First record of *Alopias superciliosus* Lowe, 1841 (Elasmobranchii: Alopiidae) in Tunisian water

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Abstract: On July 2021, one specimens of *Alopias superciliosus* Lowe, 1841 was captured as bycatch in Kelibia (Tunisia) at the following coordinate 36°30'740" N; 11°48'451" E, by a trawler at 400 m depth. It was a mature male of 350 cm total length and 159 kg in eviscerated weight. This represents the first record of the bigeye thresher shark in the area.

Keywords: Records; *Alopias superciliosus*; Tunisia; khelibia; south central Mediterranean.

1. Introduction

The bigeye thresher shark, *Alopias superciliosus* (LOWE, 1840), is a cosmopolitan species widely distributed in tropical and warm temperate waters of the Atlantic, the Pacific and the Indian Oceans (Compagno, 1984; Froese & Pauly, 2023). The species is scarcely documented in the Mediterranean Sea and limited to occasional records, maybe linked to possible misidentification with the common thresher *Alopias vulpinus* (Cigala Fulgosi, 1983). The first report of the species in the area dates from 1952 (Corsini-Foka & Sioulas, 2009). The capture is carried out in the Dodecanese waters of Aegean Sea. The second record concern four specimens bycaught in the Sicilian Channel in 1966 (Corsini-Foka & Sioulas, 2009).

During the last decades, there has been a substantial increase of *A. superciliosus* records from the eastern Mediterranean, captures have typically involved in isolated specimens (Golani, 1996; Kabasakal & Karhan, 2008; Kleitou et al., 2017; Giovos & Cakalli, 2017; Dragičević et al., 2019; Taklis et al., 2020; Tsagarakis et al., 2022). This increase of signalization can be explained by intensification of the observation efforts, yet the number of records remains low compared to the increase in fishing effort (Akyol et al., 2020; Kabasakal et al., 2011; Damalas & Megalofonou, 2012). In the Mediterranean Sea the bigeye thresher shark is listed as “endangered” following the IUCN assessment (Dulvy et al., 2016). It’s also classified in the appendix II of the both conventions: CMS (Convention on the Conservation of Migratory Species of Wild Animals) and CITES (Convention on...
International Trade in Endangered Species of Wild Fauna and Flora. Globally, their population is estimated to have been reduced by 30-49% over the last three generations (55.5 years), based on abundance data and current levels of exploitation (Rigby et al., 2019). Consequently, the conservation activities should be carried out in the Mediterranean region and all over the world as soon as possible to preserve this species. This paper reports the first occurrence of the bigeye thresher in the Southern coast of the central part of the Mediterranean basin and contributes to expand knowledge about the species in the area.

2. Materials and Methods

On July 1, 2021, during a bottom trawling operation in the North East coasts of Tunisia, an Alopiidea (Figure 1) was captured accidentally at 400 m depth at the Following coordinate: 36°30’740” N; 11°48’451” E (Figure 2) and landed in Kelibia port. The fish was photographed. The total length, the weight and the sex were carried out. Details on groove, on orbits, on caudal fin, labial furrow, on teeth… were also noted. The species was identified primarily using the description given by Compagno, 1984; Quero, 1984 and Ebert et al., 2013. The captured Alopias specimen was a mature male of 350 cm total length (TL) and weight 159 kg (animal eviscerated). It was identified as a bigeye thresher shark Alopias superciliosus based on the combination of several morphological characters: a horizontal groove present on either side of the head above the gills, eyes very large with orbits reaching the dorsal surface of the head, the first dorsal fin closer to the pelvic than to the pectoral fins, snout rather long and bulbous; a tail broad at tip, absence of the labial furrows, flanks above the pectoral and the pelvic fins not white. The figure 3, illustrate the morphological differences between Alopias superciliosus and Alopias vulpinus. The photos used in this illustration comes from the bigeye thresher describe above and a thresher shark caught in Gabes Gulf and landed in Sfax harbor on February 2015, it was also a mature male of 380 cm TL. 
Figure 3. Morphological differences between the two Alopiidae of the Mediterranean

- *Alopias vulpinus* landed in Sfax harbor in February 2015.

- Horizontal groove absents.
- Horizontal groove present above the gills.

- Eyes small don’t reaching the superior part of the head. Snout short
- Eyes very large extending on to dorsal head surface. Snout very long

- Tail moderately broad at tip
- Tail broad at tip

- Labial furrows present
- Labial furrows absent

- First dorsal fin nearer to pectoral fin than to pelvic fin.
- Flanks above pectoral and pelvic fins white.
- First dorsal fin closer to pelvic fin.
- Flanks above pectoral and pelvic fins not white
4. Discussion

Two Alopiidae species were signaled in the Mediterranean Sea: the thresher shark *Alopias vulpinus* and the bigeye thresher *Alopias superciliosus*. This latter species has been listed among the non-indigenous questionable fishes in the Mediterranean (Zenetos et al., 2005; Golani et al., 2017), due to insufficient data and uncertain origin (Saad et al., 2008). The probable introduction of the bigeye thresher shark via the Gibraltar Strait requires verification (Zenetos et al., 2008). Consequently, the origin of the species should be determined using molecular technique since this tool represent the most efficacy method used recently for rare species because of lack of historically data.

The record of the bigeye thresher shark in Tunisian water represent the first signalization of the species in the southern coasts of the central Mediterranean Sea. Although this signaling is unique, it is of great importance as it provides new information on the distribution and ecology of the species and leads us to reflect on the causes of its presence in the area: is it just an isolated record or that the species acquired new ecological niches? To answer these questions, it is crucial to better monitor catches of this species and collect more information on its status in the area. *A. superciliosus* is more reported in the North Eastern shores of the Mediterranean Sea with more than 60% of record (Figure 4). It seems that the species is more plentiful in the Greece and the Turkey waters. In fact, 23 confirmed signalizations were documented in these regions (Tsagarakis et al., 2022; Lanteri et al., 2017). Kleitou et al., (2017) indicated also the importance of Cyprus water. In the framework of a scientific campaign, they reported the capture of ten specimens by a pelagic longline during only 6 days. The abundance of the bigeye thresher shark in this area could be linked to environmental factors influencing shark movements and migration (Schlaff et al., 2014; Coelho et al., 2015), such as the water depth, the temperature, the salinity, the bottom topography and the food availability. The rare record of the species in central and western Mediterranean Sea cannot be correlated with a misidentification with the congeneric species *Alopias vulpinus* since many research programs for monitoring of large elasmobranchs were lunched in the area (MEDLEM: Mediterranean Large Elasmobranchs Monitoring, MEDITS: An international bottom trawl survey in the Mediterranean). An others possible factors of the difference on records of the species between western and eastern Mediterranean waters could be related to the recent European council (EC) regulation which have forbidden the retaining on board or the landing of *A. superciliosus* (Council Reg. 2017/127 of 28/01/2017). Fishermen are inclined to reject the specimens at sea to avoid possible sanction.

In the Mediterranean Sea, the bigeye thresher shark is mainly caught as bycatch in longline fisheries targeting swordfish.

Figure 4. Location of records of *Alopias superciliosus* in the Mediterranean Sea.
• Previous study, ● present study
More than 53% of the catches where the fishing gear is mentioned were fulfilled by longline. Trammel net, trawl and purse seine cause a low incidental catches (Lanteri et al., 2017). The size of A. superciliosus reported in Tunisian coast is comparable with sizes signaled in the area. As a matter of fact, total lengths of specimens mentioned in the area were comprised between 40 (an embryos) and 500 cm TL with an average of 300.2 cm TL, a median of 315 cm TL and a mode of 350 cm TL. Among specimens whose sex was identified, females outnumbered males by 1.6. Nevertheless, sex ratio was not statistically different ($\chi^2=0.346$) (Lanteri et al., 2017).

The species is known to be a strong diel vertical migratory, diving over 900 m depth (Coelho et al., 2015). It spends the most of the daytime in deeper and mesopelagic waters between 300 and 500m and the night in epipelagic waters between 10 and 100m depth. This behavior can explain why the thresher shark A. vulpinus (the closely sympatric species), is more vulnerable to fishing activity since it is an epipelagic species all the time (Cao et al., 2011). In recent years, records of A. superciliosus have considerably increased and various authors do not exclude that the species may have a stable population in the Mediterranean Sea (Sperone et al., 2018). The capture of juveniles (Ayas et al., 2020; Farrag, 2017) and pregnant females (Vacchi & Serena, 2000; Kabasakal & Karhan, 2008) can be considered as indices of this potentially prospect.

5. Conclusions

This signalization is a new addition to shark list in Tunisian waters. Scientific monitoring is necessary to study the abundance of the species in the area in order to understand if the species is visitor or there is a misidentification with its congeneric A. vulpinus.

The bigeye thresher shark is known to be rare in the Mediterranean Sea, however, the increase of signalizations makes questionable it’s abundance state and the existence of a veritable population in the area.

It is important to enlarge our knowledge on its origin, distribution, biology and ecology in order to identify specific conservation measures.

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References


