

Rapid Communication**Social media reveals the first records of the invasive lionfish *Pterois miles* (Bennett, 1828) and parrotfish *Scarus ghobban* Forsskål, 1775 from Egypt (Mediterranean Sea)**Sara A.A. Al Mabruk¹, Jamila Rizgalla², Ioannis Giovos³ and Michel Bariche^{4,*}¹Zoology Department, Faculty of Science, Omar Al-Mokhtar University, El Bayda, Libya²Department of Aquaculture, Faculty of Agriculture, University of Tripoli, Tripoli, Libya³Sea, Environmental Organization for the Preservation of the Aquatic Ecosystems, Thessaloniki, Greece⁴American University of Beirut, FAS, Department of Biology, Beirut, LebanonAuthor e-mails: sara.almabruk@omu.edu.ly (SA), jamilarizgalla@gmail.com (JR), ioannis.giovos@isea.com.gr (IG), michel.bariche@aub.edu.lb (MB)

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Citation: Al Mabruk SAA, Rizgalla J, Giovos I, Bariche M (2020) Social media reveals the first records of the invasive lionfish *Pterois miles* (Bennett, 1828) and parrotfish *Scarus ghobban* Forsskål, 1775 from Egypt (Mediterranean Sea). *BioInvasions Records* 9(3): 574–579, <https://doi.org/10.3391/bir.2020.9.3.13>

Received: 27 December 2019**Accepted:** 1 April 2020**Published:** 13 May 2020**Handling editor:** Yuriy Kvach**Thematic editor:** April Blakeslee**Copyright:** © Al Mabruk et al.This is an open access article distributed under terms of the Creative Commons Attribution License ([Attribution 4.0 International - CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)).**OPEN ACCESS****Abstract**

The common lionfish *Pterois miles* and the blue-barred parrotfish *Scarus ghobban* are Indo-Pacific marine fishes that have invaded several regions in the Mediterranean Sea. Two *P. miles* individuals and a single *S. ghobban* were caught off the coast of Egypt in 2018. These are first reports on the occurrences of both species in Egyptian waters, resulting in an update of their distribution in the Mediterranean Sea.

Key words: devil firefish, common lionfish, blue-barred parrotfish, invasive species, Lessepsian migration, first record, non-indigenous species

Introduction

Egypt is situated in a strategic position in the north-eastern part of Africa, with the Red Sea to the east and the Mediterranean Sea to the north. It holds the Suez Canal, considered the major pathway of introduction of non-indigenous marine organisms from the Red Sea to the Mediterranean Sea (Katsanevakis et al. 2013). The Mediterranean seashore of Egypt, which extends for more than 1000 km, has been relatively poorly studied and likely contains many non-indigenous species that are yet to be discovered (e.g. Halim and Rizkalla 2011; Abdelsalam and Ramadan 2016; Akel and Karachle 2017; Bos and Ogwang 2018).

The common lionfish *Pterois miles* (Bennett, 1828), known also as the devil firefish, is a species native to the Indo-Pacific biogeographic realm, ranging from the Red Sea to South Africa and eastward to Indonesia (Fricke 1999; Froese and Pauly 2019). Following a single record from 1991, the species seemed to have failed to establish a viable population in the Mediterranean Sea (Golani and Sonin 1992). However, it reappeared two decades later (in 2012) in the region, likely through the arrival of new specimens from the Red Sea (Bariche et al. 2013, 2015, 2017). In the

following years, the common lionfish spread further in the Mediterranean Sea, reaching as far as Tunisia and Sicily within a few years (reviewed in Azzurro et al. (2017) and Al Mabruk and Rizgalla (2019)). However, this species was surprisingly not recorded from Egyptian Mediterranean waters, despite the country's proximity to the Suez Canal and a recent record from Libya (Al Mabruk and Rizgalla 2019).

The blue-barred parrotfish *Scarus ghobban* Forsskål, 1775 is another tropical fish native to the wide Indo-Pacific region, from the Red Sea to southern Japan, Rapa and Ducie islands and southeastern Australia (Froese and Pauly 2019). It is also found in the eastern Pacific (Humann and Deloach 2003). It is believed that the earliest record of the blue-barred parrotfish in the eastern Mediterranean Sea was in 1999, and in the following years its occurrence was confirmed several times (Goren and Aronov 2002; Bariche and Saad 2008). While molecular studies revealed high genetic diversity in the species in the Mediterranean Sea (Bariche and Bernardi 2009; Bariche et al. 2015), relatively modest populations have established in several other parts of the eastern basin (e.g. Ioannou et al. 2010; Turan et al. 2014; Yağlıoğlu and Ayas 2016; Ergüden et al. 2018).

In the present paper, we report the first records for the common lionfish *P. miles* and the blue-barred parrotfish *S. ghobban* from the north-western coastal waters of Egypt (Matrouh Governorate), updating their distribution in the Mediterranean Sea basin.

Results

On 17 August 2018, a post on social media (Facebook® group) mentioned the presence of a lionfish along the Mediterranean coast of Egypt (Matrouh Governorate). It was followed by a thread of comments about the species' origin, its spines and flesh palatability, and its presence along the coast of the Levant. Two group members consecutively posted different photos of individuals caught in two different places in Marsa Matruh earlier in July–August 2018 (Figure 1). The discussion with the spearfishers revealed that one individual was about 40 cm in total length (TL) and was speared at 27 m depth off Cleopatra beach (approx. 31°22'23.1"N; 27°12'12.9"E) and the second individual was about 20 cm TL and was speared at 7 m depth off Ras Alam Al Rum beach (approx. 31°19'14.6"N; 27°21'38.6"E). One post also mentioned that several people have speared lionfishes as well, but no other individuals were documented.

On another occasion, during a private discussion (via Facebook Messenger) with spearfishers, a third member mentioned the capture of another non-indigenous fish, a “blue parrotfish”, and provided some pictures (Figure 2). The individual weighed ca. 4 kg, which was estimated to be around 50 cm in TL based on length-weight relationship available for *S. ghobban* (Froese and Pauly 2019). The specimen was speared at 20 m depth off Mina Hasheesh



Figure 1. The Common Lionfish *Pterois miles* speared in the region of Marsa Matruh (Egypt, eastern Mediterranean Sea) and as shared over social media platform Facebook™ on 17 August 2018. Photographs: Hamdi Alghotani, Fathi Alghatas.



Figure 2. The Blue-barred Parrotfish *Scarus ghobban* speared off Mina Hasheesh Beach (Egypt, eastern Mediterranean Sea) on 22 December 2018. Photographs: Saad Al-Sarhani.

Beach (approx. 31°22'05.1"N; 27°20'34.3"E) on 22 December 2018. In all three cases, the fishes were not preserved, and only pictures are available (Figures 1, 2).

Discussion

The records of the common lionfish and the blue-barred parrotfish confirm the presence of the two species along the Mediterranean coast of Egypt. These update the fish fauna of the country (Akel and Karachle 2017; Guerriero et al. 2017) and the distribution map of the two Indo-Pacific fishes in the invaded environment.

Lionfishes are considered amongst the most successful and remarkable marine invaders in the world (Albins and Hixon 2008). This has been also witnessed in the Mediterranean, where the speed of the propagation of *P. miles* in most parts of the eastern basin and its arrival to the central Mediterranean within a few years (3–5) is significant proof of its invasive potential. Despite the fact that another non-indigenous congeneric, the red lionfish *P. volitans* (Linnaeus, 1758), has also been reported in the Mediterranean (Gürlek et al. 2016; Gökoğlu et al. 2017; Ayas et al. 2018), we assume the species found in Egypt to be *P. miles* since all molecular work based on individuals from the Mediterranean show the presence of the latter species (Bariche et al. 2017; Dimitriou et al. 2019; Stern et al. 2019). Furthermore, the red lionfish is native to the eastern Indian Ocean and the Western Pacific, and thus is less likely to be a Lessepsian immigrant due to its absence from the Red Sea and western Indian Ocean (Froese and Pauly 2019). The exclusive presence of the red lionfish along the coast of Turkey can be explained by a localised population, which assumes an aquarium release, or possible misidentification.

Unlike the common lionfish, the distribution of the blue-barred parrotfish *S. ghobban* is, to date, limited to the easternmost part of the Mediterranean Sea. After the earlier first records in the Levant (Goren and Aronov 2002; Bariche and Saad 2008), it spread relatively slowly northwards. It reached Cyprus, the Mediterranean coast of Turkey and Greece, about 10–15 years later (Ioannou et al. 2010; Turan et al. 2014; Karachle et al. 2016; Yağlıoğlu and Ayas 2016). This is not surprising since most Lessepsian species are known to move northwards, along the Levant coast, upon their arrival into the Mediterranean Sea (Katsanevakis et al. 2013). Given their conspicuous morphological features, the identification based on photographs can be considered relatively easy and accurate for this species.

Social media shows a high potential of detection of non-indigenous species in remote or inaccessible areas. Its use began in the Mediterranean a few years ago and showed a modern and unconventional way for detection (e.g. Azzurro et al. 2013; Bariche and Azzurro 2016; Rizgalla et al. 2016; Giovos et al. 2019), especially for species with unmistakable (clear) morphological features (Rizgalla et al. 2019). The concept of citizen scientist-based projects is increasingly used and may provide information otherwise unattainable (Thiel et al. 2014). One limitation is that there is often an absence of a physical specimen to examine, as is the case of the

present study. Such a limitation is particularly problematic when dealing with cryptic species or species with overlapping morphological or meristic features, requiring molecular or detailed morphological description to resolve.

Acknowledgements

We are indebted to Fathi Alghatas, Hamdi Alghotani and Saad Al-Sarhani for sharing pictures and interesting discussions about exotic marine animals occurring in Egyptian waters. Thanks are also expressed to the reviewers for comments and advice on the improvement of the manuscript.

Funding Declaration

The publication of this work was funded by a University Research Board grant from the American University of Beirut (DDF 103603/23927).

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