

**SHORT COMMUNICATION**

**The alien lionfish, *Pterois miles* (Bennett, 1828), enters the Adriatic Sea, Central Mediterranean Sea**

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**Abstract**

The lionfish *Pterois miles* (Bennett, 1828), is considered one of the most dangerous invasive species for the Mediterranean biome. Since its first sighting back in 1991, the species spread widely along the Levantine Basin, in the central Mediterranean, along the North African coasts (from Egypt to Tunisia) and in Sicily. This paper reports the first sightings of the lionfish from the Adriatic Sea, in the coasts of Puglia and Albania, observed during July 2019 and August 2020.

**Keywords:** *Pterois miles*, northward dispersal, Puglia, Albania, Adriatic Sea, Mediterranean Sea

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*Pterois miles* (Bennett, 1828) is considered one of the most dangerous invasive species for the Mediterranean biome; this species is, in fact, endowed with great voracity and high reproductive rate, which characteristics make it one of the greatest dangers for Mediterranean species (Albins and Hixon 2008; Kletou *et al.* 2016). Since its first sighting in the Mediterranean Sea in 1991 (Golani and Sonin 1992), it has already spread along the Levantine coasts and then moved further north from the Turkish coasts towards the Aegean Sea (Dimitriadis *et al.* 2020 and the references therein).

As illustrated well by Dimitriadis *et al.* (2020) and Huseyinoglu *et al.* (2021), after its first appearance, *P. miles* has been frequently reported in the eastern and central Mediterranean, in the waters of the large Mediterranean islands (Cyprus, Rhodes, Crete and Sicily), in many Greek islands of the Aegean and Ionian, and in the coasts of North Africa (Egypt, Libya and Tunisia).

Previously, Dimitriadis *et al.* (2020) indicated the northernmost limit of lionfish presence in the Mediterranean Sea is the Greek island of Corfu, in the upper eastern Ionian Sea. With the observations described in this paper, the northernmost limit of lionfish expansion has been moved further north.

During a study on the surface layer of the *Posidonia* beds in July 2019, the presence of two individuals were documented in the waters of the southern Apulian coast, near Santa Cesarea Terme (Lecce) and along the Albanian coast near the beach of Dhermi (Figure 1, Table 1). Both of these sightings were made during snorkeling on rocky bottoms with large boulders covered with a rich algal vegetation in shallow waters (3 - 4 m). The lionfish specimens observed in Puglia were photographed on 20 July and in Albania on 28 July (Figure 2). The surface temperature of the water was measured using the internal thermometer of a dive computer.



**Figure 1.** Map of the Adriatic Sea showing the locations (★) where the sightings of *Pterois miles* (Bennett, 1828) were reported in this study.

The following year, on 9 August 2020, a new sighting of a lionfish (Figure 2) was documented in the Apulian coast in Torre Canne near Fasano (Brindisi) about 90 km north of the sighting of 2019. The specimen was observed again during snorkeling and the lionfish swam quietly on a mixed seabed of rocks, with good algal cover and coarse sands near a *Posidonia* bed.

This new sighting shifts the northern limit of the species distribution by more than 140 km compared to Dimitriadis *et al.* (2020).

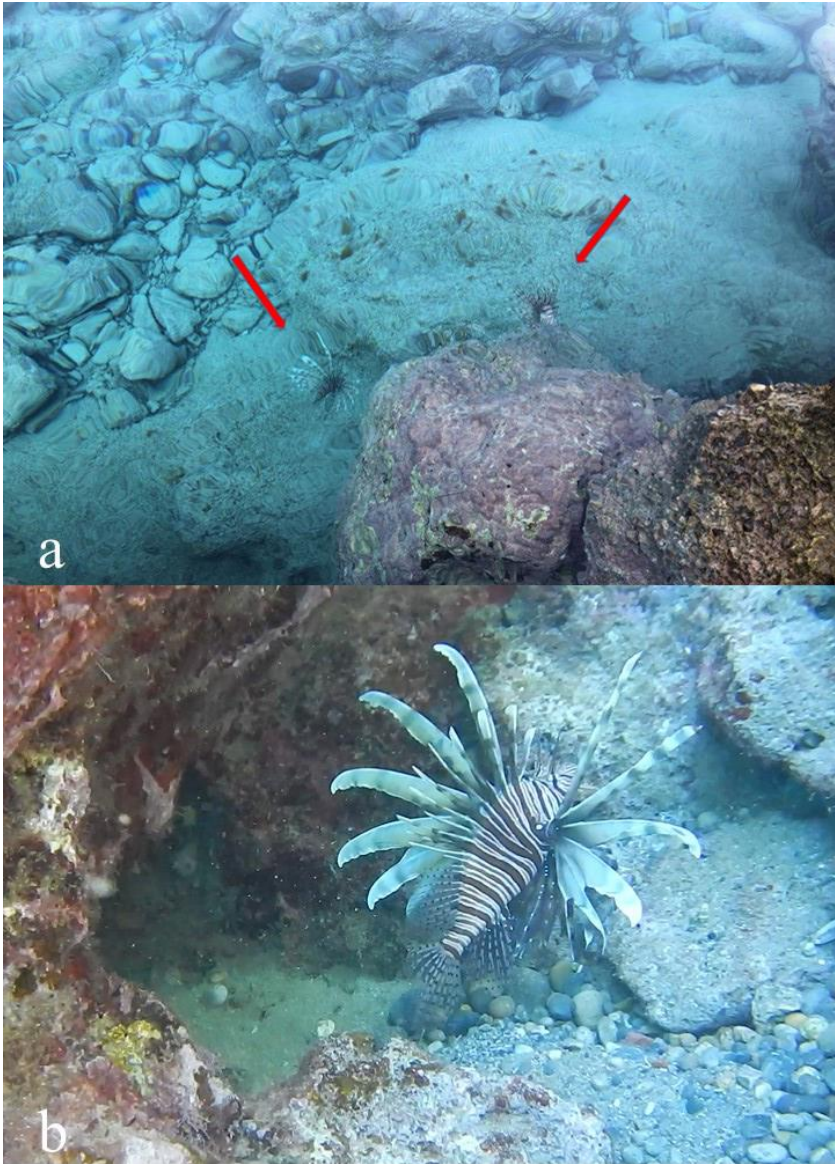
**Table 1.** Information about the sightings of *Pterois miles* reported in this study

Year	Date	Location	Geographic coordinates	Sea surface temperature	Seabed
2019	20 July	Santa Cesarea Terme – Lecce; Italy	N 40.034427° E 18.458041°	27 °C	Rocky
2019	28 July	Dhermi beach; Albania	N 40.133393° E 19.646980°	26 °C	Rocky
2020	9 August	Torre Canne – Fasano – Brindisi; Italy	N 40.851147° E 17.452765°	28 °C	Rocky / sandy

All these sightings are apparently in disagreement with what was predicted in various predictive models based solely on ecological models developed to hypothesize the dispersion trend of *P. miles* in the Mediterranean (D’Amen and Azzurro 2020).

On the other hand, it is now clear that the Ionian Sea represents a bridge for the diffusion of Lessepsian species between the Levantine basin and the western Mediterranean (Katsanevakis *et al.* 2013; Spinos *et al.* 2016). Some predictive models had, however, hypothesized that *P. miles* would not enter in the Adriatic Sea and therefore would not start its dispersion into the Adriatic (D’Amen and Azzurro 2020; Turan 2020). However, from the recent hypothesis by Dimitriadis *et al.* (2020) and from the data reported in this paper, it is clear that *P. miles* is a species capable of resisting temperatures much lower than previously assumed (Whitfield *et al.* 2014; for the co-genus *P. volitans*).

A small number of lionfish observations reported in the present study do not allow to elaborate a credible predictive model in order to formulate fleeting hypotheses about the spread of this species in the Adriatic Sea (C. Turan pers. comm.) but a citizen science campaign is currently underway which involves local diving enthusiasts and it will be possible, in the near future, to provide more solid data to disapprove or support our finding.



**Figure 2.** a) Two lionfish individuals observed in Santa Cesarea Terme on 20 July 2019;  
b) the specimen observed in Torre Canne – Fasano on 9 August 2020

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