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Research Note

First records of *Alopias superciliosus* (Lamniformes: Alopidae) in Namibian waters

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Abstract

The bigeye thresher shark, *Alopias superciliosus*, is confirmed for the first time in Namibian waters, from four specimens caught as bycatch of bottom trawlers fishing for hake. One specimen was released alive; the other three were dead when brought on board and were utilised by crew members. This species has not previously been documented in Namibia and these records complete the gap in the species' range, between Angola and South Africa.

Introduction

The Benguela Current Large Marine Ecosystem (BCLME) is one of the most productive ocean ecosystems in the world in terms of biomass production and fishery resources (Sakko 1998; Shannon & O'Toole 2003). However, little research has been conducted on the chondrichthyan fauna of Namibia, and current research activities are thus documenting a number of species for the first time in Namibian waters (e.g. Leeney et al. 2023).

There are currently three known species of thresher sharks (order Lamniformes, family Alopiidae) worldwide (Ebert et al. 2021). The pelagic thresher (*Alopias pelagicus*)

is found only in the Indo-Pacific Ocean (Ebert et al. 2021). The common thresher shark (*A. vulpinus*) occurs worldwide in tropical to cold-temperate seas (Last & Stevens 2009; Ebert et al. 2021) and has previously been documented in Namibian waters (Bianchi et al. 1999). The bigeye thresher shark, *Alopias superciliosus*, was first described in Lowe (1841) as *Alopecias superciliosus* in a description of fishes from Madeira. It has a circum-global distribution and is found in both tropical and temperate waters (Rigby et al. 2019; Ebert et al. 2021). *A. superciliosus* is distinguishable from other thresher sharks by its very large eyes, and the lateral deep groove originating behind its eyes and extending along both side of its head, above the gill openings (Ebert et al. 2021). *A. superciliosus* inhabits tropical and temperate seas worldwide, but has never previously been formally recorded in Namibian waters.

Here we report on opportunistic records of *A. superciliosus* which have come to light during research focusing on bycatch of chondrichthyans in industrial fisheries in Namibian waters.

Methods

Specimens of *A. superciliosus* were recorded during ongoing data collection on chondrichthyan bycatch in the Namibian bottom trawl fishery for hakes (shallow water hake *Merluccius capensis* and deepwater hake *M. paradoxus*). For each animal, total length (TL) and sex were recorded, and in the case of the first animal, which was alive when landed, it was then immediately released overboard. Data on the location and depth of each trawl conducted by the fishing vessel were also recorded.

Results

A total of four specimens of *A. superciliosus* were recorded during two fishing trips on which bottom trawling took place between 22nd and 27th November 2023 and between 10th and 17th December 2023. Details of these four animals are provided in Table 1 and the locations of the trawls in which they were bycaught is shown in Figure 1. A female *A. superciliosus* was recorded on 22 Nov 2023, as bycatch of a trawl in 338 m of water (Figure 2). On a subsequent fishing trip in December 2023, three additional specimens (a female and two males) were recorded. They were captured during trawls in water depths of around 403–414 m. These bycaught sharks ranged in size from 186.7 cm TL to 380 cm TL.

Three of the four *A. superciliosus* specimens recorded were dead when brought on board the vessel. The livers of the dead animals were retained and the rest of each carcass was discarded at sea. A crew member also removed the pectoral, dorsal and caudal fins from one shark and stated that he would sell them to a fin trader; no information on where the trader was based or the price such fins would fetch was collected. Crew

Table 1: Records of Alopias superciliosus caught as bycatch in the bottom trawl fishery for hake in Namibia. Times are in Central Africa Time (GMT + 2).

Date	Sex	TL (cm)	Trawl start/end time	Trawl depth (m)	Animal condition	Notes
22 Nov 2023	Female	186.7	09:00-11:20	338	Alive	Released alive
11 Dec 2023	Female	308.0	12:20-14:30	403	Dead	Liver retained, body discarded
11 Dec 2023	Male	380.0	12:20-14:30	403	Dead	Liver retained, body discarded
12 Dec 2023	Male	331.0	07:00-12:00	414	Dead	Liver and fins retained; body discarded

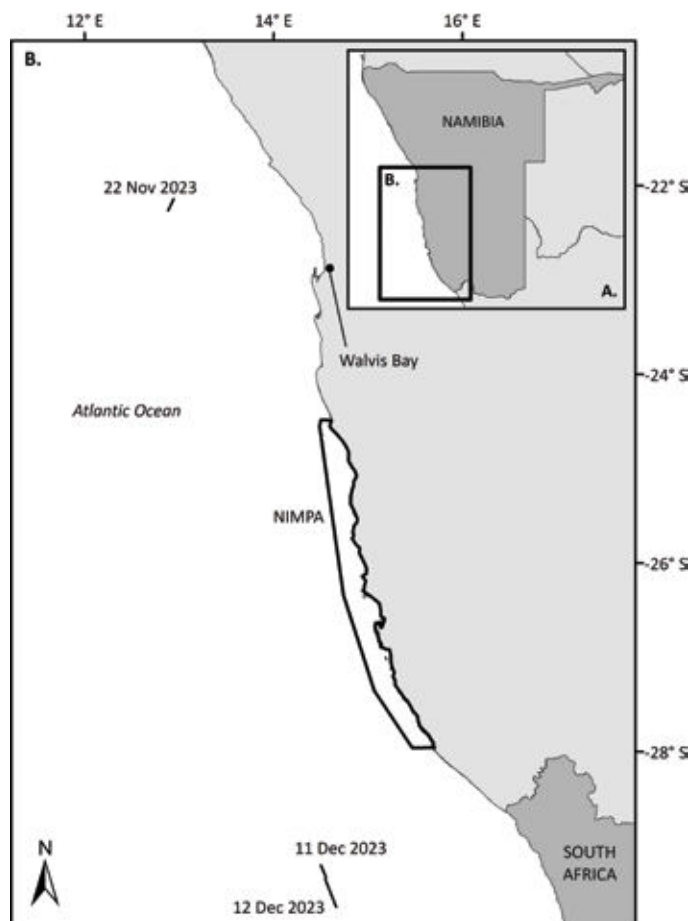


Figure 1: A. Inset: Map of Namibia; black box indicates the coastal area shown in detail in the main map. B. The southern section of the Namibian coast-line, showing the location of the bottom trawls on 22 November and 11 and 12 December 2023, during which bigeye thresher sharks were caught incidentally. The location of the Namibian Islands Marine Protected Area (NIMPA) is also indicated.



Figure 2: *Alopias superciliosus* caught as bycatch on 22 November 2023, in the hake bottom trawl fishery in southern Namibian waters. Photo ©NaRaS project.

members processed the livers whilst still at sea by chopping each liver into small pieces and placing them in a bucket, which was left in the drying room (a heated room that the crew use for drying off wet clothing in between periods of work in the on-board factory). Over the course of the trip, liver oil collected in the bucket and was then separated out and poured into plastic soft drink bottles. The crew members take this oil home and either keep it for personal use or sell it in their communities. It was stated to be used as a treatment for coughs and colds (a spoonful taken internally) or for ear infections (a small drop rubbed inside the outer ear canal). Although not observed during the trips where the data presented here were collected, crew members stated that they also retain gulper sharks (*Centrophorus* spp.) for their liver oil.

Discussion

These records are the first for *A. superciliosus* in Namibian waters and for the first time suggest that the species' range is continuous between Angola and the west coast of South

Africa. The lack of records until now may suggest that this species is rarely encountered, or alternatively it may have been misidentified as *A. vulpinus* in the past.

In a study of the reproductive biology of *A. superciliosus* in the Ecuadorian Pacific Ocean, mean size at maturity was documented as 315.7 cm TL for females and 275.2 cm TL for males (Calle-Morán et al. 2023), whilst in the north-eastern Atlantic Ocean and western Mediterranean, length at sexual maturity was estimated as c. 276 cm for males, and the smallest gravid female was 341 cm long (Moreno & Moron 1992). This suggests that at least one of the females documented here was sexually immature whilst both males were sexually mature.

The removal and retention of the livers and caudal fin of *A. superciliosus* (and reportedly, the livers of gulper sharks) by fishers on bottom trawlers in Namibian waters has not been previously reported. Large declines in populations and high vulnerability to overfishing has led the International Commission for the Conservation of Atlantic Tunas (ICCAT) to adopt retention bans and to require live releases of four pelagic shark species, including *A. superciliosus*, in fisheries managed by ICCAT (i.e. in Namibia, the pelagic longline fishery for tuna and swordfish). Retention of any part or whole carcass of *A. superciliosus* is prohibited in those fisheries (ICCAT 2010). Incidental catches of these species, and the corresponding live releases, are also required by ICCAT to be recorded (ICCAT 2012). In Namibia's pelagic longline fishery, fins and trunks of any sharks caught must be offloaded together (M. Block, Fisheries Inspectorate, pers. comm.) and vessels may not have onboard fins that total more than 5% of the total weight of the sharks onboard (ICCAT 2005). However, there is no legislation pertaining to the retention, finning or use of sharks caught as bycatch in any other fishery in Namibia. According to the Namibian Fisheries Inspectorate, the retention of dead sharks for consumption on board fishing vessels is allowed (M. Block, pers. comm.), but neither the extraction of liver oil from bigeye thresher sharks (and reportedly also from gulper sharks) for personal use and sale on land, nor the removal of fins for sale to a fin trader, constitutes consumption at sea. Further investigation is required to assess the scale of the retention and use of these species in Namibian fisheries. However, the gap in Namibian legislation essentially makes these activities permissible and national legislation is urgently needed, particularly for species listed as threatened (Critically Endangered, Endangered or Vulnerable) on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species.

The IUCN Red List lists *A. superciliosus* as Vulnerable globally (Rigby et al. 2019) and Endangered in the Mediterranean and European regions (Walls & Soldo 2015; 2016). Globally, this species is caught as a target and bycatch in commercial and small-scale pelagic longline, purse seine, and gillnet fisheries. Most catch is taken as bycatch of commercial pelagic fleets in offshore and high-seas waters (Camhi et al. 2008) but it is also caught by other gears including coastal longlines, gillnets and by trawl fisheries (Martinez-Ortiz et al. 2015; Temple et al. 2019; Fauconnet et al. 2019). In some areas, the species is retained for its quality meat and its fins (Clarke et al. 2006a; b; Dent & Clarke 2015; Fields et al. 2017), unless there are regulations prohibiting retention. Coelho et al. (2011)

reported that 68% of *A. superciliosus* caught in the Portuguese longline fishery for swordfish in the Indian Ocean were found to be dead on haulback. In recreational fisheries, the post-release mortality for the congeneric common thresher shark (*A. vulpinus*) is also high (78% for tail-hooked animals; 0% for mouth-hooked; Sepulveda et al. 2015). The post-release survival rate of *A. superciliosus* when caught by bottom trawls is unknown. The low fecundity of this species – a maximum litter size of four (two per uterus) but more commonly two (Guitart Manday 1975; Calle-Morán et al. 2023) – and long gestation period (12 months; Calle-Morán et al. 2023) means it has a limited capacity to recover from over-exploitation.

Fisheries-induced mortality of sharks has increased globally over the past ten years (Worm et al. 2024). In Namibia, *A. superciliosus* has thus far only been recorded as a bycatch in bottom trawl fisheries (the records presented here). However, comprehensive data on the bycatch of elasmobranchs is not collected for any other fishery in Namibia at present. The bottom trawl fishery for monk (*Lophius vomerinus*) likely results in bycatch of a wide range of chondrichthyan species and thus may also pose a risk to pelagic thresher sharks. The longline fishery for tuna and swordfish which, according to several individuals employed in the fishery, primarily targets blue and mako sharks (R.H. Leeney unpubl. data), may also pose a threat to *A. superciliosus* and other pelagic shark species. Although a more comprehensive dataset is required to understand the full scale of bycatch mortality of pelagic sharks in Namibian fisheries, south-east Atlantic populations of *A. superciliosus* and other pelagic shark species are likely at serious risk.

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Author contributions

RHL developed the data collection protocol, prepared the map and co-wrote the manuscript. FST collected the data at sea and co-wrote the manuscript.

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