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SHORT COMMUNICATION

First record of lionfish (Scorpaenidae: *Pterois*) from Libyan waters

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Abstract

This short communication reports the first occurrence of lionfish (Pisces: *Pterois*) in the eastern Libyan coastal waters from the images of two lionfish specimens posted on the social media network Facebook™. The lionfish were caught on 1 and 4 December 2018, by Libyan recreational longline fishermen and by a professional spearfisherman. The species identification was not possible in this case, but the important role of citizen science and social media in terms of monitoring invasive species is highlighted.

Keywords: *Pterois miles,* invasive, venomous, *Pterois volitans*

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Lionfish (Scorpaenidae) are regarded as notoriously invasive species (Morris *et al.* 2009; Schofield 2009; Johnston and Purkis 2014; Poursanidis 2015) and are considered amongst the most successful marine invaders in the history of aquatic invasions (Albins and Hixon 2008). Currently two species of lionfish *Pterois volitans* (Linnaeus, 1758) and *Pterois miles* (Bennett, 1828) are documented from the Mediterranean Sea, both of which are native to the Indo-Pacific region - *P. miles* is present in waters extending from the Red Sea to Sumatra, while *P. volitans* is principally found in the western Pacific (Schultz 1986; FishBase 2019). The movement of lionfish into the Mediterranean Sea is considered to have most likely occurred via the Suez Canal (Zenetos *et al.* 2012), although their release from aquaria cannot be excluded (Golani *et al.* 2002).

The first report of *P. miles* in the Mediterranean was on the specimens caught in the Israeli waters and subsequently reported by Golani and Sonin (1992). The second report, however, was almost twenty years later when Bariche *et al.* (2013) reported two specimens of *P. miles* caught along the Lebanese coast.

Since those earlier reports, further records of *P. miles* throughout the Mediterranean Sea from Cyprus, Turkey, Greece, Tunisia and Syria followed (Turan *et al.* 2014; Crocetta *et al.* 2015; Iglésias and Frotté 2015; Oray *et al.* 2015; Turan and Öztürk 2015; Dailianis *et al.* 2016; Jimenez *et al.* 2016; Kletou *et al.* 2016; Mytilineou *et al.* 2016; Ali *et al.* 2016; Azzurro *et al.* 2017). While *P. volitans* has been only recorded in the Turkish waters (Gürlek *et al.* 2016; Gökoğlu *et al.* 2017; Ayas *et al*. 2018).

Within the frame of a Libyan-based citizen science project, a recreational fisherman was contacted by the authors through a common interest group. He submitted photographs and a movie of a fish via the Facebook™ messenger on 5 December 2018 with a request for assistance in identifying the specimen that had been caught. The fish was caught on 1 December 2018 by a professional spear-fisherman using a diving air compressor at a depth of 25-27 m in waters close to the port of Wadi AL-Klag in the eastern part of Libya (31°49'02.8"N 25°03'16.0"E; Figure 1; Figure 2A).

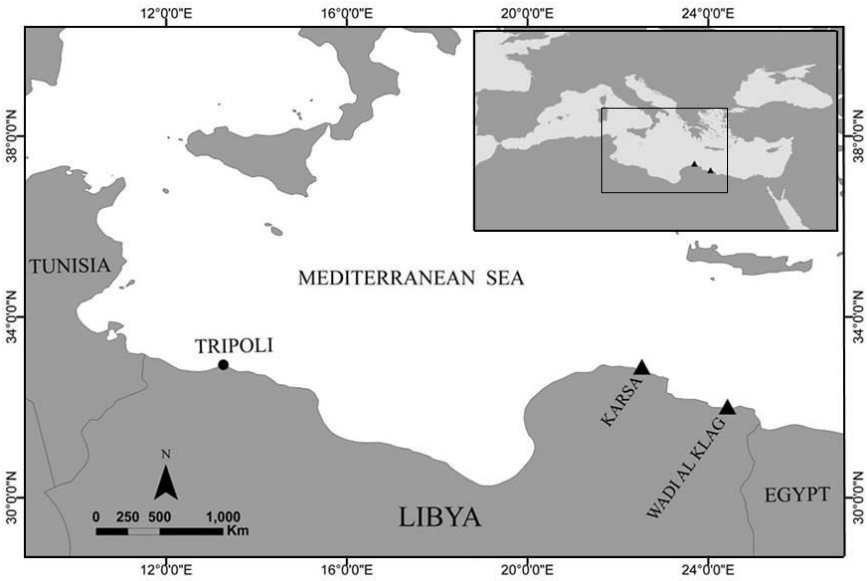

Figure 1. Libyan coastline indicating the two locations (triangles) where the lionfish were landed

In the second report posted on the Facebook™ group on 4 December 2018, a recreational fisherman submitted a photograph of a lionfish caught by longline at a depth of 8 m in the vicinity of Karsa, the eastern part of Libya

(32°51'05.9"N 22°25'52.8"E; Figure 1: Figure 2B). A request to help identify the fish was made with the posting.

Both fish specimens were identified as lionfish, based on the marked external features typical of this genus (Schultz 1986). In both cases, the fish were discarded shortly after the pictures were taken, thus no detailed examination to verify the precise species was possible.

Figure 2. (A) Mobile phone image of a spear fished lionfish, taken aboard a fibreglass boat operating off the port of Wadi Al Klag. **(B)** Image of a lionfish caught near Karsa using a longline and subsequently posted on Facebook™. Picture credits: (A) Mohamed Bubaker; (B) Mohamed Alhasi.

While some fish with distinctive morphological features can be identified directly from images (Dailianis *et al.* 2016; Vella *et al.* 2016), the similarity between lionfish species is such that meristic and morphometric measurements are required (Schultz 1986; Bariche *et al.* 2013). In cases where there is still reasonable doubt then molecular methods can be used to confirm identity. Unfortunately, as the specimens were not retained, there was no opportunity to confirm the identity of either fish.

Of the two species of lionfish documented from the Mediterranean Sea, *P. miles* appears to be the more successful with a wider recorded distribution (Turan *et al.* 2014; Turan and Öztürk 2015; Crocetta *et al.* 2015; Jimenez *et al.* 2016; Ali *et al.* 2016; Dailianis *et al.* 2016; Azzurro *et al.* 2017). The worldwide

colonising success of *P. miles* is facilitated, it is believed, by having only a few predators e.g. *Epinephelus marginatus* (Lowe, 1834) (see Schofield 2009; Turan *et al.* 2017), by its predatory feeding habits (Schofield 2009; Dailianis *et al.* 2016), and by low catch figures by fishermen who are deterred by its armament of spines which deliver a painful toxin.

Mediterranean currents may have facilitated the spread of lionfish populations from the northern part of the Mediterranean basin (Manousis and Galinou-Mitsoudi 2014), for example those found around the island of Crete (Dailianis *et al.* 2016), to the south including the coastal waters of Libya.

The present report highlights the importance of social media and citizen science-based projects in the early detection and monitoring of invasive species (Kletou *et al.* 2016; Özbek *et al.* 2017; Rizgalla *et al.* 2019). While the present study records the eastern spread of the lionfish via reports posted on social media, samples are required to confirm the precise identity of the lionfish in question. Given the fast nature of lionfish colonisation (Schofield *et al.* 2015; Kletou *et al.* 2016), monitoring its invasive status and further movement to the western region of the Mediterranean is warranted.

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