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ON THE JAWS OF A SHORTFIN MAKO SHARK, *ISURUS OXYRINCHUS*, CAUGHT OFF THE İZMİR PENINSULA (CENTRAL AEGEAN SEA, TURKEY)

Hakan KABASAKAL

Ichthyological Research Society, Tantavi mahallesi, Menteşoğlu caddesi, İdil Apt., No: 30, D: 4, Ümraniye, TR-34764, İstanbul, Turkey
e-mail: kbasakal.hakan@gmail.com

ABSTRACT

An old record of shortfin mako shark, Isurus oxyrinchus, is discussed based on the set of upper and lower jaws dissected from a specimen caught off the İzmir Peninsula, central Aegean Sea, Turkey, which is now on display at the Kuşadası fish market. The specimen was captured as bycatch by a purse-seiner in the early 1990s. Based on the lower jaw circumference to total length ratio for I. oxyrinchus, the total length of this specimen was estimated at 1.8 m.

Key words: shortfin mako shark, *Isurus*, Kuşadası, jaws, historical record

MASCELLE DI SQUALO MAKO, *ISURUS OXYRINCHUS*, CATTURATO AL LARGO DELLA PENISOLA DI İZMİR (MAR EGEO CENTRALE, TURCHIA)

SINTESI

Nell'articolo viene discusso un vecchio ritrovamento di squalo mako, Isurus oxyrinchus, sulla base della dissezione delle mascelle superiore e inferiore di un esemplare catturato al largo della penisola di İzmir (Turchia), nel mar Egeo centrale, ora esposte al mercato dei pesci di Kuşadası. L'esemplare è stato prelevato come cattura accessoria da una rete da circuizione nei primi anni 90 del secolo scorso. In base al rapporto fra la circonferenza della mascella inferiore e lunghezza totale per la specie in questione, la lunghezza totale di questo esemplare è stata stimata a 1,8 m.

Parole chiave: squalo mako, *Isurus*, Kuşadası, mascelle, ritrovamento storico

INTRODUCTION

Shark experts often rely on teeth and jaws as valuable aids in identifying the species and size of a given shark specimen. Since shark jaws and teeth are considered attractive decoration for coastal facilities, such as restaurants, fishmongers and others, these trophies can, if reliable fishing data are available, provide valuable data sources of historical records of local sharks.

The occurrence of *I. oxyrinchus* in Turkish waters was reviewed by Kabasakal (2015), and a most recent northern Aegean Sea record was reported by Tunçer & Kabasakal (2016). In the present note, the author reports on the mentioned jaw of *I. oxyrinchus*.

MATERIAL AND METHODS

In early September 2017, during a field trip, the author of the present article had the opportunity to examine a set of dried upper and lower jaws of a shortfin mako shark, *Isurus oxyrinchus* Rafinesque, 1810, which is on display in Kuşadası, Turkey. The shark, the dried jaw of which is shown in Figure 1, was caught by a purse-seiner off the İzmir Peninsula (Fig. 2) in the early 1990s. The dental features of the examined jaw were compared with the dental characters of *I. oxyrinchus* as described by Compagno (2002).

RESULTS AND DISCUSSION

Anterior teeth of the examined jaw enlarged, with single dagger-shaped cusps and not forming a continuous cutting edge. Intermediate teeth very small, less

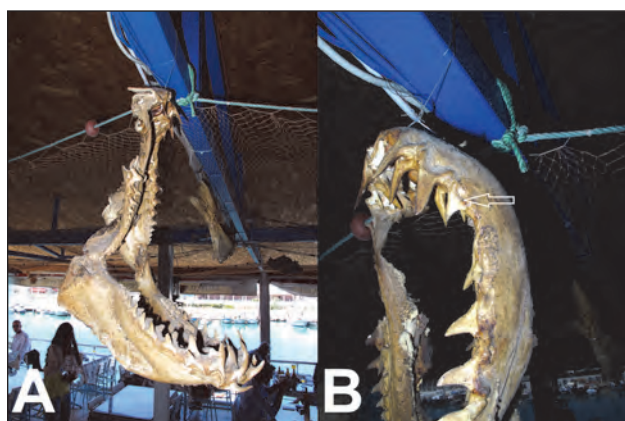


Fig. 1: (A) Examined dried jaw of the *Isurus oxyrinchus* caught off İzmir peninsula in the early 1990s. (B) Anterior and intermediate teeth of the examined jaw; the arrow indicates the 3rd anterior tooth.

Sl. 1: (A) Preiskana posušena čeljust atlantskega mako, ujetega ob izmirskem polotoku v zgodnjih devetdesetih. (B) Sprednji in vmesni zobje iz preiskane čeljusti; puščica označuje tretji sprednji zob.



Fig. 2: Map depicting the approximate site of capture (★) of the examined specimen in the central Aegean Sea.

Sl. 2: Zemljevid obravnavanega območja z označeno približno lokaliteto (★), kjer je bil primerek ujet v osrednjem Egejskem morju.

than half the height of the adjacent anterior teeth (Fig. 1). Cusps of upper and lower anterior teeth flexed, tips reversed (Fig. 1). The dental features of the examined jaw coincided with the dental characters of *I. oxyrinchus* as described by Compagno (2002). The examined jaw of the shortfin mako shark is displayed as decoration in the Kuşadası fish market.

The circumference of the lower jaw of the examined specimen was 377.4 mm, and based on this measurement, the total length of the shortfin mako shark was estimated at 1.809 m. This measurement and the resultant total length of the examined shortfin mako shark coincided with the lower jaw circumference range (203–505 mm) and estimated total length range (1,360–3,200 mm) stated by Lowry *et al.* (2009). The height of the 1st anterior tooth on the lower jaw was 32 mm. The height of the 1st anterior tooth measured by Celona *et al.* (2004) on an estimated 390 cm long female shortfin mako, caught off Scaletta Zanclea, Sicily, on 26 July 2003, was 45 mm.

The dental formula for the upper and lower jaws of the examined shortfin mako was 12-12 / 13-13, respectively. The tooth count in *I. oxyrinchus* is remarkably variable. Based on the lower-jaw tooth count information for shortfin mako sharks from the Pacific, the Atlantic-Mediterranean and the Indian Oceans, Garrick (1967) reported the dental formulae as 11-16, 11-15 and 10-13, respectively. The dental count of the upper and lower jaws of a male shortfin mako shark (123.6 cm TL) caught in the Bay of Saroz was 14-14 / 14-14 (Kabasakal & Kabasakal, 2013). The dental formula of the Scaletta Zanclea specimen was 12-12 / 12-12 (Celona *et al.*, 2004).

In a recent review of the occurrence of *I. oxyrinchus* off the Turkish coast, Kabasakal (2015) reported on the capture of 17 shortfin mako sharks in the period between 1950 and 2013. Following this review, a juvenile male (74.7 cm TL) was caught in the coastal waters of the Bay of Edremit on 8 April 2016 (Tunçer & Kabasakal, 2016). According to Kabasakal *et al.* (2017), 5.3% (n=21) of large elasmobranchs captured by the Turkish fishing fleet between 1990 and 2015 was comprised of *I. oxyrinchus*. Both historical and contemporary occurrences of shortfin mako shark in Turkish seas are corroborated by several studies (Kabasakal & De Maddalena, 2011; Ergüden *et al.*, 2013; Kabasakal & Kabasakal, 2013; Kabasakal, 2015; Tunçer & Kabasakal, 2016). Most of the data on the occurrence of *I. oxyrinchus* in the waters of Turkey were obtained by fishery-dependent studies. Such studies are valuable data sources for clarifying the contemporary occurrence of shortfin mako shark and other sharks in Turkish waters. While available data on the occurrence of *I. oxyrinchus* suggest that the shortfin mako shark is a rarely occurring large shark in Turkish Aegean and Mediterranean waters (Kabasakal, 2015; Tunçer & Kabasakal, 2016), the examined jaw provides further evidence supporting its historical occurrence in the mentioned marine region.

The forensic analysis method used to determine the size of a shark based on the circumference of the jaws (Lowry *et al.*, 2009) has proved to be a valuable tool in shark research. Following this method, it could be possible to estimate the sizes of previously recorded local sharks caught off the Turkish coasts of the Aegean and Mediterranean Seas – at least the species examined by

Lowry *et al.* (2009) – based on their preserved jaws. The size estimations of historical records can provide valuable data in determining whether nowadays the local sharks are decreasing in size or not in comparison with historical specimens. Although the historical and contemporary occurrence of shortfin mako shark in Turkish Aegean and Mediterranean waters has been confirmed, the available knowledge does not allow us to make a reliable prediction of the seasonality of *I. oxyrinchus* in the mentioned region. Since several large specimens (TL \geq 250 cm) have been caught in the mentioned region, and *I. oxyrinchus* is considered dangerous and responsible for unprovoked attacks on swimmers and boats (Bonfil & Abdallah, 2004), the seasonal occurrence of this species in Turkish waters should be monitored, as emphasised by Kabasakal (2015). Today, the aforementioned coastline is intensively used for aquaculture, fishery and recreational activities. Therefore, the seasonal co-existence of man and shortfin mako shark could evolve into a major problem, possibly triggering a headhunt and thus jeopardizing the survival of *I. oxyrinchus* as well as other local large predatory sharks.

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ČELJUSTI PRIMERKA ATLANTSKEGA MAKA, *ISURUS OXYRINCHUS*, UJETEGA OB IZMIRSKEM POLOTOKU (OSREDNJE EGEJSKO MORJE, TURČIJA)

Hakan KABASAKAL

Ichthyological Research Society, Tantavi mahallesi, Menteşoğlu caddesi, İdil Apt., No: 30, D: 4, Ümraniye, TR-34764, İstanbul, Turkey
e-mail: kabasakal.hakan@gmail.com

POVZETEK

Avtor poroča o starejšem zapisu, ki se nanaša na ulov primerka atlantskega mako, *Isurus oxyrinchus*, ob izmirskem polotoku v osrednjem Egejskem morju. Ohranjene so njegove čeljusti, ki jih razkazujejo na ribji tržnici Kuşadası. Primerk se je ujel kot prilov v povlečni mreži iz zgodnjih devetdesetih let. Na podlagi odnosa med obodom spodnje čeljusti in celotno dolžino telesa je bila ocenjena velikost primerka 1,8 m dolžine.

Ključne besede: atlantski mako, *Isurus*, Kuşadası, čeljusti, zgodovinski zapis

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