

First report of a sleeper shark (*Somniosus* sp.) in the western Caribbean, off the insular slope of a coral atoll.

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Abstract

A sleeper shark (*Somniosus sp.*) was captured over the insular slope at Glover's Reef, a coral atoll in Belize. The estimated total length of the individual was ca. 3.0-3.5 m and multiple morphological features diagnostic of a somniosid shark were observed. While the exact species could not be confirmed, it is most likely a Greenland shark (*Somniosus microcephalus*) or a hybrid between the Greenland shark and the Pacific sleeper shark (*Somniosus pacificus*). This is the first record of a sleeper shark in the western Caribbean region and further supports the hypothesis that these sharks, best known from polar and subpolar latitudes, occur at depth in tropical regions.

Introduction

Sharks belonging to the family Somniosidae (commonly referred to as sleeper sharks) are characterised as deepwater benthic and oceanic species with a circumglobal distribution (Ebert et al. 2021). There are two large (> 3 m total length [TL]) morphologically identical sister species in the Northern Hemisphere: the Greenland shark (*Somniosus microcephalus*), best known from relatively shallow depths in polar regions in the Atlantic, and the Pacific sleeper shark (*Somniosus pacificus*), from the Pacific (Yano et al. 2004). Walter et al. (2017) presented evidence for introgressive hybridization between *S. microcephalus* and *S. pacificus* with records of hybrids in the Atlantic. *Somniosus sp.* tolerate very cold waters, which implies that their preferred habitat and distribution range are potentially unlimited throughout the deep sea and ranges into low latitudes (MacNeil et al. 2012). Casey's (1971) "tropical submergence" hypothesis explained this phenomenon on the basis of temperature adaptation wherein species occupy shallow water habitats at high latitudes and deeper waters at low latitudes (such as temperate and tropical regions). Indeed, a hybrid *Somniosus* was captured at a depth of ~ 1,800 m in the Gulf of Mexico and a large *Somniosus sp.* was filmed at a depth of 1,820 m, 57 km off the Caribbean coast of Colombia (Walter et al. 2017; Acero P et al. 2018). *Somniosus sp.* could therefore be circumglobal and present at great depth throughout the tropics, but records supporting this hypothesis are scant.

Materials And Methods

On April 22, 2022, a somniosid shark (*Somniosus sp.*) was observed on a research longline set from the insular slope in Glover's Reef Marine Reserve (hereafter GRMR), a coral atoll in Belize, Central America. The demersal longline comprising of 14/0 circle hooks was set overnight approximately 6 km southeast of Northeast Caye (Fig. 1). The primary objective was to conduct research fishing surveys for the long-term elasmobranch monitoring program in collaboration with Belize Fisheries Department and local fishing communities. The atoll (GRMR) is situated on a limestone platform with rapidly increasing water depth (ranging between 500 m to 2900 m) on the outer north and east facing margins of the atoll (Ktona & Sautter 2015). While the exact depth of capture could not be established, the line was started at approximately 350 m where the bottom substrate is mainly comprised of rocks and mud. Bait consisted of mixed reef fish, barracuda and octopus. Video data was acquired, downloaded and viewed manually for the captured individual.

Results And Discussion

At 08:00 hr, an estimated 3.0-3.5 m deep-sea shark was observed on the research longline. Upon capture, the shark was sluggish and slow moving on the surface, which is commonly observed in sleeper sharks (Kiraly et al. 2003). To ensure the welfare of the caught individual and because of incoming inclement weather it was released immediately, which precluded collection of a genetic sample. However, analysis of video taken during the release revealed key diagnostic characteristics consistent with *Somniosus* sp. The caught individual had a short, rounded snout with nostrils located closer to the tip of the snout than the eye (Fig. 1a). An ectoparasite, likely the copepod *Ommatokoita elongata*, was observed attached to the eye lens (Fig. 1b). These parasitic organisms are known to cause corneal lesions in *Somniosus* sp. leading to impaired vision and even partial blindness (Edwards et al. 2019). Both dorsal and pectoral fins were low and rounded (Fig. 1c). The gill slits were dorsolaterally located on the head (Fig. 1d), and there was a thin-lipped transverse mouth and small needle-like upper teeth. The eyes were small, with posteriorly situated large spiracles (Fig. 1d) and the dorsal and pectoral fins were non-falcate (Fig. 1e), while the caudal fin was heterocercal. A lateral ridge was observed on the abdomen and the body coloration of the caught individual was dark grey to blackish with small white spots on the dorsal side of the snout (Fig. 1a).

On the basis of these characteristics, the individual's size, and the candidate species previously recorded in the Atlantic, this shark was most likely a Greenland shark (*Somniosus microcephalus*) or a Greenland-Pacific sleeper (*Somniosus pacificus*) hybrid. Regardless of species identity, this is the first record of a sleeper shark in the Western Caribbean. It is also notable because it was caught off the reef slope of a coral reef close to shore. The previous record of this species in the Caribbean was far from the coast over the continental slope. This record supports the hypothesis that sleeper sharks may be more common and widespread at depth in the tropics than available records would indicate.

Declarations

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Author Contributions D.K. wrote the manuscript with input from D.D.C. D.K, H.D.M, O.F, N.M. and E.G. conducted the field operations and made observations. D.D.C. obtained project funding.

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Data Availability

Data supporting the findings of this expedition are available as supplementary material and are publicly available.

Conflict of interest

The authors declare no conflict of interest.

Ethical approval

All research fishing activities were conducted under Belize Fisheries Department Permit #0006-22 and approved animal care protocol #IACUC-20-017-CR02.

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Figures

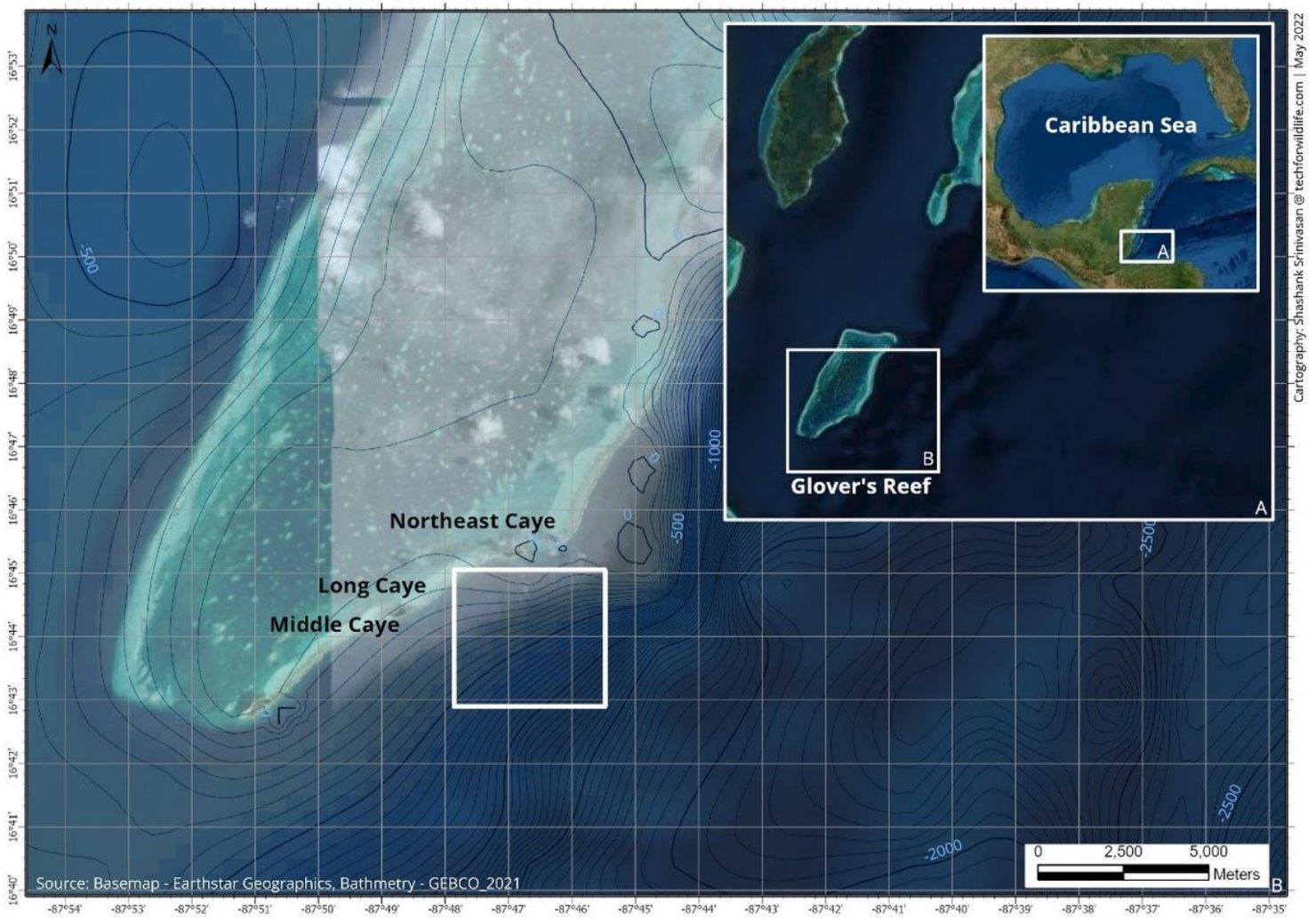


Figure 1

Study area on the insular slope in Glover's Reef Marine Reserve, Belize in the western Caribbean. White box indicates approximate capture location



Figure 2

Somniosus sp. individual observed in April 2022 (a) lateral ridge present, (b) small eyes with a parasitic copepod attached to the eye lens, (c) pectoral fin positioned low on the body, (d) large spiracle located behind the eye, (e) pectoral fin small, rounded, and non-falcate with short rear tip

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SomniosusBelize.mov](#)