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AN OVERLOOKED FINDING OF *MOLA ALEXANDRINI* (RANZANI, 1839) IN THE ADRIATIC SEA

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ABSTRACT

*The identity of a large sunfish, stranded in 1999 on a beach of the north-western Adriatic Sea, has been shifted from *Mola mola* (Linnaeus, 1758) to *Mola alexandrini* (Ranzani, 1839), considering the recent taxonomic revision of the family Molidae. The faithful fiberglass model of the specimen is displayed at the Museo Civico di Storia Naturale di Comiso, Ragusa, Italy. The record of the species is the second one ascertained in the Adriatic Sea and one of the few records of the Bumphead sunfish documented to date in the Mediterranean Sea.*

Keywords: Molidae, *Mola mola*, *Mola alexandrini*, Mediterranean Sea

UN RITROVAMENTO SOTTOVALUTATO DI *MOLA ALEXANDRINI* (RANZANI, 1839) NEL MAR ADRIATICO

SINTESI

*L'identità di un pesce luna di notevoli dimensioni, spiaggiato nel 1999 su un litorale del mar Adriatico nord-occidentale, è stata corretta da *Mola mola* (Linnaeus, 1758) a *Mola alexandrini* (Ranzani, 1839), tenendo in considerazione le recenti revisioni tassonomiche della famiglia Molidae. Il modello in fibra di vetro che riproduce fedelmente l'esemplare è esposto al Museo Civico di Storia Naturale di Comiso, Ragusa, Italia. La segnalazione della specie è la seconda accertata nell'Adriatico e una delle poche documentate finora nel Mediterraneo.*

Parole chiave: Molidae, *Mola mola*, *Mola alexandrini*, Mediterraneo

INTRODUCTION

Recent comprehensive reviews, based on morphological and molecular studies, ascertain three valid species in the genus *Mola* (Tetraodontiformes: Molidae): *Mola alexandrini* (Ranzani, 1839), *Mola mola* (Linnaeus, 1758) and *Mola tecta* Nyegaard *et al.* 2017, with *M. alexandrini* senior synonym of *Mola ramsayi* (Giglioli, 1883) (Nyegaard *et al.*, 2018a,b; Sawai *et al.*, 2018; Froese & Pauly, 2023; WoRMS Editorial Board, 2023). The Bumphead sunfish *M. alexandrini* was described for the first time as *Orthragoriscus alexandrini* by Ranzani (1839), based on a specimen collected from the Adriatic Sea. According to Sawai *et al.* (2018), the holotype of *M. alexandrini* is the old specimen preserved and displayed at the Museo di Zoologia dell'Università di Bologna (MZUB), Italy. The so-called rediscovery of *M. alexandrini* and the existence of the holotype of the species at the MZUB is nevertheless confuted by Britz (2022).

For a long time, *M. alexandrini* was regarded as a junior synonym of *M. mola* all over the world oceans (Sawai *et al.*, 2018). Therefore, *M. alexandrini* was not included in the Mediterranean fish diversity (Bauchot, 1987; Quignard & Tomasini, 2000; Psomadakis *et al.*, 2012), as well as in the regional fish checklists, where only *M. mola* was reported (Bradaï *et al.*, 2004; Relini & Lanteri, 2010; Papaconstantinou, 2014; Bilecenoğlu *et al.*, 2014; Akel & Karachle, 2017; Béarez *et al.*, 2017; Ali, 2018; Báez *et al.*, 2019; Bariche & Fricke, 2020; Kovačić *et al.*, 2020; Golani, 2021; Borg *et al.*, 2023). Due to the above mentioned taxonomic researches and clarifications, *M. alexandrini* is presently listed as a component of the fish diversity of the Mediterranean basin (Kovačić *et al.*, 2021).

Our brief note documents the second ascertained occurrence of *M. alexandrini* in the Adriatic waters. Morphological characters and measurements of the fish are presented.

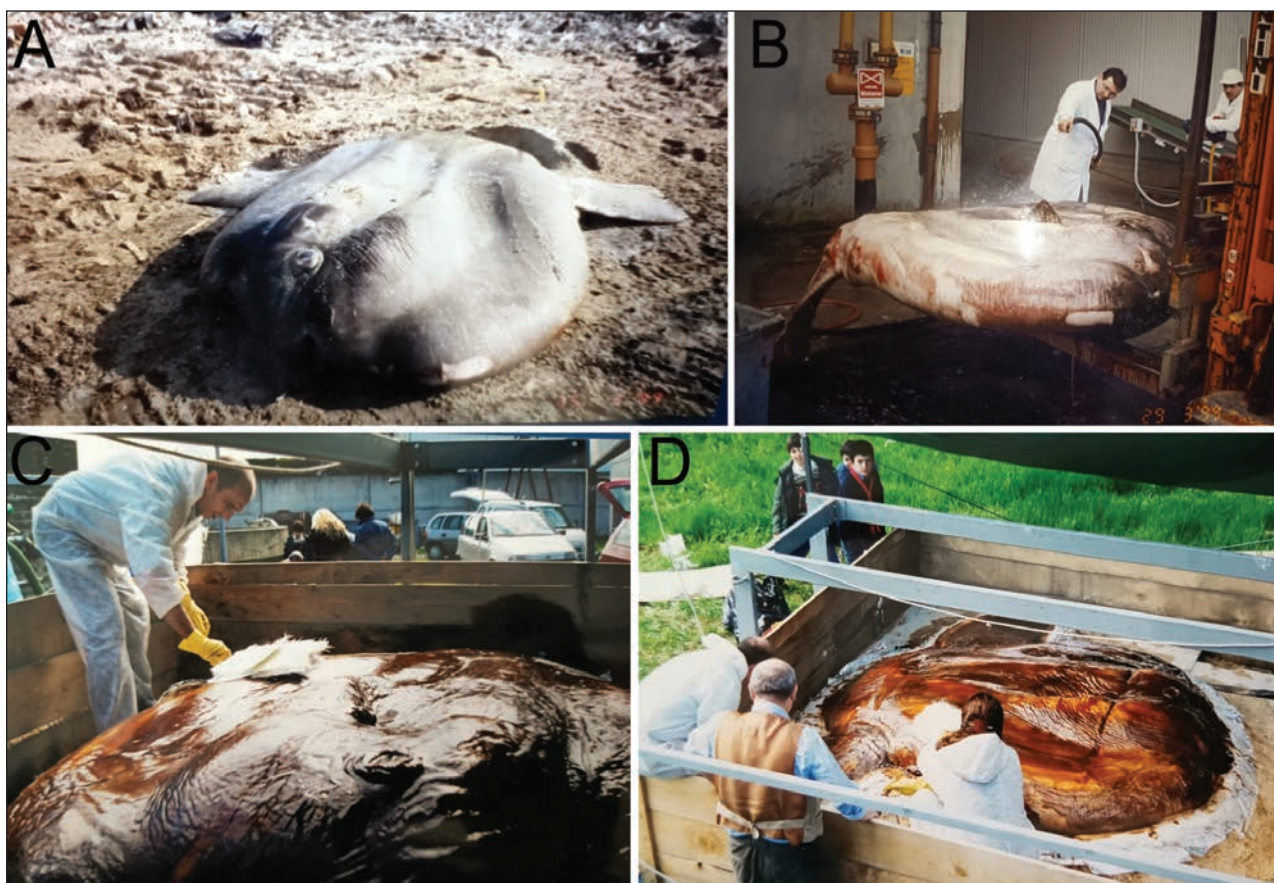


Fig. 1: The specimen of *Mola alexandrini* stranded at Cervia, Italy, in 1999 (A), its cleaning and weighing (B) and steps of the plaster mould preparation (C, D) (Photos: Archives MSNC).

Sl. 1: Nasedli primerek vrste *Mola alexandrini* iz Cervie (Italija) iz leta 1999 (A), njegovo čiščenje in tehtanje (B) in nadaljnji koraki za pripravo mavčnega kalupa (C, D) (Fotografije: arhiv MSNC).

MATERIAL AND METHODS

A large sunfish was found stranded on the beach of Cervia, Ravenna, Italy (north-western Adriatic Sea), on 24 March 1999 (44°15'30.22"N, 12°21'46.61"E). The regional scientific community was alerted and the staff of the Museo Civico di Scienze Naturali di Faenza, Ravenna, immediately activated, under the technical coordination of one of the authors (G.G.) of the Agenzia Regionale Prevenzione e Ambiente dell'Emilia Romagna (ARPA). The stranded fish (Fig. 1A) was photographed, weighed (Fig. 1B) and some measurements were taken grossly. At field, a plaster mould of the whole fresh fish was accurately done by an expert taxidermist (Figs. 1C, 1D). Anatomical samples of the specimen (one eye, a piece of gill, heart and brain) were preserved before the final disposing of the fish. A fiberglass model reproducing faithfully the body shape, size, color and details of the original specimen, was later produced. Initially the model was displayed at the Museo Civico di Storia Naturale di Faenza. In 2019 the model was acquired by the Museo Civico di Storia Naturale di Comiso (MSNC), Ragusa, Italy, for public display (Catalogue number MSNC 4504) (Fig. 2). Also, the above anatomical samples are stored.

The specimen was identified following Nyegaard *et al.* (2018a) and Sawai *et al.* (2018)

RESULTS

The large sunfish (Fig. 1A) was an adult male with a weight of 900 kg obtained by a platform scale (Fig. 1B). The specimen (Figs. 1 and 2) shows the following main characteristics: body deep and laterally compressed, head bump from above eyes to front of dorsal-fin base, bumped chin, small mouth and eyes, small and oval gill openings, located in front of pectoral fins, pectoral fins small and rounded, dorsal fin located opposite anal fin, and both with straight anterior and curved posterior margin, a rounded unlobed clavus, a band at base of clavus between dorsal and anal fins, lateral ridges from head, above and below eyes, to beyond pectoral fins. Measurements were taken according to Yoshita *et al.* (2009) from the model (Fig. 2) and they are given as absolute values and as % of total length (TL), in parenthesis: total length 226 cm, head bump length 36.9 cm (16.3 %), pre-clavus band length 186 cm (82.3 %), body depth 138 cm (61.1 %), total body depth 269 cm (119 %). Approximate number of rays obtained from the model: Pectoral fin rays 10-11, Dorsal fin rays 16, Anal fin rays 15, clavus rays 16. Colour of the stranded specimen (Fig. 1A): gray dorsally and along the ridges, dusky white ventrally and between the

ridges, all fins gray, irregular pale patches over the body. Colour of the fiberglass model (Fig. 2): grayish dorsally and along the ridges, creamy-gray ventrally and between the ridges, all fins grayish, many large or small paler spots and irregular pattern over the body.

DISCUSSION

According to Sawai *et al.* (2018), the main characters to distinguish *M. alexandrini* from *M. mola* are: the head profile with bump, the chin with bump, the body scales rectangular and the rounded unlobed clavus with an average of 17 fin rays (14-24) and 12 ossicles (8-15) on the rear margin. It is to be remarked that among these characters, the bump on the head may be not considered as a distinctive character of *M. alexandrini*, since apparently Eastern Atlantic *M. mola* can have a bump on the head similar to *M. alexandrini*, as underlined by Wirtz & Biscoito (2019).

The sample reported in the present study was initially identified as an Ocean sunfish *Mola mola*, following the literature existing in the past (e.g., Tortonese, 1986; Bauchot, 1987). Recently, the sample was re-examined and, on the basis of the body features, morphological characters and proportions and colour described above, its identification was corrected and assigned to an adult of the Bumphead sunfish *M. alexandrini*, according to Nyegaard *et al.* (2018a) and Sawai *et al.* (2018). The results of fin rays' counts, although not completely reliable because they were recorded from the model, appear included in the ranges reported for *M. alexandrini* by Sawai *et al.* (2018). The weight of 900 Kg given for the TL of our specimen (226 cm) exceeded the weight of 730 kg obtained from the length-weight relationship of *M. alexandrini* by Sawai & Nyegaard (2022).

The recent comprehensive taxonomic reviews of Molidae (Nyegaard *et al.*, 2018a; Sawai *et al.*, 2018) allowed reexamining the distribution of *Mola* spp. all over the world as well as the reassignment of sunfish specimens identity preserved in museum collections and the reassessment of data on catches and their biological characteristics in Southwest Pacific (Nyegaard & Sawai, 2018; Nyegaard *et al.*, 2018b; Sawai *et al.*, 2018). The above studies revealed that the pelagic-oceanic fish *M. alexandrini* is a circumglobal taxon, widely distributed in the world oceans of both hemispheres, except for the polar regions, and can reach a maximum TL of 330 cm (Sawai *et al.*, 2018; Sawai & Nyegaard, 2022). The Bumphead sunfish *M. alexandrini* is to date the bony fish holding the world's primacy in weight: 2744 kg, for a specimen 325 cm of TL caught in 2021 in the oceanic archipelago of the Azores,



Fig. 2: The fiberglass model of *Mola alexandrini* realized by Ermano Bianchi and displayed at the Museo Civico di Storia Naturale di Comiso (MSNC). (Photo: Archives MSNC).

Sl. 2: Model, ki ga je izdelal Ermano Bianchi iz steklenih vlaken in je prikazan v prirodoslovnem muzeju v Comisu (MSNC) (Foto: Arhiv MSNC).

mid-north-east Atlantic, Portugal (Gomes-Pereira *et al.*, 2022).

According to the IUCN Red List of threatened species, the Ocean sunfish *M. mola* is assessed as a Vulnerable species at global level (Liu *et al.*, 2015), and as Data Deficient at European level (Rijnsdorp & Papakonstantinou, 2015).

In addition to the works of Nyegaard & Sawai (2018), Sawai *et al.* (2018), Sawai & Nyegaard (2022), Nyegaard *et al.* (2018a,b), further revisions of *Mola* specimens preserved in museum

collections as well as an accurate examination of published *Mola* findings and of old and recent available photographic material and/or underwater videos of sunfishes all over the world (cf. Wirtz & Biscoito, 2019; Pedersen *et al.*, 2022, 2023), will probably lead to the identification as *M. alexandrini* other sunfish specimens previously assigned to *M. mola*. This will improve knowledge on the global distribution of the Bumphead sunfish, including the Mediterranean Sea and, in parallel with the re-elaboration of data on sunfish catches and

strandings, will contribute to assess the status of both species populations.

In the Mediterranean Sea, ascertained records of *M. alexandrini* are the oldest one from the Adriatic Sea (Ranzani, 1839) and more recently those from Turkey, Spain, Libya, and Malta (Ahuir-Baraja *et al.*, 2017; Nyegaard *et al.*, 2018a; Sawai *et al.*, 2018). The finding of *M. alexandrini* described in the present study appears therefore the second confirmed record for the Adriatic Sea and could indicate that this species is a permanent inhabitant of this basin, although uncommon, as its sympatric *M. mola* (Dulčić *et al.*, 2007; Lipej *et al.* 2007; Pastore, 2009). Considering the above cited taxonomic revisions of Molidae, other sunfishes detected in the past in the Adriatic Sea and identified as *M. mola*, could be probably assigned to *M. alexandrini*, as in our case.

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SPREGLEDANA NAJDBA VRSTE *MOLA ALEXANDRINI* (RANZANI, 1839) V JADRANSKEM MORJU

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POVZETEK

Avtorji so na podlagi recentne taksonomske revizije družine Molidae razrešili identiteto velikega morskega meseca, ki ga je 1999 naplavilo na obalo plaže v severozahodnem Jadranu, za katerega se je izkazalo, da gre za vrsto *Mola alexandrini* (Ranzani, 1839) in ne za vrsto *Mola mola* (Linnaeus, 1758). Izdelan model tega primerka iz steklenih vlaken je shranjen v prirodoslovnem muzeju v Comisu (Ragusa, Italija). Gre za drugo najdbo te vrste v Jadranu in eno redkih v Sredozemskem morju.

Ključne besede: Molidae, *Mola mola*, *Mola alexandrini*, Sredozemsko morje

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