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## A HUGE SHORTFIN MAKO SHARK *ISURUS OXYRINCHUS* RAFINESQUE, 1810 (CHONDRICHTHYES: LAMNIDAE) FROM THE WATERS OF MARMARIS, TURKEY

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### ABSTRACT

*A huge female shortfin mako shark, Isurus oxyrinchus, was caught in the late 1950s off Marmaris (SE Aegean Sea, Turkey), by a commercial fisherman. Photographic documentation has been used by the authors to estimate the total length of this specimen at 585 cm (range from 577 to 619 cm). This size greatly exceeds the previous maximum size recorded for the species (a 445 cm long female caught in September 1973, off Six-Fours les-Plages, France). It is believed that the Marmaris specimen is the largest shortfin mako ever recorded worldwide.*

**Key words:** shortfin mako shark, *Isurus oxyrinchus*, maximum size, largest specimen, Turkey, Aegean Sea

## UN ENORME SQUALO MAKO DALLE PINNE CORTE *ISURUS OXYRINCHUS* RAFINESQUE, 1810 (CHONDRICHTHYES: LAMNIDAE) CATTURATO A MARMARIS, TURCHIA

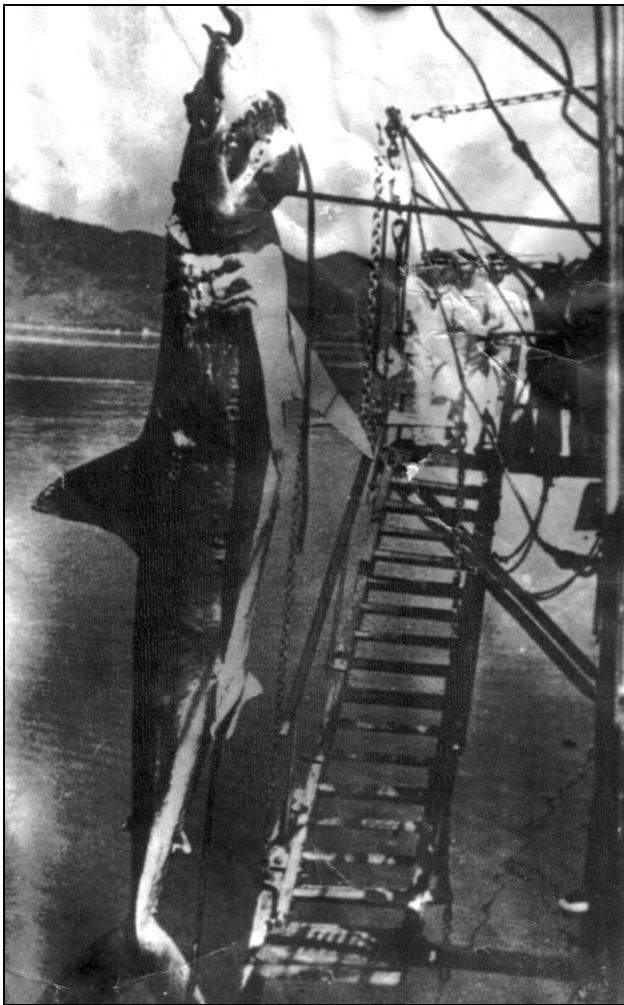
### SINTESI

*Un'enorme femmina di squalo mako dalle pinne corte, Isurus oxyrinchus, venne catturata alla fine degli anni '50 al largo di Marmaris (Mar Egeo Nord-Orientale, Turchia), da un pescatore professionista. La documentazione fotografica è stata usata dagli autori per stimare la lunghezza totale di tale esemplare pari a 585 cm (range compreso tra 577 e 619 cm). Tale misura supera ampiamente le dimensioni massime registrate in precedenza per la specie (una femmina di 445 cm presa nel Settembre 1973 a Six-Fours les-Plages, Francia). Pertanto l'esemplare di Marmaris è il più grande della sua specie mai registrato a livello mondiale.*

**Parole chiave:** squalo mako dalle pinne corte, *Isurus oxyrinchus*, dimensioni massime, Turchia, Mar Egeo

## INTRODUCTION

The peregrine falcon of the shark world, the shortfin mako, *Isurus oxyrinchus* Rafinesque, 1810, is a cosmopolitan species in temperate and tropical waters of the Atlantic, Pacific and Indian Oceans. It is pelagic, coastal and oceanic, occurring at a depth range from the surface to 500 m (Compagno, 2001). The shortfin mako is present in the entire Mediterranean (De Maddalena & Baensch, 2005), where it is caught mainly in the tuna longline fishery and occasionally in the swordfish fishery using longlines and driftnets (Celona *et al.*, 2004; Megalofonou *et al.*, 2005).



**Fig. 1:** This estimated 585 cm TL female shortfin mako shark *Isurus oxyrinchus*, caught in the late 1950s off Marmaris, Turkey, is believed to be the largest of its species ever recorded worldwide.

**Sl. 1:** Ta, po naših ocenah 585 cm dolga samica vrste atlantski mako *Isurus oxyrinchus*, ujeta v poznih 1950ih ob obali kraja Marmaris, Turčija, je verjetno največji kadarkoli zabeležen primerek svoje vrste.

The presence of *I. oxyrinchus* in Turkish waters is known due to the pioneering work of Akşiray (1954; in Bilecenoğlu *et al.*, 2002). After the first record of the species in the seas of Turkey, there have been numerous subsequent accounts of its occurrence off the Turkish coast, made by several authors reviewed in Kabasakal (2002, 2011). In the present article, we report on a historical record of a huge shortfin mako from Turkish waters.

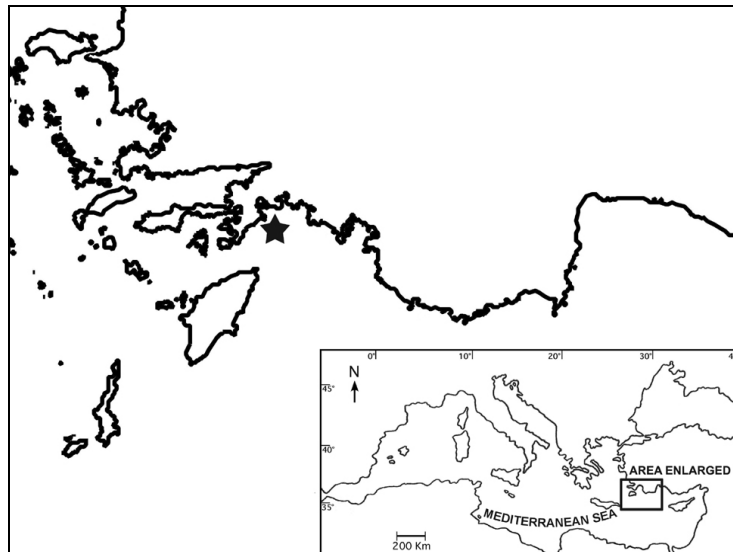
## MATERIALS AND METHODS

A shortfin mako (Fig. 1) was caught in the late 1950s off Marmaris (SE Aegean Sea, Turkey; Fig. 2), by a commercial fisherman using an unknown type of fishing net. Additional details of this capture are unknown. The captured specimen was hung on a pole from a battleship of the Turkish Navy, anchored near Marmaris. Species identification is based on the photograph, which was taken by the sailors, and is based on De Maddalena *et al.* (2005). As it was pointed out in De Maddalena *et al.* (2001), photos must be used with great caution when estimating the size of a large shark since there is a high probability of inaccurate results. It is absolutely necessary that we use only pictures of the whole specimen or a wide part of it that is not deformed by imperfections in the camera lens or by the perspective of the shot. It is also essential that a large object of known size is located in the plane of the shark in the photograph. The photo portraying the Marmaris specimen meets these criteria and has been considered suitable for producing a valid estimate of the specimen size. The photograph of the specimen is stored in the archives of the Ichthyological Research Society (IRS).

## RESULTS AND DISCUSSION

The following morphological features of the specimen portrayed in the photo allowed the authors to make an immediate identification of the specimen as *Isurus oxyrinchus*: strongly spindle-shaped body, pointed conical snout, presence of caudal keel, long gill slits, origin of dorsal fin posterior to pectoral fin free rear tips, relatively short pectoral fins, high and erect first dorsal fin, narrow and curved teeth, no black spot on the ventral surface of the apex of pectoral fins (De Maddalena *et al.*, 2005).

The size of the shark was not reported and it is not known whether it was measured at the time of capture or not. However, the exceptional size of this specimen is clearly demonstrated by the photographic documentation. The authors used the photo of the Marmaris mako to produce an accurate estimate of the size of this specimen. We used the first sailor standing at the top of the stairs of the battleship as a reference. Since the Turkish Navy is known to take sailors that are at least 170 cm tall, we assumed the sailor used as the refer



**Fig. 2: Capture location (Marmaris, Turkey) of the estimated 585 cm TL female shortfin mako shark *Isurus oxyrinchus* (photograph courtesy of Ateş Evirgen).**

**Sl. 2: Lokacija (Marmaris, Turčija), kjer je bila ujeta 585 cm dolga samica atlantskega makoja *Isurus oxyrinchus* (fotografija last Ateša Evirgena).**

ence was of that height. However, the sailor is not in the same plane as the shark, being further away from the photographer. Therefore, we needed to calculate how much the sailor's height has been reduced by the perspective compared to his size if he had been located in the same plane as the shark. We compared the height of the steps at the base of the stairs near the shark with those at the top. The photo was scanned and enlarged, and the steps were measured as accurately as possible to obtain a scaling factor. We concluded that the sailor would appear 150% of his size when transposed to the same plane as the shark. The 150% scaling factor may have a minor degree of error, because when enlarged the old photo is not sharp, which makes it impossible to obtain a more accurate measurement. Then we easily calculated the size of the shark at 486 cm precaudal length (PCL). The following relationships were then used to calculate the total length of the shark from the PCL:

$UCL$  (upper caudal length) =  $0.250 PCL + 2.583$  (Cliff *et al.*, 1989),

$TL$  (total length) =  $PCL + 0.8 UCL$  (Bass *et al.*, 1975).

We therefore obtained a measurement of 585 cm TL for the Marmaris specimen.

According to De Maddalena *et al.* (2005), shortfin mako's PCL ranges from 78.5 to 84.2% of TL, so a range for the Marmaris specimen would be from 619.11 to 577.20 cm TL.

We believe that the shortfin mako reported in this work is the largest specimen ever recorded, worldwide.

A recent study of 199 specimens showed that the average total length is 171 cm (Kohler *et al.*, 1996). The previous maximum reported length for *I. oxyrinchus* was

445 cm, for a huge specimen caught off Six-Fours les-Plages, France in September 1973 (Capapé, 1977). Other large specimens have been recorded in the Mediterranean area. A large 425 cm shortfin mako was caught off La Galite Island, Tunisia, on September 24, 1876, and its jaws are preserved in the Natural History Museum of Genoa, Italy (Doria & Gestro, 1877). Lawley (1881) reported on a 4 m long specimen that weighed 1000 kg, which was observed in a warehouse of a fishmonger in Livorno and was caught off Piombino, Italy. Another 400 cm long shortfin mako was captured off Caska, Novalja, Croatia, on May 13, 1882, and was reported by Brusina (1888). More recently, a 390 cm long shortfin mako was caught on November 30, 1991, off Bagnara Calabria, Italy (Storai *et al.*, 2001). Another 390 cm long specimen, weighing 513 kg, was caught on September 20, 2000 off Punta Alice, Italy (Storai *et al.*, 2001). A 390 cm long female was caught on July 26, 2003 off Scaletta Zanclea, Italy, and another female, measuring 370 cm TL, was caught between Portopalo di Capo Passero and Marzamemi, Italy, on June 22, 2004 (Celona *et al.*, 2004).

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ORJAŠKI PRIMEREK VRSTE ATLANTSKI MAKO *ISURUS OXYRINCHUS* RAFINESQUE, 1810 (CHONDRICHTHYES: LAMNIDAE), UJET PRI KRAJU MARMARIS, TURČIJA

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## POVZETEK

*Orjaško samico vrste atlantski mako Isurus oxyrinchus je v poznih 1950ih pri kraju Marmaris (JV Egejsko morje, Turčija) ujel komercialni ribič. Avtorji so na podlagi fotografske dokumentacije ocenili, da je bila celotna dolžina tega primerka 585 cm (od 577 do 619 cm). Ocenjena velikost zelo presega do sedaj zabeleženo maksimalno velikost primerka te vrste (445 cm dolge samice, ujete septembra 1973 pri kraju Six-Fours les-Plages, Francija). Primerek iz Marmarisa je tako verjetno največji kadarkoli zabeležen atlantski mako.*

**Ključne besede:** atlantski mako, *Isurus oxyrinchus*, maksimalna velikost, največji primerek, Turčija, Egejsko morje

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