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# First documented smoothback angelshark Squatina oculata Bonaparte, 1840 from the North-Eastern Mediterranean Sea, Turkey

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**Abstract:** One female specimen of the Smoothback Angelshark *Squatina oculata* was captured by a commercial trawler at a depth of 65 m on 4 November 2017 from Aydıncık coast (North-eastern Mediterranean Sea, Turkey). *Squatina oculata* had not been reported in this part of the North-eastern Mediterranean Sea nearly for the last two decades. The captured specimen was 726 mm in total length and 3450 g in weight. Morphometric and meristic characters of the captured specimen are compared with the other Mediterranean records. Due to increasing fishing activities and habitat degradation throughout the Mediterranean Sea during the last decades, angelshark species are dramatically declined day by day. Thus, conservation status of the Smoothback Angelshark *S. oculata* in the Mediterranean Sea is classified as "Critically Endangered" at Global Red List by IUCN.

**Résumé :** Premier signalement de l'ange de mer ocellé Squatina oculata Bonaparte, 1840 au nord-est de la Méditerranée, Turquie. Un spécimen femelle de l'ange de mer ocellé, Squatina oculata (Bonaparte, 1840), a été capturé (726 mm de longueur totale et 3450 g de poids total) par un chalutier commercial à une profondeur de 65 m le 4 novembre 2017 au large d'Aydıncık (Nord-est de la Méditerranée, Turquie). C'est le premier signalement de S. oculata le long de la côte nord-orientale de la Méditerranée depuis près de deux décennies. Les caractères morphométriques et méristiques du spécimen capturé ont été comparés à d'autres observations en Méditerranée. En raison de l'augmentation des activités de pêche et de la dégradation de l'habitat dans toute la Méditerranée au cours des dernières décennies, les anges de mer déclinent de manière dramatique de jour en jour. Ainsi, l'ange de mer ocellé S. oculata est classé en Méditerranée "en danger critique d'extinction" sur la liste rouge mondiale de l'UICN.

Keywords: Record • Rare species • Squatina oculata • Aydıncık Coast • Turkey

### Introduction

Squatina species are named as angelsharks and belong to the family Squatinidae which has one genus in the world. The genus *Squatina* Duméril, 1806 is represented by three species in the Mediterranean Sea: Sawback Angelshark, *Squatina aculeata* Cuvier, 1829, Angelshark, *Squatina squatina* (Linnaeus, 1758) and Smoothback Angelshark, *Squatina oculata* Bonaparte, 1840 (Golani et al., 2006; Akyol et al., 2015). The angelsharks are benthic species, inhabiting tropical and subtropical regions in the eastern Atlantic coastal waters (Froese & Pauly, 2018).

Nowadays, the angelsharks were identified as the second most threatened of all the world's sharks and rays (Chondrichthyans) after a global review of extinction risk by the International Union for Conservation of Nature (IUCN, 2018) Shark Specialist Group (Dulvy et al., 2014).

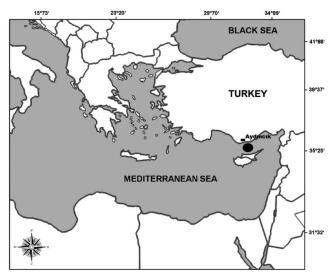
The Smoothback Angelshark *S. oculata* was commonly found in warm-temperate and tropical waters of the eastern Atlantic continental shelves and upper slopes from 20 to 500 m, mostly between 50 and 100 m (Compagno, 1984; Serena, 2005). Ondrias (1971) and Roux (1984) stated that it is rarely distributed in the western basin of the Atlantic Ocean. However, Fredj & Maurin (1987) and Fischer et al. (1987) have reported the presence of this species from the western and eastern Mediterranean waters. Nevertheless, this species has been rarely seen in Tunisia (Gulf of Gabes) and more generally in the southern regions of the Mediterranean Sea (Bradai et al., 2006).

Although the occurrence of the Smoothback Angelshark species in the Mediterranean has been reported from Turkish coast in previous years (JICA, 1993), this species is extremely rare in the north-eastern part of the Mediterranean Sea (Golani, 1996; Golani et al., 2006) and also throughout the Mediterranean (Kabasakal & Kabasakal, 2014). After a first confirmed occurrence of S. oculata in the Levantine basin by Golani (1996), this species was reported from Syria (Saad et al., 2006) and Rhodes coast (Corsini & Zava, 2007). S. oculata was recorded for the first time from the eastern Mediterranean coast of Turkey by Başusta & Erdem (2000), and then reported from the Sea of Marmara, the Aegean Sea, and the Levantine Seain the checklist of the marine fishes of Turkey by Bilecenoglu et al. (2002 & 2014). Additionally, Miller (2016) reported an individual of S. oculata from Akyaka in the Aegean Sea coasts of Turkey by local fishermen (Joanna Barker, UK & Europe Project Manager Conservation Programmes, ZSL, personal communication 2015). Very recently, S. oculata was recorded from Italy (Sicily Strait) in the Central Mediterranean Sea (Zava et al., 2016) and the coasts of Syria (Alkusairy & Saad, 2018).

The present study contributes to the recent data on the rare occurrences of Smoothback Angelshark *S. occulata* from Turkish marine waters and reports for the first time the occurrence of a female individual in the North-eastern Mediterranean Sea, Turkey.

### **Materials and Methods**

A single female specimen of *S. oculata* was caught with a commercial trawling on 4 November 2016 at a depth of 65 m on sandy bottom from Aydıncık coast (Mersin Bay, 36°07'350"N-33°16'250"E) in the North-eastern Mediterranean Sea (Fig. 1). Morphometric measurements were carried out to the nearest 0.1 mm by a calliper. The



**Figure 1.** Map showing the capture sites off Aydıncık, Mersin Bay (North-Eastern Mediterranean Sea).

specimen was preserved in 4% formalin and was deposited in the Museum of Systematic, Faculty of Fisheries, Mersin University (MEUFC-17-11-037) (Fig. 2).



**Figure 2.** Squatina oculata. The female specimen from Aydıncık coast, Turkey (Photo: D. Ergüden).

#### Results

The captured female specimen of *S. oculata* was 726 mm in total length and 3450 g in weight. Morphological features of the specimen were provided in table 1 and compared with previous observations in the Aegean Sea and Eastern Mediterranean Sea (Corsini & Zava, 2007; Zava et al.,

**Table 1.** Squatina oculata. Measurements of the individual caught in the Northeastern Mediterranean Sea (Turkey) and compared with previous records caught from the Aegean Sea, Eastern Mediterranean Sea (Corsini & Zava, 2007) and the Central Mediterranean Sea (Zava et al., 2016).

Measurement (mm)	Present study	Corsini & Zava (2007)	Zava et al. (2016)				
Number			n = 4				
Sex	Female	Female	Male	Male	Male	Female	
Weight (g)	3.450	3.750	173	625	630	1480	
Total length (TL)	726	795	291	442	432	564	
Standard length (SL)	637	-	-	-	-	-	
Disc length	375	-	-	-	-	-	
Head length	109	-	52	74	69	87	
Eye diameter	12	15	7	10	11	12	
Interorbital distance	42	49	-	-	-	-	
Pre-orbital length	26	-	10	19	17	20	
Pre-spiracle length	53	-	21	35	35	41	
Eye-spiracle space	11	12	-	-	-	-	
Distance between spiracles	47	-	-	-	-	-	
Snout to mouth	33	-	-	-	-	-	
Snout to first gill-slit	46	-	-	-	-	-	
Snout to disc	90	88	-	-	-	-	
Snout to first dorsal	435	-	-	-	-	-	
Snout to pelvic	273	-	-	-	-	-	
Snout to spiracle	38	-	-	-	-	-	
First to second dorsal	51	-	-	-	-	-	
Between dorsal bases	28	16	-	-	-	-	
Pelvic to caudal space	257	220	95	157	145	200	
Second dorsal to upper caudal	53	-	-	-	-	-	
Pelvic to median tip	73	-	-	-	-	-	
Upper caudal	76	-	-	-	-	-	
Lower caudal	86	-	-	-	-	-	
Caudal peduncle height	14	-	7	8	10	11	
Mouth width	54	-	-	-	-	-	
Inter gill length	25	-	12	12	16	20	
Inter-nasal width	39	-	-	-	-	-	
Inter-spiracular width	47	-	-	-	-	-	
Total tooth row in upper/lower jaws	4 - 3	-	-	-	-	-	
Total teeth in upper/lower jaws	64/54	-	-	-	-	-	

2016). The diagnostic characteristics were similar to those reported in the previous literature: trunk rather slender;

anterior nasal barbels weakly bifurcated; posterior margin of anterior nasal flaps between nasal barbels and tips weakly fringed; dermal folds on sides of head without triangular lobes. Origin of first dorsal fin was usually well behind free rear tips of pectoral fins; pectoral fins are low and angular; rear tips of pectoral fins were broadly subangular. Large spines were present on snout and above eyes but usually absent from midback; lateral trunk denticles were pointed and with three ridges (Compagno, 1984). The color of fresh specimen is: body light brown, belly white in color, prominent white spots on pectoral fins and on body, three dark black ocelli on both side of caudal peduncle, two large pseudoocelli on pectoral fins, pectoral and pelvic fins margin dusky, dorsal and caudal fins with white margins.

The previous and recent records of the Angel shark species in Turkish marine waters were summarized in table 2.

#### Discussion

The Smoothback Angelshark S. oculata is distinguished from the two other angelshark species (i.e. S. aculeata, S. squatina) by big thorns (sharp, tooth-like structures on the skin) that are present on the snout and above the eyes, a first dorsal fin that originates well behind the pelvic rear tips, andbrown ocelli present in a symmetrical pattern on pectoral fins, tail and on body. S. aculeata differs from the two other angleshark species by having arow of dorsal spines (sword-like bony structure) down the middle of its body, with spines also located on the snout and above the eyes. However, S. squatina can simply be distinguished from these two species by conical nasal barbels, high and wide pectoral fins, small spines that are present on snout and above eyes and may also be present down middle of back, and lateral trunk denticles that are very narrow with sharp-cusped crowns (Compagno, 1984; Miller, 2016).

Squatina oculata can reach up to 160 cm in total length for females with a common length of 120 cm TL while adult males reach a maximal TL of least 145 cm. The size at birth was about 22.6 to 27 cm (Compagno, 1984;

Capapé et al., 1990; Ebert et al., 2013). However, the growth rate, reproduction time and longevity of *S. oculata* 

**Table 2.** Records of angelshark species from the Turkish waters in 1983-2017.

References	Species	Record date	Location	Number	Gear	Depth (m)	Sex	Size TL (mm)
Gücü & Bingel (1994)	S. squatina	1983-1984	North-eastern	>1	Bottom	60-78	-	-
			Mediterranean		trawl			
Kabasakal (2003)	S. squatina	Nov. 1995	Off Kapıdağ, Southern Sea of Marmara	1	-	50	Female	870
Başusta & Erdem (2000)	S. oculata	1994-1996	Off Karataş, Southern Mediterranean Sea	1	Bottom trawl	50-60	-	756
Başusta (2002)	S. aculeata	15 May 1997	Iskenderun Bay, Southern Mediterranean Sea	1	Bottom trawl	120-200	Female	798
Filiz et al. (2005)	S. aculeata	01 Apr. 2005	Gokova Bay, Aegean Sea	1	Bottom trawl	130	Female	965
Öğretmen et al. (2005)	S. squatina	2000-2001	Gökova Bay, South-eastern Aegean Sea	1	Trammel net	-	-	850
Karakulak et al. (2006)	S. squatina	2004-2005	Gökçeada, Northern Aegean Sea	1	Trammel net	30	-	265
İşmen et al. (2009)	S. squatina	2005-2008	Saros Bay, North Aegean Sea	1	Bottom trawl	5-500	Female	232
Kabasakal & Kabasakal (2014)	S. squatina	04 Jan. 2014	Gemlik Bay, Sea of Marmara	1	Trammel net	50	Female	1740
Erguden & Bayhan (2015)	S. aculeata	25 Jun. 2014	Mersin Bay, North-eastern MediterraneanSea	1	Bottom trawl	1-513	Female	690
Akyol et al. (2015)	S. squatina	05 Feb. 2015	Gökova Bay, South-eastern Aegean Sea	1	Trammel net	20	Female	1560
	S. squatina	07 Feb. 2015	Gökova Bay, South-eastern Aegean Sea	1	Trammel net	47	Female	-
Başusta (2016)	S. aculeata	06 Jun. 2015	North-eastern Mediterranean Sea	1	Bottom trawl	415-430	Juvenile	374
This study	S. oculata	04 Nov. 2017	North-eastern Mediterranean Sea	1	Bottom trawl	65	Female	726

are still not well known. Females are reported to mature at 100 cm TL from Tunisian waters and 89 cm from Senegal coastal waters (Capapé et al., 1990 & 2002). Besides, males are reported to be mature at 71 cm from Tunisia (Capapé et al., 1990) and 82 cm from Senegal (Capapé et al., 2002). Recently, Zava et al. (2016) reported four juvenile specimens (1 female, 3 males) in the Central Mediterranean Sea (Strait of Sicily, Italy) with total lengths of 56.4, 44.2, 43.2 and 29.1 cm, respectively. In the present study, the captured female specimen was 72.6 cm TL. Therefore, this finding of *S. oculata* described in the present paper is a first documented length and weight data of matured female specimen in the Turkish marine waters.

S. oculata was rarely observed in the eastern Mediterranean Sea and exploitation data are quite uncommon. In Syrian coastal waters, the total number of catches of this species in 2002 and in 2006 was given by Ali & Saad (2003) and Saad et al. (2006) as 255 kg and 2843 kg (i.e. 2.13% and 3.52% of the total annual catch of cartilaginous fish, respectively) However, Alkusairy & Saad (2018) stated that the caught was significantly reduced after 15 years in the same area where only 25 individuals of sharks were landed within two years (2015-2017) in Syrian waters.

Squatina oculata is classified as "Critically Endangered" in the Global Red List by the International Union for Conservation of Nature (IUCN, 2018). Gordon et al. (2017) stated that the Angel Shark Conservation Strategy aims to conserve the three Critically Endangered angelshark species (S. aculeata, S. oculata and S. squatina) found in the Eastern Atlantic and Mediterranean. Thus, they determined key components to improve the overall profile of angelsharks: (i) increase the number of sightings reported, (ii) generate a better understanding of current distribution to contribute to IUCN Red List re-assessments and (iii) identify new opportunities for collaboration. These three priority goals will probably play an important role in the restoration of robust populations and the safeguarding throughout their range of the three species of angelsharks in the Eastern Atlantic and Mediterranean Sea.

So far, records of angleshark species (i.e. *S. aculeata*, *S. oculata* and *S. squatina*) from the North-eastern Mediterranean Sea, Turkey are very low in number (Table 2). Beside the fishery activities and other anthropogenic factors, the current tropicalization of the Mediterranean Sea may also render the Eastern Mediterranean Sea an unfavourable environment to

angleshark species as already reported for other native fish species (Turan et al., 2016).

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