

First documented record of the ocean sunfish, *Mola mola* (Linnaeus), from the Sea of Oman, Sultanate of Oman (Teleostei: Molidae)

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Abstract

The first assured record of the ocean sunfish, *Mola mola* (Linnaeus, 1758), in Omani waters is reported based on a specimen of 1350 mm total length which has stranded on the coast of Quriat City, 120 km north of Muscat, the capital of Oman. Morphometric and meristic data are provided and compared with those of several specimens of this species from other parts of the world.

Key words: Sea of Oman; Molidae; range extension.

Zusammenfassung

Der Mondfisch, *Mola mola* (Linnaeus, 1758), wird zum ersten Mal für Oman bestätigt. Der Nachweis basiert auf einem 1350 mm langen Exemplar, das an der Küste von Quriat City, 120 km nördlich der omanischen Hauptstadt Muscat gestrandet ist. Morphometrische und meristische Daten dieses Exemplares werden gegeben und mit einigen anderen Belegen weltweit verglichen.

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1 Introduction

The species of the ocean sunfish family Molidae are epipelagic and characterized by having laterally compressed bodies that have an abbreviated or truncated appearance posteriorly (FRASER-BRUNNER 1951). The caudal fin in molids is replaced by a vertically elongate pseudo-caudal fin (clavus) that lacks the normal components of the terminal urostylar vertebra and associated hypurals, etc.; molids also lack pelvic fins and pelvic girdles, and have no spines in the median fins that protrude prominently from the rear part of the body and which are the main source of propulsion (TYLER 1980).

Because of their often strange shapes, representatives of the tetraodontiform fishes, including ocean sunfishes, were well-known to the ancient Roman, Greek, Egyptian, and Chinese naturalists. Much later, at the very beginning of binomial nomenclature, the ocean sunfish was recognized as *Tetraodon mola* Linnaeus 1758, and shortly thereafter it was placed in *Mola* Koelreuter, 1766 (see TYLER 1980 for a history of tetraodontiform systematics). Although many generic and specific synonyms of *Mola mola* have been proposed since then (ESCHMEYER 2012), the taxonomy of

this species has become highly stable in recent decades, and a large literature now exists on its morphology and natural history.

The most comprehensive taxonomic revision of the family is that of FRASER-BRUNNER (1951), in which five species in three genera were distinguished. At present, four species are recognized: *Ranzania laevis* (Pennant, 1776), *Masturus lanceolatus* (Liénard, 1840), *Mola mola* and *M. ramsayi* (Gigoli, 1883). The latter species is infrequently mentioned in taxonomic treatments (NELSON 1994, PARENTI 2003). Both morphological and molecular approaches have been used to study the relationships among the currently recognized genera. SANTINI & TYLER (2002), using a large data set of morphological characters, and YAMANOUÉ et al. (2004), using molecular data, found strong support for the conventional hypothesis (FRASER-BRUNNER 1951, TYLER 1980) of a sister taxon relationship between the genera *Masturus* and *Mola*, with *Ranzania* being the basal clade within the family.

Three species of molids, *Ranzania laevis*, *Masturus lanceolatus*, and *Mola ramsayi*, have been recorded recently from the Sea of Oman (JAWAD et al. 2010, 2012), but until now *Mola mola* has not been known with certainty

from the coast of Oman. Additionally, *Ranzania laevis* has been reported from the northern-most region of the Arabian Gulf (JAWAD et al. 2011).

Mola mola inhabits warm to cold temperate waters of all oceans (FROESE & PAULY 2010). It has been recorded in the Eastern Pacific region from British Columbia, Canada to Peru and Chile. It is also known in the Western Pacific from Japan to Australia. In the Eastern Atlantic, it has been recorded from Scandinavia to South Africa (including the western Baltic, Mediterranean). In addition, *M. mola* is reported in the Western Atlantic from Newfoundland, Canada to Argentina.

The nearest confirmed record of *Mola mola* to the Sea of Oman is that of ASADI et al. (1997) who mention this species in their book, but do not give the exact location. Another record near Oman is that of AL-BAZ et al. (1999) from Kuwait.

Herein is provided the first documented evidence of *M. mola* in Omani waters, which also represents the second confirmed record for this species from the northern part of the Indian Ocean.

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2 Record of *Mola mola* from Oman

In April 2012, an unusual occurrence of *M. mola* was recorded along the coasts of the Oman Sea at the city of Quriat (22°35'10.22"N, 59°30'18.91"E), 120 km north of Muscat City. The specimen (Fig. 1) was found stranded on the shore of Quriat City, having been tossed ashore by the swell. The fish was 1350 mm in total length and weighed 89 kg. It is deposited in the fish collection of the Marine Science and Fisheries Centre, Ministry of Agriculture and Fisheries Wealth, Muscat, Sultanate of Oman, catalogue number OMMSTC 1097.

Morphometric and meristic details of this specimen are given in Tab. 1. Thirteen body proportions were measured, including the total length (TL), measured horizontally from the tip of the snout to the posterior edge of the clavus; preorbital length, measured from the tip of the snout to the anterior edge of the orbit; eye diameter, i. e. the distance between the anterior and posterior edges of the orbit; preopercular opening length, measured from the tip of the snout to the edge of the opercular slit; predorsal fin length, measured from the tip of the snout to the anterior edge of

Tab. 1. Morphometric and meristic characteristics of *Mola mola* in the Sea of Oman compared with specimens from the literature. – TL = total length; – = not available.

	Present study	AL-BAZ et al. 1999, Kuwait	BRITO 2003, Chile
Morphometric characters (mm) and ratios (percent of TL)			
TL	1350	1800	955
Eye diameter	65 (4.8)	–	42 (4.4)
Preorbital length	19.8 (1.5)	–	13.5 (1.4)
Preopercular opening length	452 (33.5)	–	–
Predorsal fin length	784 (58.1)	–	545 (57.1)
Height of dorsal fin	651 (48.2)	–	390 (40.8)
Distance between base of dorsal and anal fin	840 (62.2)	–	–
Prepectoral fin length	475 (35.2)	–	323 (33.8)
Height of anal fin	678 (50.2)	–	420 (43.9)
Preanal fin length	715 (52.9)	–	–
Preanus length	665 (49.3)	–	–
Maximum body depth	942 (69.8)	1130 (62.8)	–
Clavus height	82.5 (6.1)	85 (4.7)	–
Meristic characters			
Dorsal soft rays	16	–	16
Anal soft rays	14	–	16
Pectoral fin rays	12	–	12

the dorsal fin base; height of dorsal fin, measured vertically from the base to the distal tip of the dorsal fin; distance between bases of dorsal and anal fins, measured vertically between the bases of the dorsal and anal fins; prepectoral fin length, measured from the snout tip to the anterior edge of the pectoral fin; height of anal fin, measured vertically from the base of the anal fin to the distal tip of the anal fin; preanal fin length, measured horizontally from the snout tip to the anterior edge of the anal fin base; preanus length, measured horizontally from the tip of the snout to the anus; maximum body depth, measured vertically at the widest points of the body margin; and clavus length; measured vertically from the ventral to the dorsal edges of the clavus. Morphometric and meristic details were determined using standard methods given by TYLER (1980) (Tab. 1).

Body with a tough covering of thick collagenous skin, which in turn is covered by scales modified as denticles. Clavus, a rudder-like structure, replacing the aborted caudal fin. Dorsal and anal fins very high, with short bases. Pectoral fins small and rounded, directed upward. Mouth very small; teeth fused with jaw bones to form a parrot-like beak. Four gills, with a reduced gill slit located at the base of the pectoral fin. Clavus supported by 12 rays, 8 of which bear ossicles; the ossicles widely separated, completely covered with cuticle, which grows beyond the edge of the

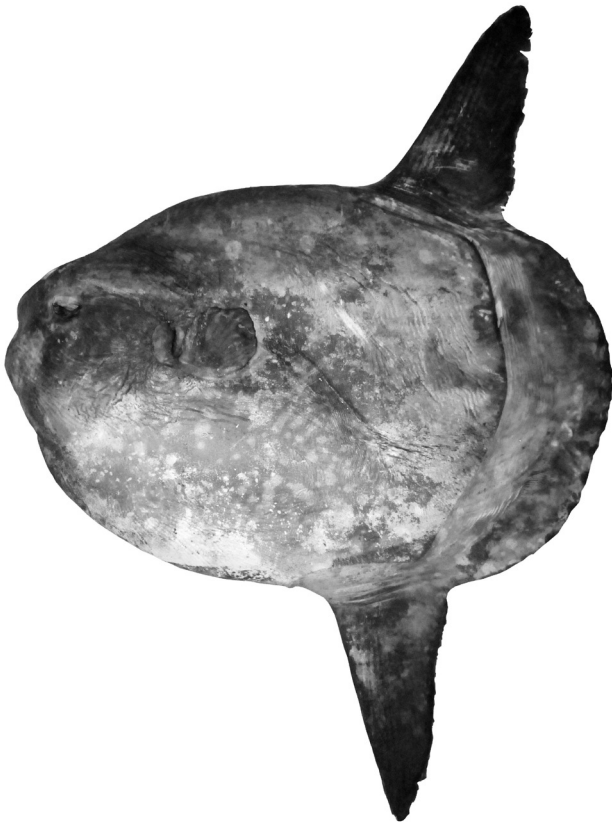


Fig. 1. Fresh specimen of *Mola mola*, OMMSTC 1097, 1350 mm total length, Quriat City, Sultanate of Oman.

ossicles and forms lobes in large specimens, ossicles found on paraxial rays united to form larger ossicles. Smooth band of reduced denticles at base of clavus between dorsal and anal fins. Grey silver colour.

Mola mola differs from *M. ramsayi* in the following set of characters given by FRASER-BRUNNER (1951): skin rough with small denticles including a band of somewhat reduced denticles between the bases of the dorsal and anal fins; ossicles widely separated, less broad than the spaces between them; clavus with about 12 fin rays, of which 8 or 9 bear ossicles.

3 Discussion

Relatively few studies have provided extensive morphological measurements for *M. mola* specimens collected from around the world (AL-BAZ et al. 1999, BRITO 2003). These morphological data are compared with that of the Omani specimen in Tab. 1. AL-BAZ et al. (1999) reported a specimen from the Kuwait coast, BRITO (2003) described another one from west of Las Cruces (33°31'S), Chile.

The recent specimen from Oman could have become stranded for the following possible reasons: (1) net en-

tanglement followed by stress; (2) susceptibility to shark attacks; (3) locomotion difficulty stemming from injuries and exhaustion; (4) body striking the reefs that form a barrier before arriving at the site where the specimen was found. There were several fishing net marks revealing that the Omani specimen must have been entangled in a fishing net and suffered stress and trauma. Such an unhealthy state would make the specimen susceptible to attacks from predators and probably from parasites. Accidental entanglement in fishing gear is one of the main threats to sunfish populations (JOUNG et al. 2005, AKYOL et al. 2005, ARAÚJO et al. 2010).

There are several possible explanations for the presence of this fish in the coastal waters of the Sea of Oman. *Mola mola* is a strictly marine species and has different ecological preferences or requirements during various periods of its lifetime: for example, it has a larval pelagic existence in coastal waters (FRASER-BRUNNER 1951). It is premature to assess whether the present population of *M. mola* is represented only by a few visitors in a new area or whether it is a well-established population hitherto undetected, probably due to a lack of ichthyological expeditions and fishery surveys. Thus, there is a need to investigate further the frequency of occurrence of *M. mola* and other molids in the Sea of Oman and to study the biological characteristics of these species in order to determine whether they have established sustainable populations in this region.

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