

Incidental predation by a largetooth cookiecutter shark on a Cuvier's beaked whale in Puerto Rico

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Abstract

Two species of cigar or cookiecutter sharks (*Isistius brasiliensis* and *I. plutodus*) are known to predate by causing crater wounds on pelagic fishes off Puerto Rico and in marine mammals in other parts of the world. No records exist for wounds caused by the largetooth cookiecutter shark (*I. plutodus*) in marine mammals, and furthermore, no records exist for the Caribbean of wounds inflicted on whales or dolphins by either of these sharks. We report the first record of cookiecutter shark predation in a stranded Cuvier's beaked whale (*Ziphius cavirostris*) from Puerto Rico. We attributed this wound to have been caused by a largetooth cookiecutter shark, based on its size and shape, in addition to the characteristic teeth markings creating pointed-grooves on the borders and the inside of the bite. The finding of a largetooth cookiecutter shark attack on this specimen is of particular interest since it is the first time we have observed this type of fresh wound in our study area. Cookiecutter shark wounds attributed to the widely-distributed cigar shark, have been reported in ten species of seals, whales, and dolphins. However, this is the first record of a largetooth cookiecutter shark wound on a cetacean.

Key words: Caribbean, *Isistius brasiliensis*, *Isistius plutodus*, *Ziphius cavirostris*, predation, cookiecutter shark, Cuvier's beaked whale.

Introduction

Two species of cigar or cookiecutter sharks (*Isistius brasiliensis* and *I. plutodus*) are known to predate by

causing crater wounds on pelagic fishes off Puerto Rico, such as Atlantic blue marlin (*Makaira nigricans*), dolphin fish (*Coryphaena hippurus*), yellowfin tuna (*Thunnus albacares*), albacore (*Thunnus alalunga*), and blackfin tuna (*Thunnus atlanticus*) (Williams & Bunkley-Williams, 1996). In other localities, the cosmopolitan cookiecutter shark (*I. brasiliensis*) has been suspected as responsible for wounds in marine mammals, especially cetaceans (Jones, 1971). No records exist for wounds caused by the largetooth cookiecutter shark (*I. plutodus*) in marine mammals, and furthermore, no records exist for the Caribbean of wounds inflicted on whales or dolphins by either of these sharks. We report the first record of cookiecutter shark predation in a Cuvier's beaked whale (*Ziphius cavirostris*) from Puerto Rico.

Case report

On 29 July 1998, an adult Cuvier's beaked whale stranded off Parque Colón, Aguadilla (18°24.9'N, 67°09.7'W), part of a mass stranding of five Cuvier's beaked whales. The whale, a male, measured 530 cm in length and was found in a fresh state of decomposition. This species is one of the most frequently stranded cetaceans in the North-eastern Caribbean and has been recorded during all months of the year (Mignucci-Giannoni, 1998), thus indicating their residency in this area. Upon external examination of the animal, we noticed on its right flank an oval-shaped crater wound some 21 cm caudolateral to the umbilicus (Fig. 1). The wound measured 6 cm in length and 3.5 cm in height. Its central depth was about 2 cm. By the characteristic

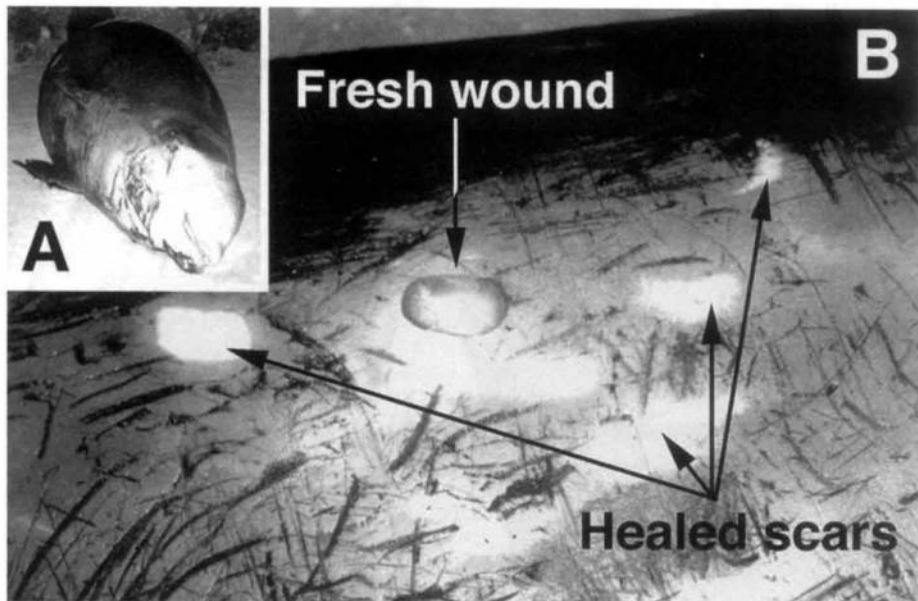


Figure 1. Male goosebeak whale stranded in Aguadilla, Puerto Rico (A). Evidence of largetooth cookiecutter shark attack to whale specimen, showing the fresh wound and healed scars (B).

dermal haemorrhage and the specimen's fresh state of decomposition, the wound appeared to have been made *ante-mortem*. No other fresh wounds were found on the carcass, although a number of healed oval-shaped scars were visible near the wound and genital area.

Compagno (1984) and Garrick & Springer (1964) described the predatory behavior for the *I. brasiliensis* as the shark clamps onto its prey's skin with its jaws and bites down with its sharp teeth on its lower jaw, twisting its body around and gouging out a plug-like piece of flesh. The shark then creates an oral suction with its thick fleshy lips, large tongue and strong throat muscles to suction the piece of flesh out of the prey's body. Williams & Bunkley-Williams (1996) described the wounds of *I. brasiliensis* as round-shaped with an interior spiral pattern of more than 15 groove teeth marks corresponding to the known tooth count on the species lower jaw, while those of *I. plutodus* as oval and elongated with an interior parallel pattern of about 13 groove teeth marks also corresponding to the numbers of species tooth count (Fig. 2). Thus, we attributed the wound observed on the Cuvier's beaked whale in Puerto Rico to have been caused by a largetooth cookiecutter shark, based on its size and shape, in addition to the characteristic teeth markings creating parallel grooves on the borders and the inside of the bite.

Discussion

The finding of a largetooth cookiecutter shark attack on this specimen is of particular interest since it is the first time we have observed this type of fresh wound in our study area, considering that we have tended over 130 marine mammal strandings in Puerto Rico and the Virgin Islands since 1985 (Mignucci-Giannoni, 1996). During these strandings, we have seen shark attacks on carcasses of sperm whales (*Physeter macrocephalus*), humpback whales (*Megaptera novaeangliae*), and Cuvier's beaked whales, especially of the tiger sharks (*Galeocerdo cuvieri*), as well as healed scars of cookiecutter sharks, but we have not observed fresh small cookiecutter-type wounds. Cookiecutter shark wounds attributed to the widely-distributed *Isistius brasiliensis*, have been reported in Guadalupe fur seals (*Arctocephalus townsendi*) (Gallo-Reynoso & Figueroa-Carenza, 1992), northern elephant seals (*Mirounga angustirostris*) (Le Boeuf *et al.*, 1987), sperm whales (Rice, 1989), blue whales (*Balaenoptera musculus*) and fin whales (*Balaenoptera physalus*) (Mackintosh & Wheeler, 1929), Fraser's dolphins (*Lagenodelphis hosei*) (Perrin *et al.*, 1973), melonhead whales (*Peponocephala electra*) (Best & Shaughnessy, 1981), harbor porpoises (*Phocoena phocoena*) (van Utrecht, 1959), beaked whales (*Mesoplodon* spp.) and Cuvier's

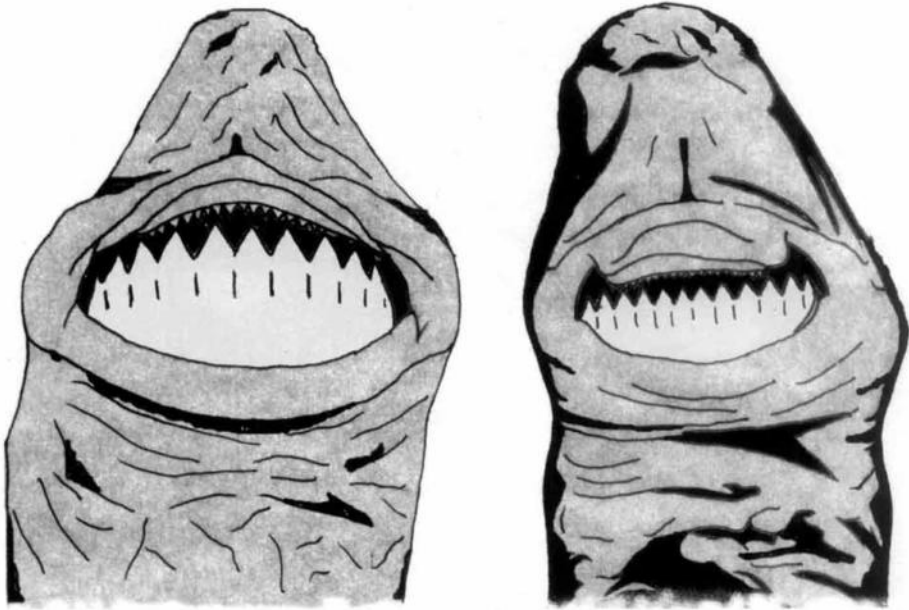


Figure 2. Composite illustration showing the mouth and teeth of the two species of cookiecutter sharks, *Isistius plutodus* (left) and *Isistius brasiliensis* (right).

beaked whales (Mead *et al.*, 1982; Heyning, 1989). This is also the first record of a largetooth cookiecutter shark wound on a cetacean.

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