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Research Article / Araştırma Makalesi

Occurrence of the Young Thresher Shark *Alopias superciliosus* Lowe, 1841 (Lamniformes: Alopiidae) in the Northeastern Mediterranean Sea

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Abstract: The Bigeye Thresher Shark *Alopias superciliosus* Lowe, 1841 is one of the largest shark species found in the Pacific, Atlantic, and Indian oceans. They also have started to be seen in the Mediterranean Sea since the 1980s. The presence of two different species of Thresher sharks in Turkish waters is known, which are *A. vulpinus* and *A. superciliosus*. Thresher sharks can easily be distinguished from other shark species with their big tails. A juvenile female specimen of *A. superciliosus* with a total length of 240 cm was caught incidentally in Mersin Bay in January 2020. Essential measurements of the fish were fulfilled and the specimen was deposited in the Museum of the Systematic, Faculty of Fisheries, Mersin University (catalog number: MEUFC-20-11-127). This study is the first record of *A. superciliosus* in Mersin Bay.

Keywords: Shark conservation, juvenile fish, first record, incidental capture, threatened species.

Kuzeydoğu Akdeniz'de Yavru Sapan Köpekbalığı'nın *Alopias superciliosus* Lowe, 1841 (Lamniformes: Alopiidae) Bulunuşu

Öz: Sapan Köpekbalığı (*Alopias superciliosus* Lowe, 1841), Pasifik, Atlantik ve Hint Okyanusunda büyük köpek balığı türlerinden biridir. 1980'lerden itibaren Akdeniz'de de görülmeye başlamışlardır. Türk sularında *A. vulpinus* ve *A. superciliosus* türlerinin görüldüğü bilinmektedir. Sapan Köpekbalıkları, büyük kuyrukları ile diğer köpekbalıklarından kolaylıkla ayırt edilebilirler. Toplam uzunluğu 240 cm olan bir adet yavru-dişi *A. superciliosus* örneği Ocak 2020'de Mersin Körfezi'nde tesadüfen yakalanmıştır. Örneğin gerekli ölçümleri tamamlandıktan sonra Mersin Üniversitesi, Su Ürünleri Fakültesi, Sistematik Müzesi'nde saklanmıştır (katalog numarası: MEUFC-20-11-127). Bu çalışma Mersin Körfezi'nde *A. superciliosus* için ilk kayıttır.

Anahtar kelimeler: Köpekbalığı koruma, yavru balık, ilk kayıt, tesadüfi yakalama, tehdit altındaki türler.

1. Introduction

Alopias superciliosus Lowe, 1841 is a large shark species belonging to order Lamniformes, family Alopidae. The common name of *A. superciliosus* is the Bigeye Thresher Shark. In general, thresher sharks can easily be distinguished with their long tails (Compagno, 1984). They are distributed in temperate and tropical waters circumglobal. They are mostly found at depths below 100 m in the continental shelf regions. Sometimes they can be seen in shallow waters. *A. superciliosus* feeds on pelagic fishes (Compagno, 2001). Another detailed stomach content analyzes performed in California for *A. superciliosus* showed that barracuda species that belong to the Paralepididae family had the highest rate among the species hunted by *A. superciliosus*. Moreover, many teleost species, mollusks, and crustaceans are a part of the diet (Preti, Kohin, Dewar, & Ramon, 2008). Aplacental viviparous breeding occurs in bigeye thresher sharks. The number of juvenile sharks is usually 2, rarely 4. *A. superciliosus* species mature more slowly than other thresher sharks (Carvalho et al., 2015). During the birth, individuals are around 100-140 cm. It is known that they can reach a total length of 488 cm (Froese & Pauly, 2019). It was reported that the males reached reproductive maturity at 279 cm and the females at 294 cm (Compagno, 2001).

In a study completed in 2015, *A. superciliosus* reached 2.5% by weight among the by-catch of shark species in Turkish waters (Kabasakal, Karman, & Sakinan, 2017). In Turkey, *A. superciliosus* was first seen in Gokova in 2005. This was followed by the sample captured in 2007 in Silivri (Kabasakal & Karhan, 2008) and from Fethiye in 2011 (Kabasakal, Dalyan, & Yurtsever, 2011). The species was reported from the Gulf of Antalya in 2017 (Gökoğlu, Teker, & Julian, 2017). This study is the first record of *A. superciliosus* for Mersin Bay.

2. Material and Methods

A young *A. superciliosus* was captured on January 2nd, 2020 by a long-line at a depth of approximately 25 m, Taşucu located in western Silifke (Coordinate: 36°18'17.6"N, 33°51'41.0"E) (Fig. 1). The young specimen (Fig. 2) was a female measuring 240 cm in total length and weighing 48 kg. This specimen was preserved in 4% formaldehyde and deposited in the Museum of the Systematic, Faculty of Fisheries, Mersin University (catalog number: MEUFC-20-11-127). All diagnostic characteristics and color patterns agree with the descriptions of Compagno (1984) and Compagno (2001). In addition, the morphometric characters determined in Corsini and Sioulas (2009) were measured with dual calipers nearest to 1 mm.

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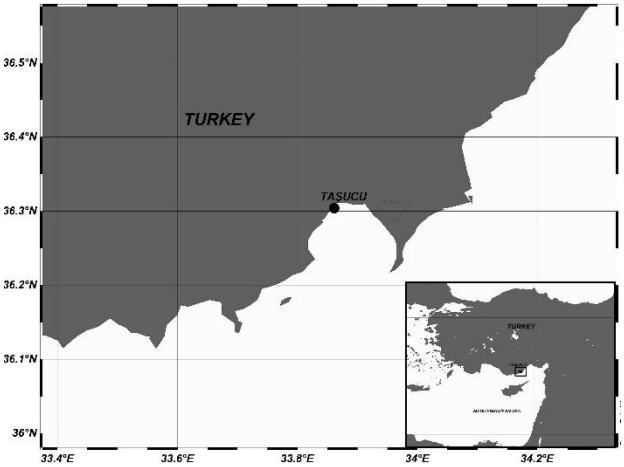

Figure 1. Incidental captured locality (●) for *Alopias superciliosus* from Mersin Bay

Figure 2. Young female specimen of *A. superciliosus* from Taşucu coast (NE Mediterranean, Turkey)

3. Results

In this study, a juvenile female specimen of *Alopias superciliosus* was captured incidentally by a fisher using long-line technique. The sample had a total length of 240 cm and weighing 48 kg. There were 46 teeth in total with three empty tooth roots (Fig. 3). The dental formula of the jaw is 12-12/11-11. The depth of the capture was 25 m, respectively. Moreover, the characteristics of the fish were consistent with the literature. Some distinguishing features for *A. superciliosus* are as follows. The dorsal extension of the caudal fin is close to the length of the fish other than the tail. The head is flattened from the dorsal and ventral and they have a long nose. The eyes are large and extend to the dorsal part of the head. The pectoral fins are broad-tipped and sickle-shaped. There are a total of 42-51 teeth in the jaw. The body is brownish-gray in dorsal and lateral and grayish-white in the ventral (Compagno, 1984, 2001).

The date, depth, region, capture technique, gender, length, and weight of the captured sample are shown in Table 1 together with the previous records in Turkish waters. When Turkey records examined for *A. superciliosus* (Table 1), it is seen that the samples, except Mersin, were mature individuals from Marmara and Aegean regions. The catching depth varies between 12 m and 110 m. All catches coincide with the period between the last month of winter and the end of spring. The genders of two of the four captured specimens are known and both are female individuals.

Morphometric measurement of two selected studies from the Mediterranean Sea was compared with this study in Table 2. When total length values investigated in detail, the Mersin sample and Dodecanese (Corsini-Foka & Sioulas, 2009) samples look similar. According to Compagno (2001), only the sample from Mersin is a juvenile individual.

Figure 3. Jaw image of the captured sample.

Table 1. Recent data on *Alopias superciliosus* in Turkish Mediterranean waters

Authors	Date	Depth (m)	Locality	Capture Method	Sex	Length (cm)	Weight (Kg)
Kabasakal & Karhan (2008)	23th May 2005	12	Gökova	Shrimp-net	N/A	350	150
Kabasakal & Karhan (2008)	23rd February 2007	N/A	Silivri	Purse-seine	N/A	450	N/A
Kabasakal et al. (2011)	28th February 2011	110	Fethiye	Trammel-net	♀	430	300
Gökoglu et al. (2017)	March, April and July 2015	600-700	Antalya	Bottom trawl, long-line	♀,♂	180-299	15.5-65
This study	2nd January 2020	25	Taşucu	Trammel net	♀	240	48

Table 2. Comparison of some morphometric measurements of *A. superciliosus* with two other reports from the Mediterranean Sea.

This study			**Corsini-Foka & Sioulas (2009)**			**Kabasakal et al. (2011)**		
Mersin Bay	NE Med.	female	Dodecanese	AS	male	Fethiye	AS	female
Character	cm	%TL	Character	cm	%TL	Character	cm	%TL
TL	240		TL	310		TL	450	
FDFL	17.9	7.4	FDFL	27	8,7	FDFL	41	9,1
FDFBL	13.6	5.6	FDFBL	21	6,8	FDFBL	32	7,1
PFL	51.5	21.4	PFL	62	20,0	PFL	82	18,2
PFBL	20.1	8.4	PFBL	21	6,8	PFBL	30	6,7
VFL	20.6	8.6	VFL	26	8,4	VFL	39	8,7
VFBL	15.4	6.4	VFBL	21	6,8	VFBL	30	6,7
DFVF	17.8	7.4	DFVF	23	7,4	DFVF	N/A	N/A
PFVF	68.9	28.7	PFVF	77	24,8	PFVF	N/A	N/A
PDL	87.7	36.5	PDL	94	30,3	PDL	128	28,4
PVL	105.3	43.9	PVL	118	38,1	PVL	165	36,7
PPL	43.7	18.2	PPL	45	14,5	PPL	55	12,2
TailL	103.8	43.3	TailL	143	46,1	TailL	217	48,2

(Abbreviations used: TL (total length), FDFL (first dorsal fin length), FDFBL (first dorsal fin base length), PFL (pectoral fin length), PFBL (pectoral fin base length), VFL (ventral fin length), VFBL (ventral fin base length), DFVF (distance between dorsal-fin origin and ventral fin origin), PFVF (distance between pectoral fin origin and ventral fin origin), PDL (predorsal length), PVL (preventral length), PPL (pre pectoral length), TailL (tail length) N/A (not available), NE Med. (Northeastern Mediterranean), AS (Aegean Sea)).

4. Discussion

In this study, a female juvenile *Alopias superciliosus* with a total length of 240 cm was reported from Mersin Bay. Its morphometric measurements were compared with two other selected studies from the Mediterranean Sea. When the results are examined, it is seen that as the sample size increases, some values increase steadily and some decrease in the same way. For example, FDFL, FDFBL, and TailL increase proportional to the size of the fish. On the other hand, PFL, PFBL, PDL, PVL, and PPL values decrease inversely proportional to the fish size. VFL, VFBL, and DFVF values are not affected by the length changes of the fish.

The first records of *A. superciliosus* in the Mediterranean were limited to the Aegean and Marmara regions. All of them were mature individuals. A recent paper of *A. superciliosus* from Egypt (Farrag, 2017) was a juvenile individual and the individual in our study was a juvenile, too. Two juveniles reported from adjacent regions in a close time range may be an indication that the fish settled in the eastern Mediterranean and began to reproduce.

Alopias superciliosus is shown on the IUCN red list (The International Union for Conservation of Nature's Red List of Threatened Species) as endangered species and their population has been reported to have decreased in number (Walls & Soldo, 2016). In order to prevent the extinction of this species, conservation activities should be carried out in the Mediterranean region as soon as possible.

It is crucial that these sharks, which can give birth up to 2-4 juvenile sharks at a time (Carvalho et al., 2015), are taken under protection in order not to be extinct. According to the information received from fishers and scuba divers, in the region around the place where Göksu Delta flows into the sea, juvenile sharks are frequently seen. Also, recently a pregnant thresher shark *Alopias vulpinus* with four pups inside (Ayas, Erguden, Erguden, & Akbora, 2020b), a juvenile *Carcharhinus brevipinna* (Ayas, Çiftçi, & Akbora, 2019), and another juvenile *C. altimus* (Ayas et al., 2020a) were caught incidentally near the same region. This area can be a nursing area for many shark species. We are planning to advise this area as a marine protected area after more detailed studies.

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