

Note

# First record of immature silver-cheeked toadfish *Lagocephalus scleratus* (Gmelin, 1789) on Eastern Tunisian coasts (Central Mediterranean)

Olfa BEN ABDALLAH\* , Nader BEN HADJ HAMIDA , Mohamed Ali LABNI  & Majd Abdeljalil KALAMOUN 

University of Carthage. Institut National des Sciences et Technologies de la Mer, Tunisia

\*Correspondence: [olfa.benabdallah@instm.rnrt.tn](mailto:olfa.benabdallah@instm.rnrt.tn)

Received: 09/10/2024; Accepted: 16/12/2024; Published: 31/12/2024

**Abstract:** The silver-cheeked toadfish *Lagocephalus scleratus* (Gmelin, 1789) has been present in Tunisian waters for around ten years. It was recorded in Mahdia in 2012. The species, although caught accidentally and in low abundance, seems to generate negative interactions with small-scale fishing gear, mainly nets and lines, giving rise to reasonable concerns and complaints.

This note reports the identification of a nursery area of *L. scleratus* along the Tunisian coasts.

**Keywords:** *Lagocephalus scleratus*; juveniles; nursery area; Eastern Tunisia; Central Mediterranean.

## 1. Introduction

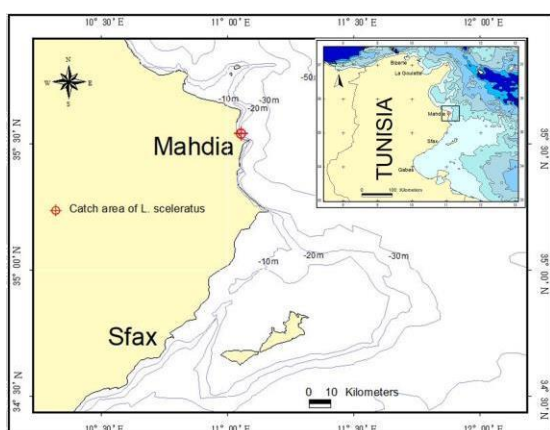
The puffer fish species (Tetraodontidae) are distributed in tropical and subtropical coastal waters around the world, and nine species exist in the Mediterranean Sea, as documented by several authors (Golani et al. 2002; Akyol et al., 2005; Corsini et al., 2005; Golani et al., 2006). In Tunisia, five species have been recorded: *Lagocephalus scleratus* (Gmelin, 1789), which is the focus of this paper; *Ephippion guttiferum* (Bennett, 1831 (Hachaichi 1981); *Lagocephalus lagocephalus* (Linnaeus, 1758) (Bradai et al., 2004); *Lagocephalus spadiceus* (Richardson, 1844), and *Sphoeroides pachygaster* (Muller and Troschel, 1848 (Bradai et al., 1993).

The silver-cheeked toadfish *L. scleratus* (Gmelin, 1789) was recorded for the first time in Tunisian waters, in the Gulf of Gabès in 2012 (Jribi and Bradai, 2012). Then, the species was observed in several localities along Tunisian coasts. However, all observations were made on singular, mature individuals. In this paper we present the first occurrence of immature individuals in the Tunisian waters.

## 2. Materials and Methods

During the last week of September 2024, a recreational fisher posted a video on social networks showing the capture of 8 small specimens of *Lagocephalus sp.* in the region of Mahdia (Tunisia's eastern fishing

zone, figure 1). The fisherman was contacted to obtain all the necessary information and to recover the captured individuals (figure 2). Regular monitoring of the species' captures was thus carried out. Captured individuals are collected. Once recovered, *Lagocephalus* sp. specimens are transported to the laboratory (figure 3) where they were identified and biometric measurements (LT, LS) and weight were recorded, respectively, to within 0.1 cm and 0.1 g. When possible, sex was determined. All specimens collected showed a regular pattern of equally sized spots along the dorsal region, the absence of spiny rays in the dorsal and anal fins, the presence of small spinules on the belly and dorsal surface extending to the base of the dorsal fin, and a pectoral fin base with the upper edge positioned below the lower edge of the eye. Other distinctive features, including a broad, prominent silver stripe along the lower flanks, a silver patch in front of the eyes, a dark pectoral fin base and a white belly enabled the collected individuals to be all conclusively identified as *Lagocephalus sceleratus*.



**Figure 1.** Geographical position of the Catch area of *L. sceleratus* in Tunisian waters

The specimens caught showed an upward trend, and the largest catch consisted of around fifty individuals (dated 3<sup>rd</sup> October 2024).



**Figure 2.** Individuals of *L. sceleratus* caught on 27th September 2024

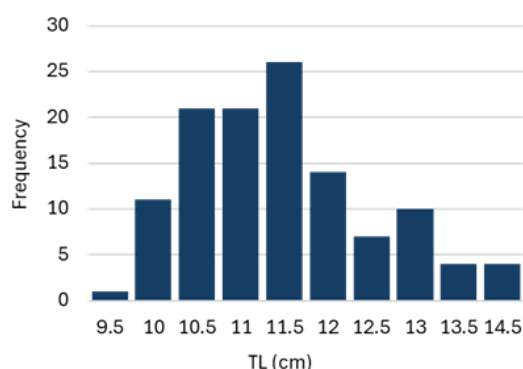


**Figure 3.** *Lagocephalus sceleratus*' sample (1<sup>st</sup> October 2024)

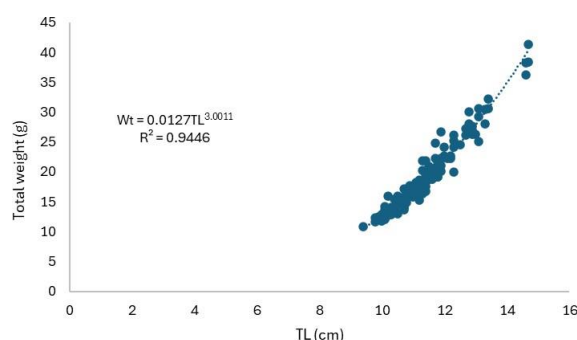
It should be noted that the specimens were caught using hook-and-line fishing with bait generally made up of picarels, sardines or other species of no commercial interest. The fishing area is spatially limited, the bottom is sandy, and the depth is around 14 m. The first sighting of this species in the Mahdia region dates back to June 2012, when a single mature individual was caught (Ben Souissi et al, 2014).

### 3. Results and discussion

During the period from 25/09/2024 to 04/10/2024, more than a hundred immature juveniles were caught, with a total length of between 9.4 and 13.3 cm (figure 4) with an average of  $11.5 \text{ cm} \pm 0.19$ , or a weight of between 10.8 and 41.1 g with an average of  $19.8 \pm 1.08$ ). The collected individuals exhibited an isometric relationship between length and weight (figure 5).



**Figure 4.** Length frequencies distribution of *L. scleratus* caught in Mahdia



**Figure 5.** Length-weight relationship of *L. scleratus* caught in Mahdia

In the Mediterranean, scientific studies have shown that the breeding season is between spring and summer and spawning generally takes place between late spring and mid-summer (Ali et al., 2015; Kara et al., 2015; Roussou et al., 2014; Kalogirou, 2013). This seems the same season for Mahdia area which explains the presence of juveniles in the Mahdia area during this period. The species matures at a minimum size of 32.5 cm total length. The estimated size of first sexual maturity in different localities in the Mediterranean varies between 32.5 cm and 48.8 cm (Ali et al., 2015; Kara et al., 2015; Roussou et al., 2014; Kalogirou, 2013); indicating that the individuals caught in Mahdia are immature.

Sandy bottoms have proved preferable for juveniles of this species (and this is already the case in the fishing area where immature individuals were caught in Mahdia), while adults are more common in *Posidonia oceanica* meadows (Nader et al., 2012; Kalogirou 2013; Dulčić & Dragičević, 2014). Thus, in the fishing area

with its sandy bottom, only juveniles were observed as the capture of individuals did not align with the spawning season.

#### 4. Conclusion

*L. scleratus* is considered one of the Mediterranean's "worst" biological invaders (Streftaris and Zenetos 2006), a devastator to fisheries and a threat to native biodiversity and human health (Ben Souissi et al., 2014; Kalogirou 2013). The Silver-cheeked toadfish can be lethally toxic when consumed due to its tetrodotoxin content (Arakawa et al. 2010), which has paralyzing effects on both the nervous and respiratory systems.

The presence of a significant number of juvenile individuals in Tunisian waters bears witness to the expansion of the species' invasion and represents evidence of the first stage of its establishment in the area. Particular attention needs to be paid, and regular monitoring must be established to act in time and mitigate this invasion. However, the public must be informed and warned not to eat it. In addition, fishermen need to be warned not to throw back into the sea any individuals caught, not to cut them up into pieces, and not to sell it in fish markets.

#### Acknowledgments

We wish to express our sincere gratitude to the recreational fisherman Lotfi DHRAIEF from Mahdia for providing as with biological materials as well as related information.

#### References

1. Ali A., El- Ganainy AA., Ahmed AI., & Ahmed MI. (2015). Reproductive biology of *Lagocephalus sceleratus* in Mediterranean and Red Seas, Egypt. *Egyptian Journal of Aquatic Biology and Fisheries*, 19 (4), 103- 114. <http://dx.doi.org/10.21608/ejabf.2015.2280>.
2. Akyol O., Ünal V., Ceyhan T., & Bilecenoglu M. (2005). First confirmed record of *Lagocephalus sceleratus*

- (Gmelin, 1789) in the Mediterranean Sea. *Journal of Fish Biology* 66 (4), 1183-1186.  
<http://dx.doi.org/10.1111/j.0022-1112.2005.00667.x>
3. Arakawa, O., Hwang, D.-F., Taniyama, S., & Takatani, T. (2010). Toxins of Pufferfish That Cause Human Intoxications. *Coastal Environmental and Ecosystem Issues of the East China Sea*, 227-244.
  4. Ben Souissi J., Rifi M., Ghanem R., Ghazzi L., Boughedir W. & Azzurro E. (2014). *Lagocephalus sceleratus* (Gmelin, 1789) expands through the African coasts towards the Western Mediterranean Sea: A call for awareness. *Management of Biological Invasions*, 5(4), 357-362.  
<http://dx.doi.org/10.3391/mbi.2014.5.4.06>
  5. Bradai M.N., Quignard J.P., Bouain A., Jarboui O., Ouannes-Ghorbel A., Ben Abdallah L., Zaouali J., & Ben Salem S. (2004). Ichtyofaune autochtone et exotique des côtes Tunisiennes : Recensement et biogéographique. *Cybiu* 28(4), 315-328.  
<https://doi.org/10.26028/cybiu/2004-284-003>
  6. Bradai M.N., Ghorbel M., & Bouain A., (1993). Premières observations dans le golfe de Gabès (Tunisie) de *Sphoeroides cutaneus* (Tetraodontidae). *Cybiu* 17(1), 86.  
<https://doi.org/10.26028/cybiu/1993-171-014>
  7. Corsini M., Margies P., Kondilatos G. & Economidis P.S. (2006). Three new exotic fish records from the SE Aegean Greek waters. *Scientia Marina*. 70(2), 319-323.  
<https://doi.org/10.3989/scimar.2006.70n2319>
  8. Dulčić J., & Dragičević B. (2014). Occurrence of Lessepsian migrant *Lagocephalus sceleratus* (Tetraodontidae) in the Adriatic Sea. *Cybiu*, 38(3), 238-240.
  9. Golani D., Orsi-Relini L., Massutí E., & Quignard J.P. (2002). CIESM Atlas of exotic species in the Mediterranean. CIESM Publishers, Monaco.
  10. Golani D., Öztürk B., & Başusta N. (2006). Fishes of the eastern Mediterranean. Turkish Marine Research Foundation, Istanbul, Turkey.
  11. Hachaichi M. (1981). Première capture d'*Ephippion guttiferum* (Bennett, 1831) (Pisces, tetraodontidae) dans les eaux Tunisiennes. *Bulletin de l'INSTOP*.  
<https://n2t.net/ark:/68747/INSTM.Bulletin.v8.1117>
  12. Jribi I., & Bradai M.N. (2012). First record of the Lessepsian migrant species *Lagocephalus sceleratus* (Gmelin, 1789) (Actinopterygii: Tetraodontidae) in the Central Mediterranean. *Bioinvasions Records* 1 (1), 49-52
  13. Kalougiro S. (2013). Ecological characteristics of the invasive pufferfish *Lagocephalus sceleratus* (Gmelin, 1789) in Rhodes, Eastern Mediterranean Sea. A case study. *Mediterranean Marine Science*, 14 (2), 251-260.
  14. Kara M.H., Ben Lamine E., & Francour P. (2015). Range expansion of an invasive pufferfish, *Lagocephalus sceleratus* (Actinopterygii: Tetraodontiformes: Tetraodontidae), to the south-western Mediterranean. *Acta Ichthyologica e Piscatoria*, 45 (1), 103-108.
  15. Nader M., Indary S., & Boustany L. (2012). FAO EastMed. The Puffer Fish *Lagocephalus sceleratus* (Gmelin, 1789) in the Eastern Mediterranean. GCP/INT/041/EC – GRE – ITA/TD-10. Athens, 39 pp.
  16. Rousou M., Ganas K., Kletou D., Loucaides A., & Tsinganis M. (2014). Maturity of the pufferfish *Lagocephalus sceleratus* in the southeastern Mediterranean Sea.

- Environmental Science*, 1, 35-44.  
<http://dx.doi.org/10.3354/sedao00005>
17. Streftaris N., Zenetos A. (2006). Alien Marine Species in the Mediterranean - The 100 'Worst Invasives' and their Impact. *Mediterranean Marine Science*, 7(1), 87-118.



© By the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).