



- **SHORT COMMUNICATION** -

**New record of diamondback puffer *Lagocephalus guentheri* Miranda Ribeiro, 1915
from the North-Eastern Mediterranean, Turkey**

Deniz Ergüden^{1*}, Ferhat Kabaklı¹, Ali Uyan¹, Servet Ahmet Dođdu¹, Serpil Karan¹, Mevlut Gurlek¹, Cemal Turan¹

¹Department of Marine Sciences, Faculty of Marine Sciences and Technology, Iskenderun Technical University, 31220 Iskenderun, Hatay, Turkey

Abstract

One specimen of the diamondback puffer fish, *Lagocephalus guentheri* (33.7 cm, TL) was caught by a commercial trammel net at a depth of 37 m on 12 May 2017 from the Arsuz coast, Turkey. The present paper is the first report of *L. guentheri* from the eastern Mediterranean coast of Turkey. Morphometric and meristics characters of our specimens are given and some remarks about the geographical distribution of the species in the all around the Mediterranean is presented. Although *L. guentheri* is recorded in the Mediterranean Sea and have been reported from the North-eastern Aegean waters of Turkey. The present study, *L. guentheri* was recorded for the first time from the northeastern Mediterranean, Turkey (Iskenderun Bay). The present of this species in the Mediterranean is probably due to migration from the Red Sea via the Suez Canal.

Keywords:

First record, Diamondback puffer, Iskenderun Bay, Turkey waters

Article history:

Received 26 July 2017, Accepted 24 October 2017, Available online 19 December 2017

Introduction

The family Tetraodontidae is represented in the Mediterranean Sea by five genera and ten species (Tortonese, 1986; Vacchi et al., 2007; Mastsuura et al., 2011; Farrag et al., 2016): *Ephippion guttiferum* (Bennett, 1831), *Lagocephalus guentheri* Miranda Ribeiro, 1915, *Lagocephalus*

* Corresponding Author: Deniz Ergüden, e-mail: deniz.erguden@iste.edu.tr

lagocephalus lagocephalus (Linnaeus, 1758), *Lagocephalus spadiceus* (Richardson, 1844), *Lagocephalus suezensis* Clark and Gohar, 1953, *Lagocephalus sceleratus* (Gmelin, 1789), *Sphoeroides marmoratus* (Lowe, 1838), *Sphoeroides pachygaster* (Müller & Tronchel, 1848), *Torquigener filavimaculosus* Hardy & Randall, 1983 and *Tylerius spinosissimus* (Regan, 1908). Of these ten, only *E. guttiferum*, *L. lagocephalus*, *S. marmoratus* and *S. pachygaster* were not Lessepsian migrants (Erguden et al., 2011; Erguden et al., 2017).

The diamondback puffer, *Lagocephalus guentheri* is found from the Indo West Pasific to the Red Sea and Southwest Atlantic. This species usually occur in shallow waters (Froese & Pauly, 2017).

In 2015, the first report of *L. guentheri* from the Mediterranean Sea was reported from Egypt waters (Farrag et al., 2016) and then the presence of the species in Turkey was confirmed with a single record from Çandarlı Bay, İzmir in the northern Aegean Sea (Akyol & Aydın, 2016).

To date several alien puffer fish species that have penetrated the Mediterranean Sea via the Suez Canal and Straits of Gibraltar (Bilecenoglu, 2003; Akyol et al., 2005; Turan et al., 2010; Erguden et al., 2011; Turan & Yaglioglu, 2011). These alien species rapidly dispersed throughout the Mediterranean Sea (Ragonese et al., 1997; Quignard & Tomasini, 2000) and it is presently considered as frequent in the western basin and in large areas of the eastern basin (Golani et al., 2002; Turan et al., 2010). The increase in water temperature has been considered as the main reason for the increasing introductions of alien fish species in the Mediterranean Sea (Ben Rais Lasram et al., 2010, Golani, 2010, Turan et al., 2016).

Although *L. guentheri* is recorded in the Mediterranean Sea and have been reported from the North-eastern Aegean waters of Turkey, in the present study, *L. guentheri* was recorded for the first time from the northeastern Mediterranean coast of Turkey (Iskenderun Bay).

Material and Methods

On 12 May 2017, one specimen diamondback puffer, *L. guentheri* was captured from Arsuz coast (Iskenderun Bay, northeastern Mediterranean Sea) (Figure 1). The specimens were obtained by a commercial trammel net at a depth of 37 m on sandy and rocky bottoms. This specimen preserved in 4% formalin and were deposited in the Museum of the Faculty of Marine Sciences and Technology, Iskenderun Technical University, (MSM-PIS/2017-1) (Figure 2). All morphometric measurements were measured to the nearest 0.01 mm using digital calipers. All counts and measurements, and the morphological description and colour of the diamondback puffer agree with descriptions Matsuura et al. (2011), Farrag et al. (2016) and Akyol et al. (2016). Sex was determined by macroscopic examination of the gonad.



Figure 1. The female specimen of *Lagocephalus guentheri* from Iskenderun Bay (Arsuz coast), Turkey (Photo: D. Erguden)

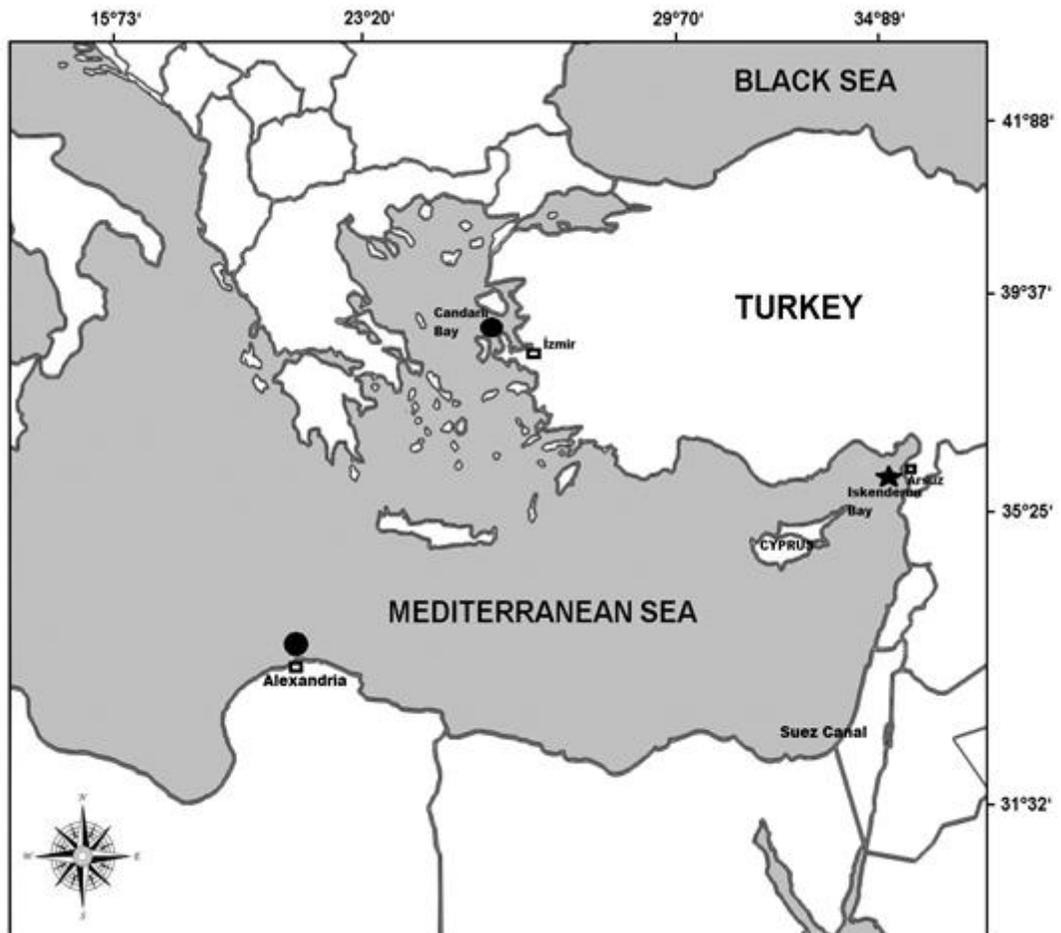


Figure 2. Map showing capture sites of (black dots indicate the previous report and black star indicates the present record) *Lagocephalus guentheri* in the Mediterranean Sea

Results

The distinguishing meristic and morphometric characteristics of the specimen are given and compared with other previous records in Table 1. The specimen is a mature fish measuring in total length 33.7 cm and 565.8 g in weight. The Mediterranean specimen of *L. guentheri* is described as follows: Body is relatively elongate, broad, head; two lateral lines with no spots. Eyes are large rounded with an orbital edge at lower part. Head and belly with trough spinules extending posteriorly to the lower jaw and slightly to before the anus. Spinules on the back forming a rhomboidal patch and spinule patch that extends posteriorly to the region dorsal to the posterior part of the pectoral fin and also the middle part of the caudal fin slightly produced posteriorly.

In fresh specimen, the colour is yellow-brownish or dark green yellowish with dark bands over the back, the first band between the eyes, the second above the gill opening, the third above the posterior part of the pectoral fin, the fourth encircling the dorsal fin base. The dorsal fin dusky, pectoral and anal fins pale, the caudal fin is lunate and dark brown with white dorsal and ventral tips.

Discussion

To date four species of the genus *Lagocephalus* are known from the Red Sea. *L. guentheri* is closely related to *L. spadiceus* and *L. gloveri*. According to Matsuura et al. (2011) *L. guentheri* is similar to *L. spadiceus* in the shape of the caudal fin and another similar species of *L. gloveri* in the colour of the pectoral fin.

Matsuura et al. (2011) reported these three species are only distinguished from each other by their shape of caudal fin and colour of caudal fin and pectoral fin. The caudal fin in *L. spadiceus* has a slightly lunate whereas the caudal fin in *L. guentheri* has a slight posterior extension medially that makes the fin appear to be doubly emarginate. Besides, differs caudal coloration in *L. guentheri*; the caudal fin is dark brown or almost black excepting the dorsal and ventral white tips, but in *L. spadiceus*; the dorsal two-thirds of the caudal fin are dark yellow and the ventral one-third is white. However, *L. guentheri* is similar to *L. gloveri* in the colour of the pectoral fin. The pectoral fin of the former is pale in *L. guentheri* whereas the colour of pectoral fin is dusky in *L. gloveri*.

Table 1. Measurements and counts of *Lagocephalus guentheri* compared with previous records caught from Candarli Bay, Aegean Sea (Akyol & Aydın, 2016) and the Red Sea (Matsuura et al., 2011). Morphometric measurements as proportions are given in parentheses

Metric (cm)	This study n=1	Akyol & Aydın (2016) n=1	Matsuura et al. (2011) n=1 (n=4)
Total length (TL)	33.7	13.4 (117.5% SL)	-
Standard length (SL)	28.9	11.4	17.5(11.7-18.3)
Head length (HL)	7.9 (27.3% SL)	3.3 (28.9% SL)	34.5% SL (30.5–32.6% SL)
Snout length	1.7 (21.5% HL)	-	17.1% SL (15.4–16.6% SL)

Maximum body depth	8.4 (29.0% SL)	3.5 (30.7% SL)	-
Pre-dorsal fin length	17.7 (61.2%SL)	7.1 (62.3% SL)	-
Pre-pectoral fin length	8.9 (30.8%SL)	3.6 (31.6% SL)	-
Pre-anal fin length	17.6 (60.9% SL)	7.3 (64.0% SL)	-
Eye diameter	1.8 (22.8% HL)	1.0 (30.3% HL)	9.3% SL (8.1–9.5% SL)
Interorbital distance	4.2 (53.2% HL)	-	11.5% SL (10.8–13.5% SL)
Pre-orbital length	4.1 (51.9% SL)	1.4 (42.4% HL)	-
Post-orbital length	5.8 (73.4% HL)	-	-
Longest dorsal-fin ray	4.5 (15.6% SL)	-	19.0% SL (16.1–19.3% SL)
Longest anal-fin ray	3.9 (13.5% SL)	-	17.3% SL (16.5–19.0% SL)
Longest pectoral-fin ray	4.1 (14.2% SL)	-	15.6% SL (16.8–18.5% SL)
Depth of caudal peduncle	1.9 (6.6% SL)	-	5.7% SL (5.4–6.2% SL)
Meristic			
Dorsal fin ray	13	12	14 (12-13)
Anal fin ray	11	11	12 (11)
Pectoral fin ray	19	16	19 (16-17)
Caudal fin ray	17	-	-
Weight	565.78	34.0	-

Although, description of Matsuura et al. (2011) indicates clear differences between *L. guentheri* and *L. spadiceus*, and *L. guentheri* in this study first confirmed record from eastern Mediterranean, Turkey with this report, the number of *Lagocephalus* species in the Mediterranean Sea reach to five. However, according to Matsuura et al. (2011) previous records of *L. spadiceus* in the Red Sea and Mediterranean Sea are probably misidentification and need to be again reconfirmed. Thus, further morphologic and genetic studies are needed to confirm whether *L. spadiceus* occurs in the Mediterranean.

This study also reports the longest maximum total length of *L. guentheri* or entire Mediterranean Sea. Randall (1995) reported that maximum total length of *L. guentheri* for males/unsexed as 26.0 cm in Mediterranean. The present study showed that the maximum total length for females as 33.7 cm (Table 1). However, this study is the first report on maximum length for *L. guentheri* for females in Mediterranean coast of Turkey.

Consequently, monitoring of coastal habitats and biodiversity is increasingly contributing to the discovery of new alien fish species in the Mediterranean. The present records indicate an eastward migration of *Lagocephalus* species in the Mediterranean Sea coast of Turkey.

References

- 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, 1183-1186.
- Akyol, O. & Aydın, İ. (2016). A new record of *Lagocephalus guentheri* (Tetraodontiformes: Tetraodontidae) from the north-eastern Aegean Sea, *Zoology in the Middle East*, 62(3), 271-273.
- Ben Rais Lasram, F., Guilhaumon, F., Albouy, C., Somot S., Thuiller, W., & Mouillot, D. (2010). The Mediterranean Sea as a 'cul-de-sac' for endemic fishes facing climate change. *Global Change Biology*, 16 (12), 3233-3245.
- Bilecenoglu, M. (2003). Kizildeniz göçmeni balon baligi (*Torquigener flavimaculosus* Hardy and Randall, 1983), Türkiye kıyılarından ilk gözlemler. *Sualti Dunyasi Dergisi*, 74, 38-39 (in Turkish).
- Erguden, D., Yaglioglu, D., Gurlek, M., & Turan, C. (2011). Geographical distribution and spreading of blunthead puffer *Sphoeroides pachygaster* (Müller & Troschel, 1848) in the Mediterranean Sea. *New Mediterranean Biodiversity Records* (December, 2011), *Mediterranean Marine Science*, 12(2), 491-508.
- Erguden, D., Gürlek, M., & Turan, C. (2017). First occurrence of the oceanic puffer *Lagocephalus lagocephalus* Linnaeus 1758 in Iskenderun Bay North eastern Mediterranean Turkey. *Journal of Applied Ichthyology*, 33(3), 801-803.
- Farrag, M.M.S., El-Haweet, A.K., Akel, E.H.Kh., & Moustafa, M.A. (2016). Occurrence of puffer fishes (Tetraodontidae) in the eastern Mediterranean, Egyptian coast – filling in the gap. *BioInvasions Records*, 5, 47–54.
- Froese, R. & Pauly, D. (Eds.) (2017). FishBase. World Wide Web electronic publication. www.fishbase.org, version (02/2017).
- Golani, D., Orsi-Relini L., Massuti, E., & Quignard, J.P. (2002). *CIESM Atlas of Exotic Species in the Mediterranean*. Vol. 1. Fishes. F. Briand (Ed.). Monaco, CIESM Publications.
- Golani D. (2010). *Colonization of the Mediterranean by Red Sea fishes via the Suez Canal Lessepsian migration*. D. Golani, B. Appelbaum-Golani (Eds.). Fish invasions of the Mediterranean Sea: Changes and renewal. Sofia–Moscow: Pensoft Publishers, pp. 145-188.
- Matsuura, K., Golani, D., & Bogorodsky, V. (2011). The first record of *Lagocephalus guentheri* Miranda Ribeiro, 1915 from the Red Sea with notes on previous records of *L. lunaris* (Actinopterygii, Tetraodontiformes, Tetraodontidae). *Bulletin of the National Museum of Nature and Science*, Series A, 37, 163–169.
- Quignard, J.P. & Tomasini, J.A. (2000). Mediterranean fish biodiversity. *Biologia Marina Mediterranea*, 7, 1-66.
- Ragonese, S., Jereb, P., & Morara, U. (1997). Morphometric relationships of *Sphoeroides pachygaster* (Pisces, Tetraodontidae) of the Strait of Sicily (Mediterranean Sea). *Cahiers de Biologie Marine*, 38, 283-289.
- Randall, J.E. (1995). *Coastal fishes of Oman*. University of Hawaii Press, Honolulu, Hawaii.

- Tortonese, E. (1986). *Tetraodontidae (including Canthigasteridae)*. PJP. Whitehead, M.L. Bauchot, J.C. Hureau, J. Nielsen & E. Tortonese (Eds.). Fishes of the Northeastern Atlantic and the Mediterranean, Vol. III. Paris: Unesco, pp 1341–1345.
- Turan, C., Yaglioglu, D., Erguden, D., Gurlek, M., & Sonmez, B. (2010). First record of the broad-banded cardinal fish *Apogon fasciatus* (White, 1790) from Turkey. *Mediterranean Marine Science*, 11 (2), 369-372.
- Turan, C., & Yaglioglu, D. (2011). First record of the spiny blaasop *Tylerius spinosissimus* (Regan, 1908) (Tetraodontidae) from the Turkish coasts. *Mediterranean Marine Science*, 12(1), 247-252.
- Turan, C., Erguden, D., & Gürlek, M. (2016). Climate change and biodiversity effects in Turkish Seas. *Natural and Engineering Sciences*, 1(2), 15-24.
- Vacchi, M., Bussotti, S., Miglietta, A.M., & Guidetti, P. (2007). Presence of the Guinean puffer *Sphoeroides marmoratus* (Lowe, 1838) in the Mediterranean Sea. *Journal of Fish Biology*, 71, 1215-1219.