12.7	12.2	0.38
Pelvic fin length % in SL	7.0–7.1	7.1	0.07
Caudal peduncle length % in SL	8.3–9.0	8.5	0.33
Meristic characters			
1 st Dorsal fin spines	3–3		
2 nd Dorsal fin rays	33–34		
Anal fin rays	29–30		
Pectoral fin rays	14–14		
Pelvic fin spines	1–1		

Fig. 1 Map showing sampling locality



Results

The specimens of *O. niger* (Fig. 2) are characterized by the following set of characters. Body deep and laterally compressed, covered with a thick skin composed of rectangular scales. The scales located above the base of the pectoral fin and just behind the operculum are large and form a flexible tympanum. The scales located on the posterior half of the body form a series of longitudinal ridges. A deep furrow runs horizontally and anteriorly from the eye toward the snout. The mouth is supraterminal, with two anteriorly projecting fang-like teeth in the upper jaw which are visible when the mouth is closed (Fig. 3). The dorsal fin has three projecting spines, the first spine can be locked in an erect position by the second. The caudal fin with distinctly concave margin and each fin lobe is prolonged into a long filament. The body and fins are deep brownish blue in color, usually with a darker band from the mouth to the pectoral-fin base. The posterior margin of the caudal fin with a lunar-shaped white bar. The teeth are red.

The specimens were identified as *Odonus niger* based on morphometric and meristic characteristics which are shown in Table 1.

Fig. 2 Specimens of *Odonus niger* 343 – 383 mm total length collected from Khorramshahr city fish market, Iran



Discussion

The specimens of *O. niger* examined in the present study were taken from the fish market of Khorramshahr City, Iran. Asking the fishermen and fish mongers at the fish market revealed that the marine organisms, including fish specimens offered for sale in the fish market, usually originated from the northeastern part of the Arabian Gulf.

The range of the total length of the three specimens of *O. niger* examined in the present study is less than the total length given by Randall (1995) (400 mm) and less than the maximum total length given by Smith and Heemstra (1986). Their size indicates that examined specimens are adults and possibly originated from an established population in the northeastern region of the Arabian Gulf. A comprehensive survey is needed in the studied area to reveal more individuals of this species in order to confirm the presence of an established population.

The other balistid species differ from *O. niger* in having teeth not red, no prominent fang-like teeth in the upper jaw, and different color patterns.

The present study is important from the zoogeographical point of view. It confirms of the presence of *O. niger* in

Fig. 3 Specimen of *Odonus niger* 383 mm TL showing a red fang-like tooth in the upper jaw



the Arabian Gulf's fish fauna. No record of this species has been mentioned in both scientific publications, e.g. Hutchins (1984) and Randall (1995), or websites related to biodiversity (GBIF 2022; Froese and Pauly 2022). This species was also not reported in the recent checklist of the fishes of the Arabian Gulf by Eagderi et al. (2019) but its first record from the Arabian Gulf from Iraq was published by Jawad et al. (2018). The nearest locality where this species was reported from Fujairah, United Arab Emirates coasts on three occasions in 2004, 2015, and 2016. In 2004, specimens were collected by Angela von den Driesch, Henriette Manhart, Angela von den Driesch and Henriette Manhart. The specimens were deposited in Staatssammlung für anthropologie und Paläoanatomie München, Catalogue number SAPM-PI-01860 / 536382 / 219969SAPM-PI-01860 / 536382 / 219969. The 2015 report was an underwater observation made by Josh Saldanha and Fadi Yaghmour, United Arab Emirates. The lack of previous confirmed records of *O. niger* from the Arabian Gulf might be due to three

possibilities: (i) Lack of sampling in the area preventing the regular detection of this species that had been overlooked in the past; (ii) As a result of global climate change, recent natural colonization taking place along the northern coast of the Indian Ocean; (iii) The Arabian Gulf is one of the busiest waterways in the world, and ballast water from ships is a possibility. With three specimens of *O. niger*, it is premature to consider this species has established a sustainable population in its new region. Thus, conservation measures by the Iranian Fisheries authority are needed further investigate this species' biological characteristics to become endangered. The presence of this species in its new locality can be based on the rarity of species assumption which prevented its record in the Arabian Gulf until recently.

Acknowledgements Our sincere thanks are to the Marine Science Centre, University of Basrah, Basrah, Iraq for using the research facility available at the Department of Fisheries and Marine Resources. Also, our thanks should be due to Sergey Bogorodsky, Station of Naturalists, Omsk, Russia for the identification of the fish specimen.

Authors' Contributions MSFZ: Data curation (equal); investigation (equal); resources (equal); validation (supporting); visualization (supporting); writing – review and editing (supporting). AJAF: Data curation (equal); formal analysis (supporting); investigation (supporting); methodology (supporting); project administration (supporting); resources (equal); supervision (supporting); validation (supporting). LAJ: Conceptualization (lead); formal analysis (equal); investigation (lead); methodology (lead); project administration (lead); resources (equal); supervision (lead); validation (lead); visualization (lead); writing – original draft (lead); writing – review and editing (lead).

Funding No funding is used in performing this study.

Availability of Supporting Data There are no supporting data to make available.

Declarations

Ethical Approval and Consent to Participate The fish material was obtained from a commercial catch. Therefore, no ethical approval is needed.

Human and Animal Ethics N/A

Consent for Publication All author of this manuscript agree for publication in *Thalassas: International Journal of Marine Science*.

Competing Interests The authors declare that they have no conflict of interest.

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