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ON THE RECORD OF THE MORAY EEL (*MURAENA HELENA* LINNAEUS, 1758) IN SLOVENIAN COASTAL WATERS (GULF OF TRIESTE, NORTHERN ADRIATIC)

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ABSTRACT

*The authors report on the record of the moray eel (*Muraena helena*) in Slovenian coastal waters (Gulf of Trieste, northern Adriatic). The specimen was caught by a diver with a speargun in June 2011. The moray eel measured 1,127 mm in total length and weighed 4,120 g. The estimated age of the moray eel was about 12 years. This is the first recorded case of the occurrence of moray eel in Slovenian waters.*

Keywords: moray eel, *Muraena helena*, first record, Gulf of Trieste

PRIMA SEGNALAZIONE DI MURENA MEDITERRANEA (*MURAENA HELENA* LINNAEUS, 1758) IN ACQUE COSTIERE SLOVENE (GOLFO DI TRIESTE, ADRIATICO SETTENTRIONALE)

SINTESI

*Gli autori riportano il ritrovamento della murena mediterranea (*Muraena helena*) nelle acque costiere slovene (Golfo di Trieste, Adriatico settentrionale). L'esemplare è stato catturato da un sommozzatore, con l'ausilio di un fucile subacqueo, nel giugno del 2011. La lunghezza totale della murena era pari a 1127 mm, per un peso di 4120 g. L'età dell'esemplare è stata valutata essere attorno ai 12 anni. Tale cattura è il primo ritrovamento di questa specie in acque slovene.*

Parole chiave: murena mediterranea, *Muraena helena*, prima segnalazione, Golfo di Trieste

INTRODUCTION

The Mediterranean moray eel (*Muraena helena* Linnaeus, 1758) is one of three species of muraenids, known to occur in the Adriatic Sea. The second muraenid in the area is the brown moray *Gymnothorax unicolor*, which is a rare and less known fish in the whole Adriatic Sea (Tortonese, 1970; Jardas, 1996). The third muraenid species is a recently discovered non native species, the fangtoothed moray *Enchelycore anatina*, which was photographed in waters off two southern Adriatic islands (Lipej *et al.*, 2011). The Mediterranean moray eel is a subtropical, reef-associated resident species, living across the eastern Atlantic from south of the British Isles to Senegal, including the Mediterranean, the Azores, Madeira, the Canary and the Cape Verde Islands (Tortonese, 1970; Bauchot, 1986).

There is a lack of published data on the Mediterranean moray in the Adriatic Sea, but also in the Mediterranean as a whole (Matić-Skoko *et al.*, 2011). Jardas (1996) reported on the presence of the moray eel in the middle and southern Adriatic Sea, whereas in the northern part it is considered rare. In older checklists, *M. helena* was not recorded for the Gulf of Trieste (for example, Trois, 1875; Perugia, 1881; Stossich, 1881; Faber, 1883). In the "Key for identification of vertebrates in Slovenia" Marčeta (1999) did not mention this species among the vertebrates known to be recorded in Slovenia.

The aim of this paper is to present the first data on the occurrence of a single specimen of moray eel for the Slovenian coastal sea.



Fig. 1: Map of the studied area with the locality, where the specimen of *Muraena helena* was caught.
Sl. 1: Zemljevid obravnavanega območja, kjer je bil ujet primerek murene (*Muraena helena*).

MATERIAL AND METHODS

A diver caught the moray eel with a speargun while shore diving on 18 June 2011 in the early morning hours. The speargun was equipped with the Panasonic DMC-FT2 camera. The diver sighted the moray eel at 6.7 m of depth on a rocky bottom off the town of Piran (Fig. 1). The habitat where the moray eel was caught is characterized by sandstone boulders covered mainly with sponges and colonies of the Mediterranean stony coral *Cladocora caespitosa*. The surroundings of the moray eel hole were almost completely covered with sponges *Verongia aerophoba* and *Chondrilla nucula*. At the time of capture, the moray eel was emerging its head out of the vertical hole. The diameter of the hole was estimated to measure 12 cm. The diver erroneously thought that the fish was a European conger *Conger conger* Linnaeus, 1758, which is a rather common anguilliform species in the area. After the capture, the specimen was photographed and measured with a hand meter to the nearest millimetre and weighed to the nearest gram.

RESULTS AND DISCUSSION

The specimen of moray eel (Figs. 2, 3) was determined due to typical diagnostic characters. The body was elongated and typical anguilliform. The dorsal fin began behind its head and extended to the caudal fin. The pelvic and pectoral fins were absent. The head was short and massive. The gill opening was reduced to a small lateral pore. The specimen exhibited a typical marbled colour pattern. The moray eel measured 1,127 mm in total length (TL) and weighed 4,120 g (Tab. 1). Since *Muraena helena* can range from 419 to 1,340 mm TL and weigh between 109 and 6,450 g (Jiménez *et al.*, 2007), the studied specimen could be considered as quite big. According to the length-at-age equation used

Tab. 1: Biometric data for the specimen of *M. helena*.
Tab. 1: Biometrični podatki za primerek murene.

Parameter	Length/weight	% of standard length
Standard length (mm)	1,127	100.00
Head length (mm)	136	12.07
Eye diameter (mm)	8	0.71
Preorbital length (mm)	23	2.04
Jaw length (mm)	55	4.88
Predorsal distance (mm)	121	10.74
Dorsal fin length (mm)	1,006	89.26
Anal fin length (mm)	542	48.09
Height at orbit (mm)	39	3.46
Height at gill opening (mm)	112	9.94
Weight (g)	4,120	

by Matić-Skoko *et al.* (2011), the estimated age derived from the total length and weight of our specimen would be 12 years. The same authors consider the life span to be around 15 years.

P. Kružič (*in litt.*) recorded this species at the island of Čutin. M. Kovačić (*pers. comm.*), the curator of marine ichthyofauna and other vertebrates in the Rijeka Natural History Museum, has never recorded this species during his ichthyological surveys in the Kvarner area. Up to date the moray eel has not been recorded off the western Istrian coast. However, A. Jaklin (Centre for Marine Research, Rovinj, *pers. comm.*) possesses an information about a small specimen of moray eel, found at a depth of 30 m close to the islet of Fraškera, south of the very tip of the Istrian peninsula.

The occurrence of the moray eel in Slovenian waters could be related to the northward spreading of southern species. As in many other regions, also in the Adriatic Sea the present-day sea warming ultimately favours the spreading of thermophilous fish species. Many cases of this phenomenon in the Adriatic Sea have already been pointed out by various studies (Dulčić *et al.*, 1999; Lipej & Dulčić, 2004). Such indicator fish species, which



Fig. 2: 1,127 mm long specimen of *M. helena*, caught in waters off Piran (Gulf of Piran). (Photo: S. Moškon)
Sl. 2: 1127 mm dolg primerek murene, ujete v vodah blizu Pirana (Piranski zaliv). (Foto: S. Moškon)



Fig. 3: A close photo of the head of moray eel. (Photo: S. Moškon).

Sl. 3: Bližinski posnetek glave murene. (Foto: S. Moškon).

were able to reach the southern tip of the Istrian peninsula, are for example *Thalassoma pavo* (P. Kružič, *pers. comm.*) and *Sphoroides pachygaster* (Dulčić, 2002). Certain fish species which could be related to the northward spreading and have recently been confirmed in the Slovenian part of the Adriatic Sea are *Coryphaena hippurus* (Dulčić & Lipej, 1997) and *Pomatomus saltator*. The later was caught in great numbers in spring 2011 at the mouth of the Dragonja River.

The moray eel in Slovenian coastal waters probably arrived from waters off the western Istrian peninsula. The possibility that the moray eel has simply been overlooked in the area is to our opinion less realistic. In fact, in the period from 1999 to 2011 there were regular faunistic surveys, especially visual census techniques, performed in the studied area. Additionally, we cannot completely disregard the possibility of an intentional release of aquarium specimens in the marine ecosystem. Only in the nearby future we will be able to ascertain whether this case of the moray eel should be considered as a rather exceptional one or should it be attributed to a spreading of moray eel range extension.

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O POJAVLJANJU MURENE (*MURAENA HELENA* LINNAEUS, 1758) V SLOVENSKIH OBALNIH VODAH (TRŽAŠKI ZALIV, SEVERNI JADRAN)

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POVZETEK

Avtorja poročata o pojavljanju murene (*Muraena helena*) v slovenskih obalnih vodah (Tržaški zaliv, severni Jadrán). Primerek je ujel potapljač s podvodno puško junija 2011. Murena je v celotno dolžino merila 1127 mm in tehta 412 g. Ocenjena starost primerka je 12 let. To je prvi zabeležen primer pojavljanja murene v slovenskih vodah.

Ključne besede: murena, *Muraena helena*, prva najdba, Tržaški zaliv

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