




Note

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

Ichrak BOUZIDI <sup>1</sup> , Samira ENAJJAR <sup>\*1</sup> , Bechir SAIDI <sup>2</sup>   
& Mohamed Nejmeddine BRADAI <sup>1</sup> 

<sup>1</sup> Carthage University, National Institute of Science and Technology of the Sea, Marine Biodiversity Laboratory, B.P. 1035 Sfax 3018, Tunisia

<sup>2</sup> Kairouan University, Faculty of Sciences and Techniques of Sidi Bouzid, 9100, Sidi Bouzid, Tunisia

\*Correspondence: [enajjarsamira@yahoo.fr](mailto:enajjarsamira@yahoo.fr)

Received: 01/12/2022; Accepted: 22/09/2023; Published: 21/11/2023

**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.

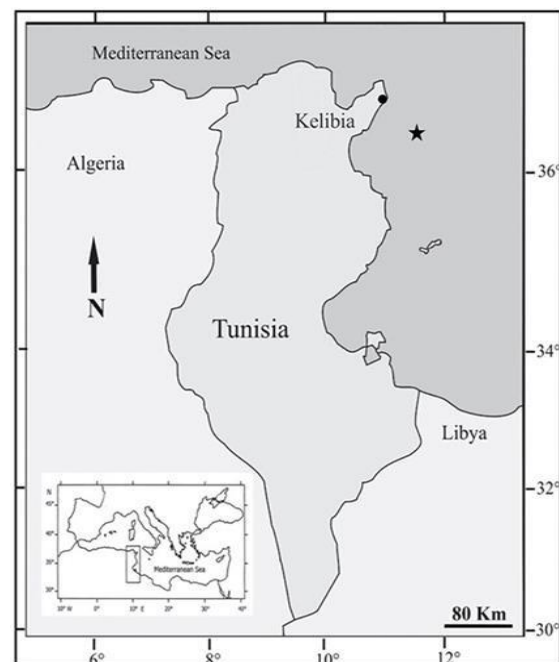
## 2. Materials and Methods

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.



**Figure 1.** Alopiidae specimen landed in Kelibia



**Figure 2.** Map showing the capture location of *Alopias superciliosus* of Tunisian coasts.

## 3. Results

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.



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



- *Alopias superciliosus* landed in kelibia harbor in July 2021.



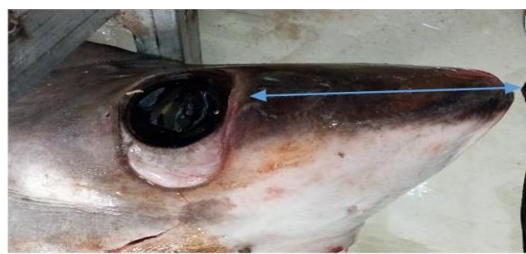
- Horizontal groove absents.



- 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

**Figure 3.** Morphological differences between the two Alopiidae of the Mediterranean



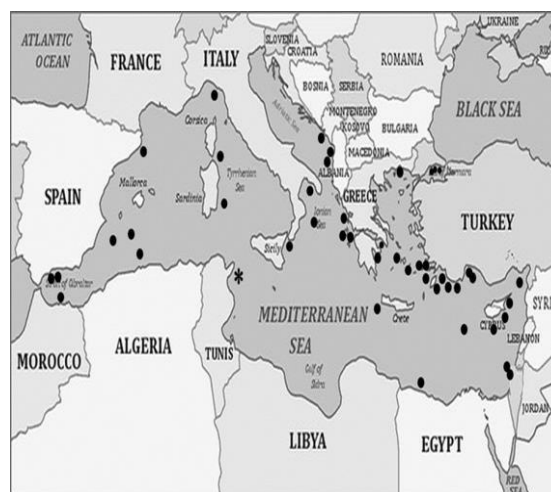
#### 4. Discussion

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 launched 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's the fishing gear is mentioned were fulfill 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.

## Acknowledgements

The authors wish to thank Kelibia fishers for their cooperation. We also acknowledge anonymous referees for providing useful suggestions that significantly improved our manuscript.

## References

1. Akyol, O., Ceyhan, T. & Capapé, C. (2020). Capture of a Bigeye Thresher Shark *Alopias superciliosus* (Alopiidae) in Turkish Waters (Eastern Mediterranean Sea). *Annales, Series Historia Naturalis*, 30(1), 31-36. <https://doi.org/10.19233/ASHN.2020.05>
2. Ayas, D., Akbora, H.D. & Çiçek, B.A. (2020). Occurrence of the Young Thresher Shark *Alopias superciliosus* Lowe, 1841 (Lamniformes: Alopiidae) in the Northeastern Mediterranean Sea. *Commagene Journal of Biology*, 4(1), 28-31. <https://doi.org/10.31594/commagene.713381>
3. Cao, D.M., Song, L.M., Yu Zhan, K.K.LV. & Hu, Z.X. (2011). Environmental preferences of *Alopias superciliosus* and *Alopias vulpinus* in waters near Marshall Islands. *N. Z. J. Marine and Freshwater Research*, 45(1), 103-119.

- <https://doi.org/10.1080/00288330.2010.540017>
4. Cigala Fulgosi, F. (1983). First record of *Alopias superciliosus* (Lowe, 1839) in the Mediterranean, with some notes on some fossil species of the genus *Alopias*. *Annali del Museo civico di storia naturale di Genova*, 84, 211-229.
  5. Coelho, R., Fernandez-Carvalho, J. & Santos, M.N. (2015). Habitat use and diel vertical migration of bigeye thresher shark: Overlap with pelagic longline fishing gear. *Marine Environmental Research*, 112, Part B, 91-99.  
<https://doi.org/10.1016/j.marenvres.2015.10.009>
  6. Compagno, L.J.V. (1984). FAO species catalogue. Vol. 4. Sharks of the world. An annotated and illustrated catalogue of shark's species known to date. Hexanchiformes to Lamniformes. *FAO Fisheries Synopsis*, no 125, vol. 4, Part 1, 258 p.
  7. Corsini-Foka, M. & Sioulas, A. (2009). On two old specimens of *Alopias superciliosus* (Chondrichthyes: Alopiidae) from the Aegean waters. *Marine Biodiversity Records*, 2, <https://doi.org/10.1017/S175526720900044X>
  8. Damalas, D. & Megalofonou, P. (2012). Occurrences of large sharks in the open waters of the Southeastern Mediterranean Sea. *Journal of Natural History*, 46(43-44), 2701-2723  
<https://doi.org/10.1080/00222933.2012.716864>
  9. Dragičević, B., Anadoli, O., Angel, D., Benabdi, M., Bitar, G., Castriota, L., Crocetta, F., Deidun, A., Dulčić, J., Edelist, D., (...) (2019). New Mediterranean Biodiversity Records. *Mediterranean Marine Science*, 20 (3), 645-656.  
<https://doi.org/10.12681/mms.20913>
  10. Dulvy, N.K., Allen, D.J., Ralph, G.M. & Walls, R.H.L. (2016). The conservation status of Sharks, Rays and Chimaeras in the Mediterranean Sea [Brochure]. IUCN, Malaga, Spain.  
<https://portals.iucn.org/library/sites/library/files/documents/Rep-2016-024.pdf>
  11. Ebert, D.A. & Stehmann, M.F.W. (2013). *Sharks, batoids, and chimaeras of the North Atlantic*. FAO Species Catalogue for Fishery Purposes, 7. Rome, FAO: 523 pp.
  12. Farrag, M.M. (2017). New record of the bigeye thresher shark, *Alopias superciliosus* Lowe, 1841 (Family: Alopiidae) from the Eastern Mediterranean Sea, Egypt. *International Journal of Fisheries and Aquatic Studies*, 5(2), Part E, 316-318.
  13. Froese, R. & Pauly, D. (2023). Fish Base. (accessed on 8 October 2022)  
<https://www.fishbase.se>
  14. Golani, D. (1996). The marine ichthyofauna of the eastern Levant history, inventory and characterization. *Israel Journal of Zoology*, 42(1), 15-55.  
<https://doi.org/10.1080/00212210.1996.10688830>
  15. Mediterranean Science Commission (accessed in January 2017). Ciesm Atlas of Exotic Fishes in the Mediterranean Sea: alien fishes, invasive fishes.  
<https://www.ciesm.org/atlas/appendix1.html>
  16. Kabasakal, H. & Karhan, S.U. (2008). On the occurrence of the bigeye thresher shark, *Alopias superciliosus* (Chondrichthyes: Alopiidae), in Turkish waters. *Marine Biodiversity Records*, 1, E69.  
<https://doi.org/10.1017/S1755267207007452>

17. Kabasakal, H., Dalyan, C. & Yurtsever, A. (2011). Additional records of the bigeye thresher shark *Alopias superciliosus* (Lowe, 1839) (Chondrichthyes: Lamniformes: Alopiidae) from Turkish waters. *Annales, Series Historia Naturalis*, 21(2), 143-148.
18. Kleitou, P.C., Giovos A.I. & Kletou, D. (2017). How accurately are we describing the longline bycatch? The case of the 'rare' shark *Alopias superciliosus* in eastern Mediterranean. *International Journal of Fisheries and Aquatic Studies*, 5(3), 375-378.
19. Lanteri, L., Castellano, L. & Gabibaldi, F. (2017). New record of *Alopias superciliosus* Lowe, 1841 in the North-Western Mediterranean and annotated review of the Mediterranean records. *Acta Adriatica*, 58(2), 313-324.  
<https://doi.org/10.32582/aa.58.2.10>
20. Quero, J.C. (1984). Alopiidae. In: P.J.P. Whitehead, M.L. Bauchot, J.C. Hureau, J. Nielsen & E. Tortonese (eds.), *Fishes of the North-Eastern Atlantic and the Mediterranean*. Unesco, pp.91-92.
21. Rigby, C.L., Barreto, R.J., Carlson, D., Fernando, S., Fordham, M.P., Francis, K., Herman, R.W., Jabado, K.M., Liu, A., Marshall, N., (...) (2019). *Alopias superciliosus*. The IUCN Red List of Threatened Species 2019: e.T39339A212641186. (accessed on 10 September 2022).  
<https://dx.doi.org/10.2305/IUCN.UK.2.022-1.RLTS.T39339A212641186.en0>.
22. Saad, A., Ali, M. & Seret, B. (2008). Shark Exploitation and Conservation in Syria. In: *Proceedings of the Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean*. 2008, pp. 202-208.
23. Schlaff, A.M., Heipel, M.R. & Simpfendorfer, C.A. (2014). Influence of environmental factors on shark and ray movement, behavior and habitat use: a review. *Reviews in Fish Biology and Fisheries*, 24, 1089-1103.  
<https://doi.org/10.1007/s11160-014-9364-8>
24. Sperone, E., Coppola, F., Parise, G., Bernabò, I., Reinero, F.R., Micarelli, P., Giglio, G. & Milazzo, C. (2018). Confirmation of the presence of the bigeye thresher *Alopias superciliosus* in the Tyrrhenian Sea, with first parasitological notes for the Mediterranean Sea. *Cahiers de Biologie Marine*, 59(2), 181-185.  
<https://dx.doi.org/10.21411/CBM.A.EA9CAF0A>
25. Stamouli, C., Akel, E. H. K., Azzurro, E., Bakiu, R., Bas, A. A., Bitar, G., Boyaci, Y., Cakalli, M., Corsini-Foka, M., Crocetta, F., (...) (2018). New Mediterranean Biodiversity Records (December 2017). *Mediterranean Marine Science*, 18(3), 534-556.  
<https://doi.org/10.12681/mms.15823>.
26. Taklis, C., Giovos, I. & Karamandilis, A.A. (2020). Social media: a valuable tool to inform shark conservation in Greece. *Mediterranean Marine Science*, 21(3), 493-498.  
<https://doi.org/10.12681/mms.22165>
27. Tsagarakis, K., Darmanin, S. A., Al Mabruk, S., Auriemma, R., Azzurro, E., Badouvas, N., Bakiu, R., Bariche, M., Battaglia, P., Betti, (...) (2021). New records of rare species in the Mediterranean Sea (October 2021). *Mediterranean Marine Science*, 22(3), 627-652.  
<https://doi.org/10.12681/mms.26669>
28. Vacchi, M. & Serena, F. (2000). On a large specimen of bigeye thresher shark *Alopias superciliosus* (Lowe, 1839) (Chondrichthyes: Alopiidae) stranded in Tavolara Island (Eastern Sardinia, Mediterranean Sea). In

- Séret, B. and Sire, J.-Y. (Editors). 3th European Elasmobranch Association Meeting, Vol. 3. Paris: Soc. Fr. Ichtyol. & IRD. p. 84.
29. Zenetos, A., Çinar, M. E., Pancucci-Papadopoulou, M. A., Harmelin, J. G., Furnari, G., Andaloro, F., Bellou, N., Streftaris, N. & Zibrowius H. (2005). Annotated list of marine alien species in the Mediterranean with records of the worst invasive species. *Mediterranean Marine Science*, 6(2), 63-118.  
<https://doi.org/10.12681/mms.186>
30. Zenetos, A., Meriç, E., Verlaque, M., Gallin P., Boudouresque, C.-F., Giangrande, A., Çinar, M. E. & Bilecenoğlu, M. (2008). Additions to the annotated list of marine alien biota in the Mediterranean with special emphasis on Foraminifera and Parasites. *Mediterranean Marine Science*, 9(1), 119-166.  
<https://doi.org/10.12681/mms.146>

