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Short Communication

Historical and contemporary records of the angular rough shark *Oxynotus centrina* (Chondrichthyes; Oxynotidae) in Turkish waters

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Abstract

During the last 58 years only 12 angular rough sharks have been recorded in Turkish waters. Rare captures of the species in the area indicate a need for immediate action to be taken for the conservation of *O. centrina.* To protect the habitat of *O. centrina,* strict regulations should be implemented regarding diving in the localities where angular rough sharks occur regularly. Protecting the habitat of the angular rough shark is an urgent need before subjecting *O. centrina* to 100% protection in the seas of Turkey.

Keywords: Rough shark; Oxynotidae; Protection; Mediterranean.

Introduction

The angular rough shark, *Oxynotus centrina* (Linnaeus, 1758), is an uncommon, little-known shark, reported in the entire Mediterranean Sea (SERENA, 2005) and eastern Atlantic from south of the British Isles to Senegal, and farther south off South Africa (COMPAGNO, 1984). *O. centrina* is a sluggish shark found over the continental shelf and upper slope at depth ranges generally between 60 and 660 m (COMPAGNO, 1984); however, a recent DESEAS survey revealed that lower limit of the depth range of the angular rough shark extends to 800 m in the western Ionian Sea (SION *et al.,* 2004), and the upper limit may cover shallower areas around 30 m, as observed in the present study.

In the Mediterranean Sea occurrence of *O. centrina,* a rare bycatch in deep-sea trawling, is well-documented (SERENA, 2005). The presence of the angular rough shark in Turkish waters was reported in several studies (BAŞUSTA *et al.,* 1998; BAYHAN *et al.,* 2006; ERAZİ , 1942; ERYILMAZ, 2003; KABASAKAL, 2003; KABASAKAL & KABASAKAL, 2004; ÖZİ Ç & YILMAZ, 2006).

Some traits of the reproductive biology of *O. centrina* were given by CAPAPÉ *et al.* (1999) for specimens from both Langue-

docian and Tunisian coasts, while a description of a female bearing developing embryos was reported by MEGALOFONOU & DAMALAS (2004) from the Aegean Sea. DRAGIČEVIĆ *et al.* (2009) made observations on the reproductive tract of a mature female accidentally caught in the eastern Adriatic Sea. Additionally, CAPAPÉ *et al.* (2001) reported biological observations carried out on *O. centrina* from the coast of Senegal. Some aspects of the diet of *O. centrina* were given for specimens off Tunisia (CAPAPÉ, 1975), from Catalonia's continental slope waters (BARRULL & MATE, 2001) and off the Languedocian coast (CAPAPÉ, 2008).

The aim of this paper is to present the historical and contemporary records of *O. centrina* from Turkish waters. The status of the angular rough shark in Turkish waters with respect to the conservation of the species is discussed in the light of current data.

Material and Methods

The present study is part of the KANIT project, which was initiated in 2000 by the Ichthyological Research Society (I.R.S.), in order to update the status of sharks in Turkish waters. Historical and contemporary records of *O. centrina* in Turkish waters were obtained from the following data: (a) ichthyological literature; (b) popular media such as daily newspapers or fishing and/or diving magazines; (c) fishmonger surveys; (d) specimens stored in museums; and (e) underwater photographs with information on locality of sight, date, etc. Total length (TOT) of specimens was extracted from the literature, measured on board (specimen Nos. 2, 3 & 4; Tab.1) or in water (specimen Nos. 11 & 12; Tab. 1). TOT is the distance from the tip of the snout to a perpendicular intersecting the upper caudal lobe (COMPAGNO, 1984). Because of the inconvenient conditions of in water measurement, divers were not able to measure the total length of specimen Nos. 11 & 12 accurrately. Therefore, their TOTs are given as approximate values. Raw data and images are kept in the archives of I.R.S. To watch the underwater video footage of specimen No. 12, please visit the following link: http://derintakip.blogspot.com/2009/11/angular-rough-shark-in-sea-of-marmara.html

Results

Historical and contemporary records of *O. centrina* from Turkish waters and fishing data are presented in Table 1. Fishing localities are shown on the map in Figure 1.

Discussion and Conclusions

The earliest record of *O. centrina* (Fig. 2) from Turkish waters was made by ERAZİ (1942). In one of the pioneering studies on the fish fauna of the Sea of Marmara and the Bosphorus Strait, the author mentioned the angular rough shark as a Mediterranean-originated fish occurring in the investigated area. Although ERAZİ (1942) added *O. centrina* to the fish fauna of the Bosphorus Strait, currently the angular rough shark does not occur in the waters of the Bosphorus (KABASAKAL, 2003). Following the earliest record of *O. centrina* in Turkish waters by ERAZİ (1942), the angular rough shark has been accounted in several ichthyological studies of the seas of Turkey (BAŞ USTA, *et al.,* 1998; ERYILMAZ, 2003; KABASAKAL, 2003; KABASAKAL & KABASAKAL, 2004; BAYHAN *et al.,* 2006; ÖZİÇ & YILMAZ, 2006). The rarity of *O. centrina* in the Turkish waters has become obvious after the most recent thorough investigations.

Table 1
Present specimen and the recent records of *O. centrina* from Turkish waters. The numbers seen under the "No" column are the same as the numbers seen on the map in Figure 1.

No	Date	Locality	TOT (cm)	Sex	Depth (m)	Gear	Reference
1	1942	Sea of Marmara	?	?	?	?	ERAZİ (1942)
2	November 1994	Yassıada	40	♀	90	Bottom trawl	KABASAKAL (2003)
3	February 1996	Ekinlik island	35	♂	60	Gill net	KABASAKAL (2003)
4	February 1996	Ekinlik island	41	♂	60	Gill net	KABASAKAL (2003)
5	November 1998	NE Aegean Sea	65	♀	?	Bottom trawl	KABASAKAL & KABASAKAL (2004)
6	?	İskenderun Bay	53.2	?	70-80	Bottom trawl	BAŞUSTA *et al.* (2000)
7	September 2001	Bozcaada	22.5	?	60	Bottom trawl	ERYILMAZ (2003)
8	?	Gökova Bay	?	?	80	Bottom trawl	ÖZİÇ & YILMAZ (2006)
9	December 2000	Marmara Adası	36	?	42	Beam trawl	BAYHAN *et al.* (2006)
10	June 2001	Bandırma Bay	52	?	86	Beam trawl	BAYHAN *et al.* (2006)
11	2000	Yassıada	ca. 50	♀	ca. 35	Visual sampling (Fig. 2)	KABASAKAL (unpublished data)
12	September 2009	Balıkçı Island	ca. 60	♀	35	Visual sampling	Present specimen

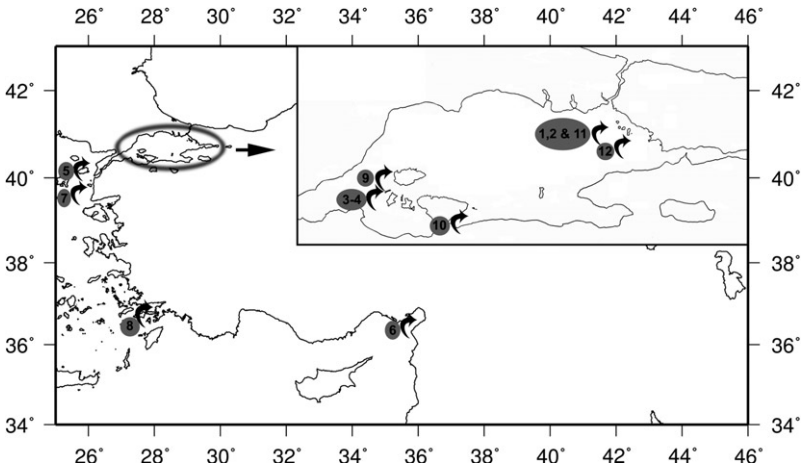

Fig. 1: Fishing localities of the angular rough sharks, *Oxynotus centrina,* along the Turkish coast. Numbers on the map are the same as the numbers seen in 'No' column in Table 1.

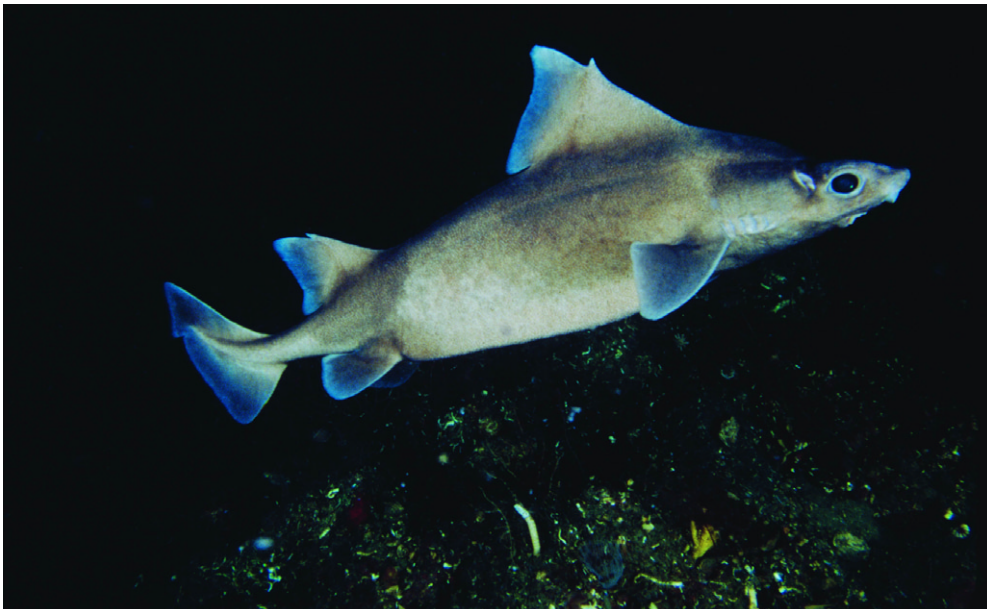

Fig. 2: Angular rough shark, *Oxynotus centrina,* observed in coastal waters off Yassıada in 2000 (specimen No. 11; Tab. 1). (Photo: Tahsin Ceylan).

O. centrina is considered to be a deep-water shark (COMPAGNO, 1984; SION *et al.,* 2004); however, the present study has shown that it can ascend to shallower depths of around 30 m. Nocturnal excursions to shallow water by the angular rough shark increase the chance of incidental captures by coastal fishing gear, coastal gill-netting in particular. Furthermore, the shallower the angular rough shark occurs, the higher the chance of encountering divers. Personal communication with local scuba divers, who regularly visit the Prince Islands (see the locality of specimen Nos. 1, 2, 11 & 12; Fig. 1), a favourable location for angular rough shark watching, revealed that in several instances, divers retained the shark and brought it to shallower depths to display it to other divers.

In the literature, the maximum total length of *O. centrina* is reported as 150 cm (SERENA, 2005); however, a female of 80 cm total length was recorded from the Adriatic Sea, and is considered to be the largest angular rough shark recorded to date in the Mediterranean (DRAGIČEVIĆ *et al.,* 2009). Total length of the largest specimen recorded during the present study was 65 cm (Table 1; specimen no 5). According to TSIKLIRAS *et al.* (2005), O. centrina is one of the slowest growing species in reaching the first maturity. Ratio of size at first maturity to maximum reported size of *O. centrina* is 0.94, which means the angular rough shark is a slow growing and late maturing shark (TSIKLIRAS *et al.,* 2005). Deep-sea fish resources are generally considered to have high longevity, slow growth, late maturity and low fecundity. Thus, they have been considered significantly vulnerable to exploitation (CAVANAGH & KYNE, 2003; MORATO *et al.,* 2006). Based on the unproductive life-history characteristics of the angular rough shark and documented de-

clines in the Mediterranean as well as inferred declines in the northeast Atlantic, and continuing fishing pressure through much of its range, *O. centrina* is assessed as 'vulnerable' globally and listed in the IUCN Red List (GIBSON *et al.,* 2008). According to SERENA (2005), *O. centrina* is a 'threatened species' in the Mediterranean Sea. FRICKE *et al.* (2007) considered *O. centrina* as 'vulnerable', as well as sensitive to human activities in the seas of Turkey; however, the species has low priority for conservation action. In Turkey, the angular rough shark has no economic value and is generally discarded by fishermen at sea, which explains why the species is not observed in fishery landings and in fish markets. During the last 58 years, only 12 angular rough sharks have been recorded in Turkish waters (Table 1).

At present, modern angling gear allowing fishermen to deploy fishing tackle down to bathyal waters, is a new risk to deep-dwelling sharks, especially in the Sea of Marmara. Although, *O. centrina* inhabits deep sea bottoms, use of modern fishing gear makes it accessible and rather vulnerable (DRAGIČEVIĆ *et al.,* 2009). Recently, recreational anglers captured an adolescent sixgill shark (*Hexanchus griseus*), which had a total length of ca. 200 cm in the Çınarcık trench (north-eastern Sea of Marmara), at a depth of nearly 1000 m by means of a deep-water shark tackle. Based on Rio Decleration Principle 15, in order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities (UN PUBLICATIONS, 1992). Recent evidence showed that northern Sea of Marmara trenches are inhabited by several other sharks, such as *H. griseus, Echinorhinus brucus* (bramble shark) and *Dalatias licha* (kitefin shark) (KABASAKAL, 2003). Therefore, promoting action to protect the habitat of *O. centrina* will be beneficial for the conservation of sympatric deep-water sharks occurring in the bathyal grounds of the Sea of Marmara, as well. Since no data are available to estimate the life history characteristics of *O. centrina* in Turkish waters, this precautionary approach should be more or less suggested for all shark species when lacking basic knowledge of their biology. In order to protect the habitat of *O. centrina,* as well as to avoid disturbing the specimens encountered during recreational diving activities, strict regulations should be implemented regarding diving in the localities where the angular rough sharks occur regularly. Habitat protection seems an urgent need for the conservation of the angular rough shark in the seas of Turkey.

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