

Confirmation of the Record of the Serpent Eel, *Ophisurus serpens* (Family: Ophichthidae) from Mersin Bay (NE Mediterranean, Turkey)

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Abstract: A specimen of the serpent eel, *Ophisurus serpens*, with a total length of 190.2 cm was caught off the coast of Mersin (Incekum), Turkey on November 2014 during trawling. This manuscript presents the first digitized specimen of *O. serpens* from the Mersin Bay (northeastern Mediterranean), and hence, confirms the presence of the species in the northeastern Mediterranean despite a suspicious previous report, possibly mistaken with *Echelus myrus*, of the species from Yumurtalık Bay. Remarks on the morphology and geographical distribution of the species in the Mediterranean Sea, Turkey are given.

Key words: Generalized extreme value distribution, ozone, selection of variables.

1. Introduction

The family Ophichthidae represented with about 290 species in the world, only five of which has been reported in Mediterranean waters [1]: *Echelus myrus* (Linnaeus, 1758), *Dalophis imberbis* (Delaroche, 1809), *Pisodonophis semicinctus* (Richardson, 1848), *Ophisurus serpens* (Linnaeus, 1758) and *Ophichthus rufus* (Rafinesque, 1810). The serpent eel, *O. serpens* is a benthic marine and brackish water species occurring from shallow waters to depths of 300-400 m [2, 3]. In the Mediterranean Sea *O. serpens* has been first reported from Gulf of Trieste, northern Adriatic Sea [4] and then, the northernmost area of the Adriatic Sea: Italy [5, 6]; the western and central Mediterranean coasts [2, 7, 8]; the Alboran Sea [9]; the Ligurian Sea [10]; the Tunis Southern Lagoon [11]; and the northwestern Ionian Sea [12]; the Algarve coast (southern Portugal), near the Gibraltar Strait [13]; the Galician waters (northwestern,

Spain) [14]; the northwestern Ionian Sea, central Mediterranean [12, 15]; and also from the Greek waters of the north and central Aegean Sea: the Evvoikos Gulf [16, 17], the Korinthiakos Gulf [18] and the Saronikos Gulf [19]. In Turkish marine waters serpent eel, *O. serpens* was reported for the first time in 1966 from Aliaga (Çandarlı Bay) [20], and then three records of this species have been reported in southern and northern Aegean Sea, Turkey [21-25]. Although Sangun et al. [26] have reported forty one *O. serpens* specimens without any description or data in the Turkish Mediterranean coast this may be a result of misidentification of the species since the species is highly rare in the area. It should be taken into account that the species has recently been reported a few times from Aegean waters [22-25] and possibly distributed to northern Mediterranean from there. Thus, the presence of *O. serpens* has remained doubtful for northeastern Mediterranean Sea until now.

Although *O. serpens* has distributed in the southern and northern Aegean Sea up to now, specimens of this

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species has not been reported in the Mersin Bay (north eastern Mediterranean) previously. The present paper reports the presence of *O. serpens* on the base of a single digitized record from the Mersin Bay and confirms the presence of the species in the northeastern Mediterranean, Sea Turkey.

2. Material and Methods

A single specimen of serpent eel *O. serpens* (Fig. 1) was caught during bottom trawling at 492 m depth, off İncekum, Mersin Bay (36°07'679 N-34°03'979 E), (Fig. 2) on November 6, 2014. Morphometric and meristic characters of the collected specimen were recorded. Morphometric measurements of the specimen were made to the nearest 0.01 mm using digital caliper. All measurements, morphological description and coloration of the serpent eel agree with previous

descriptions by Bauchot [2], Ben Amor et al. [11], Torcu Koc and Erdogan [23].

3. Results and Discussion

Body is very elongated, and cylindrical and scaleless, snout long and conical with the upper jaw projecting. Jaws elongated and slender, teeth large caniniform and more or less curved and enlarged on premaxillae, small and biserial on maxillae. Small and uniserial teeth are on lower jaw. Vomerine uniserial teeth are enlarged anteriorly. Small anterior nostril is at mid snout. Eyes are relatively small. Dorsal and anal fins well developed; dorsal fin origin slightly behind the pectoral fins. Dorsal and anal fins ending near to the hardened caudal tip. Pectoral fins present, pelvic and caudal fins absents. Morphometric measurements and meristic counts are summarized in Table 1.



Fig. 1 The serpent eel, *Ophisurus serpens* caught off the Mersin Bay, Northeastern Mediterranean Sea.

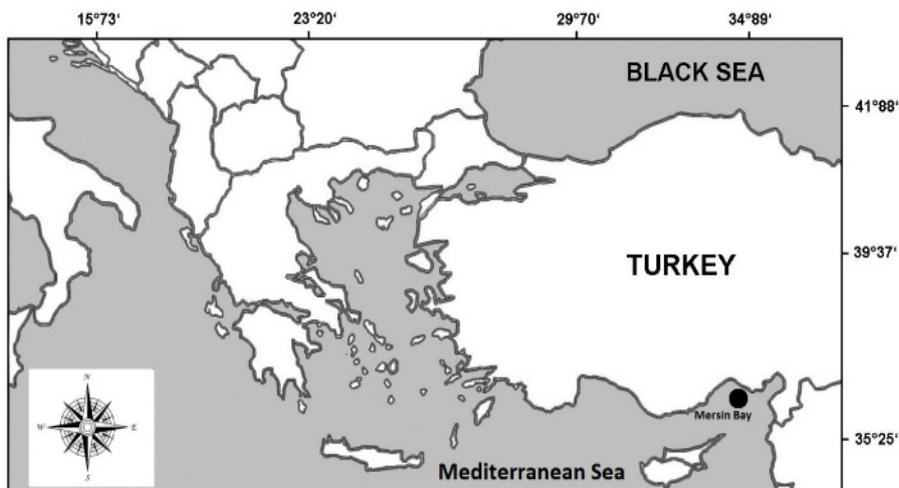


Fig. 2 Map showing the capture site (●) *Ophisurus serpens* in the NE Mediterranean Sea.

Table 1 Morphometric and meristic features of *Ophisurus serpens* in Mersin Bay NE, Mediterranean, Turkey.

Morphometric	mm
Total length	1,902
Pre-dorsal length	214
Pre-anal length	718
Body depth	39.61
Head length	148.51
Eye diameter	10.26
Pre-orbital length	38.42
Meristic	
Dorsal ray	465
Anal ray	284
Pectoral ray	13
The number of pores in linea lateralis	205
Weight	1,320 g

Table 2 Previous records of *Ophisurus serpens* in Turkish marine waters.

References	Location	Recorded date	Fishing gear	Depth (m)	Number of individuals	Size (TL, mm)
Geldiay and Mater [20]	Aliğa Bay, N Aegean Sea	27 August 1996	Lift Net	35-40	1	-
Karakulak et al. [25]	Gökçeada, N Aegean Sea	2004-2005	Gill Net, Trammel Net	<30	2	1,580-1,692
Sangun et al. [26]	Yumurtalık Bay, Eastern Mediterranean	2001-2003	Longline, Trawl	5-100	41	121-501
Cengiz et al. [21]	Saros Bay, N Aegean Sea	2005-2008	Trawl	1-500	1	-
Ulaş and Akyol [22]	Karaburun, N Aegean Sea	2 March 2014	Hand line	32	1	1,917
Torcu Koç and Erdogan [23]	Edremit Bay (Northern Aegean Sea)	15 January 2014	Long line	40	1	2,000
Filiz et al. [24]	Gokova Bay	5 January 2015	Purse seine	55	1	1,212
This study	Mersin Bay, NE Mediterranean	6 November 2014	Bottom Trawl	492	1	1,902

Color: Body coloration dorsally brownish and ventrally yellowish-white; snout light ochre; dorsal and anal fins edged with greyish; lateral and cephalic pores blackish. Data on the occurrence and of *O. serpens* in marine waters of Turkey are summarized in Table 2.

The serpent eel, *O. serpens* is a cosmopolitan species widely distributed in the Atlantic Ocean (northern coast of Iberian peninsula to South Africa, and also Madeira) and the Indo-Pacific Ocean (southern Mozambique to South Africa; north to Japan, south to Australasia) [2, 27]. This species is very rare in the Aegean Sea and Mediterranean Sea, Turkey, where it generally lives between 30 m and 400 m depth on sandy and sandy-muddy bottom [28]. It feeds mainly on benthic invertebrates and fish, and its average size is between 50 cm and 150 cm with a maximum of 240 cm [29].

A previous record of the species from the Turkish Mediterranean waters [26], should probably be considered as a misidentification of *Echelus myrus*. Ulaş and Akyol [22] claim that this species rarely occurs in the northern and southern Aegean Sea. Nevertheless, Sangun et al. [26] reported the handling of 41 specimens from eastern part of the Mediterranean Sea for a length-weight relationship research (at depth ranging from 5 to 100 meters). However, no description, concerning metric and meristic characters, of the species has been included in their article. Occurrence of considerable high number of the specimens is highly doubtful and needs confirmation with supporting materials such as description and pictures. Thorough reviews of previous studies [30-32] have revealed no indication of the presence of *O.*

serpens in the eastern and western Mediterranean Sea of Turkey.

4. Conclusion

Although the serpent eel, *O. serpens* has been reported for several times in the Aegean Sea, Turkey (Table 2) up to now, there was no report of the eastward expansion of the distribution of this species to the north-eastern Mediterranean Sea (Mersin Bay). This paper confirms the presence of the species in the north-eastern Mediterranean, and hence expansion of the occurrence area of the species.

Recent investigations conducted regularly and permanently in Turkish marine waters, especially in north-eastern areas of Mediterranean Sea, allowed capture of rare specimens just like the one presented and described in this paper. Hence, authors' finding from Mersin Bay is the first confirming report of this species from the NE Mediterranean Sea, Turkey. The occurrence of this species in the northeastern part of the Mediterranean Sea might be due to changing trophic or ecological conditions of these marine ecosystems.

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