Mediterranean Marine Science

Vol 24, No 1 (2023)

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doi: 10.12681/mms.31742

Comment

Mediterranean Marine Science
Indexed in WoS (Web of Science, ISI Thomson) and SCOPUS
The journal is available on line at http://www.medit-mar-sc.net
www.hcmr.gr
DOI: http://doi.org/10.12681/mms.31742

Comment on "4.4 First record of the goblin shark *Mitsukurina owstoni* Jordan, 1898 (Lamniformes: Mitsukurinidae) in the Mediterranean Sea" by Athanasios Anastasiadis, Evangelos Papadimitriou and Frithjof C. Küpper in: Kousteni, V., Anastasiadis, A., Bariche, M., Battaglia, P., Bonifazi, A. *et al.* (2022). New records of rare species in the Mediterranean Sea (May 2022). *Mediterranean Marine Science*, 23 (3), 417-446

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Received: 6 November 2022; Accepted: 17 November 2022; Published online: 13 March 2023

The authors describe a first record of *Mitsukurina owstoni* in the Mediterranean Sea: "*On 25th August 2020, a specimen of* M. owstoni *was spotted dead on the shore accidentally by a citizen while walking on Klisidi beach of the Anafi Island (Cyclades, Aegean Sea, Greece: 36.3449°N, 25.7770°E) at a distance of about 6 m from the coastline. The goblin shark was placed on rocks to allow the capture of the best possible photograph (Fig. 17), based on which the key external taxonomical characters of the species were identified, including an extremely elongated, flat and blade-like snout; relatively small eyes; highly protrusible jaws; and absence of lower lobe from the tail.*" and continue "*Considering that the specimen reported herein did not exceed 80 cm in total length, it could be considered as a juvenile* M. owstoni*, suggesting that the species reproduction may occur in the Mediterranean Sea.*" The record is supported by their Fig. 17 depicting a photograph of the specimen.

On close examination of this image and analysis of the morphological characteristics of *M. owstoni*, doubts arise about the authenticity of the image provided as figure to support the record. Our doubts are based on the following reasons. (1) Figure 17 in Kousteni *et al.* (2022) shows a specimen with protruded jaws. The jaws of *Mitsukurina* are usually protruded in such a way in the context of the biting process in Nakaya *et al.*, 2016). In landed specimens, the protrusion of the jaws may be caused by the fishing gear applied or the specimen handling (Holanda & Filho, 2008; Prokofiev & Kukuev, 2009; Rincon *et al.*, 2012; Driggers *et al.*, 2014; Orlov *et al.*, 2017; Iqbal *et al.*, 2020). The authors state that the specimen did not show any signs of harm, which raises the question why the jaws are protruded at all, as this is an unnatural state. Further, (2) the image quality of figure 17 does not allow to clearly identify the number of gill slits in the specimen, but it seems as if the specimen shown in Kousteni *et al.* (2022) has only four gill slits (Fig. 1A), although *Mitsukurina* has five gill slits (Fig. 1B; Fig. 2) (Jordan, 1898). (3) The pectoral fins of the specimen in figure 17 appear too short for *M. owstoni,* in which the anterior margin length should be 7.49-9.97% of TL (Yano *et al.*, 2007) and stick out unnaturally giving the impression of stiffness. Especially unpreserved *Mitsukurina* specimens are soft-bodied and we would expect the fins not to stick out in such a way. Overall, the depicted specimen shows unnatural stiffness compared to the soft bodies of fresh but also preserved specimens (Fig. 1B). (4) Both the pectoral and pelvic fins are too roundish (Fig. 1A) compared to other specimens, which show a rather fan-like shape (Fig. 1B). (5) The shape of the caudal fin does not conform to that of other *M. owstoni* specimens. The lower edge of the caudal fin is straight in *M. owstoni* (Fig. 3), the illustrated specimen in Kousteni *et al.* (2022) shows a distinct widening in the anterior lobe (Fig. 1A). (6) *M. owstoni* has distinct large teeth, which should be visible when the jaws are protruded, even in such a low-quality image as in Kousteni *et al.* (2022) (Fig. 2B; Fig. 4). (7) The specimen shown in their Figure 17 appears to have a rounded rostrum, while it is flat in *M. owstoni.* (8) Generally, the fin edges seem not to be conformed to fin edges of other specimens of *M. owstoni* (Yano *et al.*, 2007). (9) The authors miss to provide information on the total length of the specimen but only state that the specimen was smaller than 80 cm. In the absence of a size standard, it would be important if the authors provided additional information about their size conclusion. (10) The name of the citizen who took the image and the origin of the picture is not provided. It remains unclear whether the rights holder of the image, Giannis Papadakis, is also the photographer and finder. Providing more than one photograph of the record would be of high value. Based on the above reasons, we have doubts that the specimen of *M. owstoni* shown in Kousteni *et al.* (2022) is a natural specimen. We would like to encourage the authors to provide additional evidence on their first record of *M. owstoni* in the Mediterranean Sea to strengthen their hypothesis.

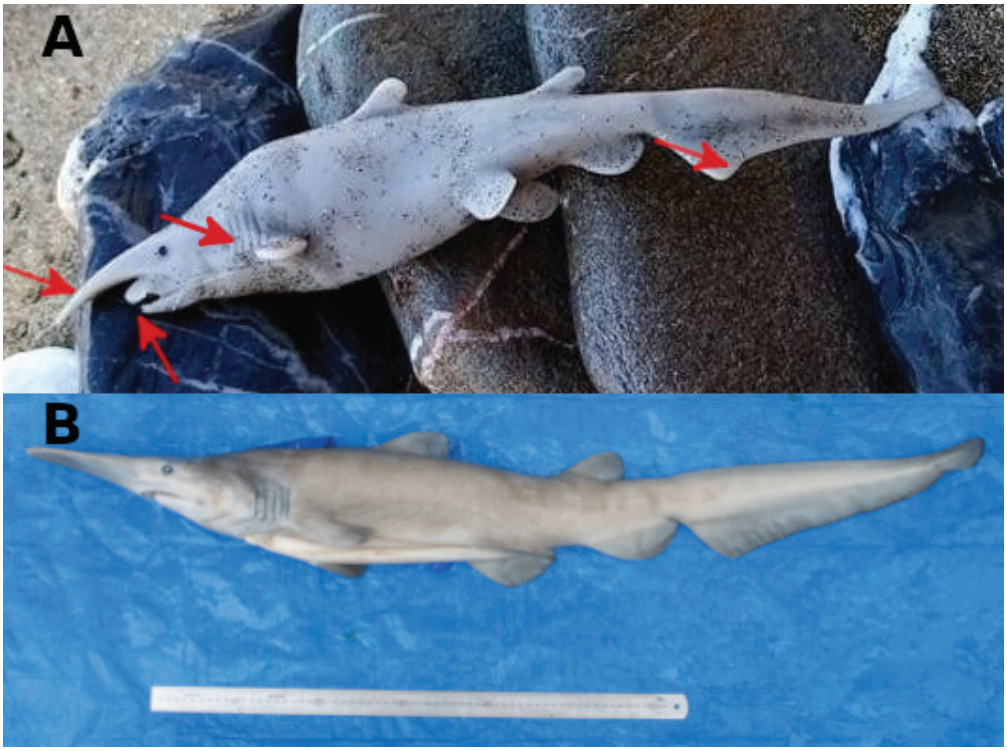

Fig. 1: Comparison of *M. owstoni* images. A: Fig. 17 from Kousteni *et al.* (2022): *M. owstoni* specimen found by a citizen on Klisidi beach of Anafi Island (Cyclades, Aegean Sea, Greece) on 25th August 2020. Photo credit: Giannis Papadakis. B: juvenile female *M. owstoni*, off Shimizu (Japan), TMFE 20778, Tokai University, Japan. Photo Credit: Nicolas Straube.

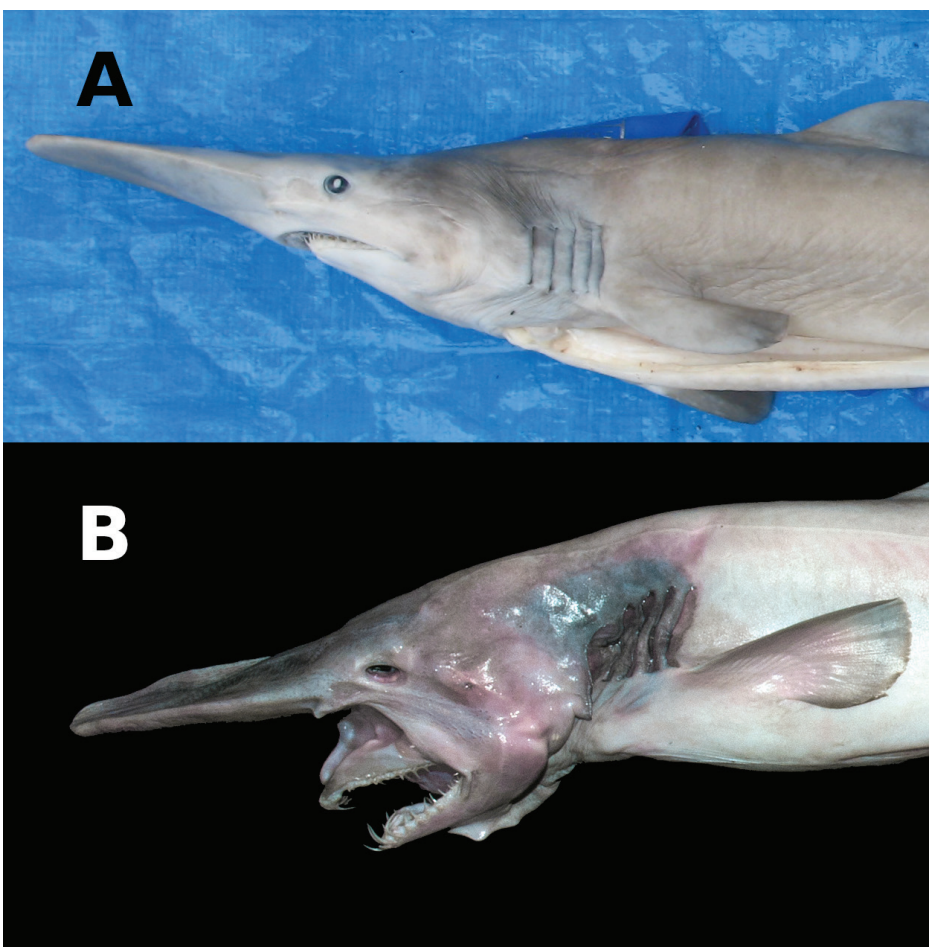

Fig. 2: Comparison of museum specimens of *Mitsukurina owstoni* with and without protruded jaws. A: juvenile female *M. owstoni*, off Shimizu (Japan), TMFE 20778, Tokai University, Japan. Photo Credit: Nicolas Straube. B: juvenile *M. owstoni*, NMV A 31131-001, Tasmania, Australia, June 2012. Source: Julian K. Finn / Museums Victoria. License: CC by Attribution (https://fishesofaustralia.net.au/Images/Image/MitsukOwston1JKFinn.jpg).

Fig. 3: Tail of juvenile *M. owstoni*, NMV A 31131-001, Tasmania, Australia. Source: Julian K. Finn / Museums Victoria. License: CC by Attribution (https://fishesofaustralia.net.au/Images/Image/MitsukOwston1JKFinn.jpg).

Fig. 4: *Mitsukurina owstoni*, jaw, Australia, 7-778/RZ, Shark Museum, Aathal, Source: https://shark-references.com/species/view/Mitsukurina-owstoni.

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