

First record of the Clymene dolphin (*Stenella clymene* Gray, 1850) in Costa Rican waters

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The genus *Stenella* includes five species, of which the Atlantic spotted (*Stenella frontalis*) and the Clymene (*S. clymene*) dolphins are endemic to the Atlantic Ocean (Perrin et al., 1981; Fertl et al., 2003; Moreno et al., 2005; Jefferson et al., 2015). The Clymene dolphin is described as the smallest of the genus *Stenella* and reaches at least 1.97 m (males) and 1.90 m (females); moreover, the neonatal length is unknown but is thought to be less than 1.2 m (Jefferson et al., 2015). This oceanic species is found only in the tropical and subtropical Atlantic Ocean, including the Caribbean Sea and the Gulf of Mexico, and prefers deep waters between 250-5,000 m (Perrin et al., 1981; do Amaral et al., 2015; Jefferson et al., 2015; Barragán-Barrera et al., 2019). Recent reports confirm the species' presence in the Mexican Caribbean, Belize, Colombia, and Venezuela (Niño Torres et al., 2015; Ramos et al., 2016; Briceño et al., 2020; Mignucci et al., 2021) but records are unknown for other Caribbean Central American waters (*i.e.*, Nicaragua, Costa Rica, and Panama).

Keywords:

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Given the scarcity of cetacean records in Central American waters and even more in the Caribbean waters (Bolaños-Jiménez et al., 2014, 2021, 2023; Alvarado-Hofmeister, 2021; Valencia Cubillos, 2022), it is essential to document the presence of particular species in specific areas to refine the regional cetacean inventory. Here, we report on the presence of a dead, young Clymene dolphin in waters off Tortuguero Volcano, Caribbean Sea, the first record of the species for Costa Rica, more than 800 km afar from the nearest available record in the Gulf of Morrosquillo, Colombia (Mignucci et al., 2021).

On 02 November 2022, a dead dolphin was found floating in Costa Rican waters approximately 45 km from Tortuguero Hill (approx. 10°48'N, 83°00'W, Fig. 1) by the crew of a sport fishing boat. According to the General Bathymetric Chart of the Oceans

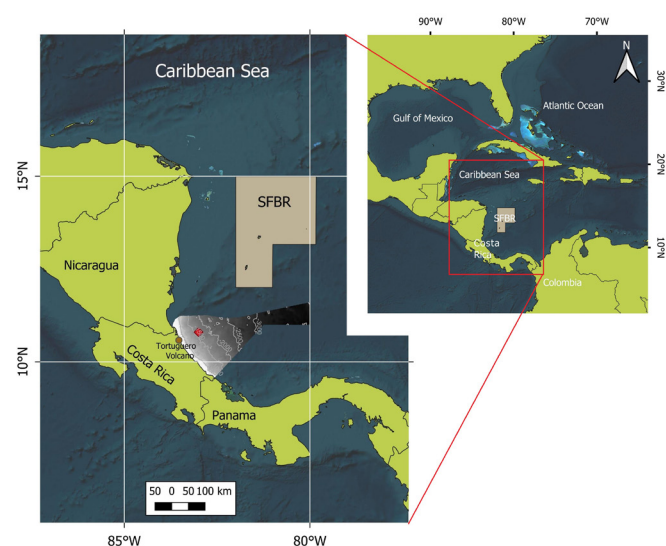


Figure 1. Approximate location of the floating Clymene (*Stenella clymene*) dolphin carcass (red diamond) off Costa Rica, on 02 November 2022. Reference points and bathymetric contours of the Costa Rican Economic Exclusive Zone are indicated. SFBR = Seaflower Biosphere Reserve (Colombia)

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(GEBCO, 2023) the depth at the site of detection of the carcass was between 1,500-2,000 m (Fig. 1). As the boat crew had been exposed to marine megafauna awareness activities (Borges, pers. obs.), they decided to recover and photograph the dolphin for scientific purposes and then returned the carcass to the sea; therefore, studies of histopathology, diseases, or toxicology could not be conducted.

The dolphin was identified as a Clymene dolphin based on diagnostic characteristics visible in the photographs (Fig. 2). These included 1) a three-part color pattern including a dark gray cape, light gray sides, and white belly; 2) a cape that dips above the eyes and below the dorsal fin; 3) dark “mustache” marking on the middle of the top of the beak; and 4) dark stripe on the top of the beak running from the tip to the apex of the melon (see Jefferson et al., 2015). Based on the comparison with reference objects in Fig. 2A, the total body length of this dolphin was estimated to be 100 – 200 cm. Because of the total length and absence of fetal folds, the dolphin was determined to be probably a “young of the year”. Because of the dolphin body’s fresh appearance and the absence of bloating, the decomposition code was determined as 2 (Geraci & Lounsbury, 2005). Macroscopic analysis of the photographs found an irregular laceration on the dorsal aspect of the peduncle of unknown cause, however, given the lack of visible hemorrhage and surrounding tissue reaction this may correlate with a postmortem trauma. Mild postmortem sloughing of the skin caudal to the dorsal fin was noticed. The skin on the caudal edge of the right pectoral fin was white, soft and irregular, which is suggestive of erosion and mild tissue reaction. Other than this finding, no evidence of lesions such as propeller injuries, scars, net or predator marks, or external parasites in the body. Disease studies are important since some pathogens in cetaceans have been described in the Clymene dolphin in the Atlantic Ocean (Attademo et al., 2018). For example, in 2012, *Brucella ceti*, a well-known bacterium related to chronic disease in cetaceans, characterized by abortion, fetal mortality, infertility, osteoarthritis, endocarditis, placentitis, and neuro brucellosis (Guzmán-Verri et al., 2012), was detected using PCR assay in the brain tissue of a Clymene dolphin calf from northeastern Brazil. This disease may have implications for the mortality and reproductive rates of the infected cetacean populations (Attademo et al., 2018).

The most recent inventory of cetacean species for the Costa Rican Caribbean confirmed at least nine species (May-Collado et al., 2018), including the sperm whale (*Physeter macrocephalus*), pygmy killer whale (*Feresa attenuata*), dwarf sperm whale (*Kogia sima*), killer whale (*Orcinus orca*), false killer whale (*Pseudorca crassidens*), Guiana dolphin (*Sotalia guianensis*), rough-toothed dolphin (*Steno bredanensis*), bottlenose dolphin (*Tursiops truncatus*) and the Atlantic spotted dolphin (*Stenella frontalis*). In addition, recent research in the nearby waters of the Seaflower Biosphere Reserve (Colombia, see Fig. 1) found confirmed records of the pantropical spotted (*Stenella attenuata*) and spinner dolphins (*S. longirostris*) (Barragán-Barrera et al., 2019). A regional cetacean review (López Martínez et al., 2022) included the Clymene dolphin in the list of confirmed species for Costa Rica, but no valid reference or evidence was provided.

The present record adds one species to the current inventory of the cetacean fauna of Costa Rica, increasing the number of confirmed species to ten. Based on the presence of the pantropical



Figure 2. Young Clymene (*Stenella clymene*) dolphin that was found floating dead off Costa Rica on 02 November 2022. Diagnostic species characteristics (red arrows) are included. A) Three-part color pattern and the cape dips above the eye and below the dorsal fin; B) “mustache” marking and dark stripe on the top of the beak running from the tip to the apex of the melon. Photo credits: G. Alfaro.

spotted and spinner dolphins in nearby waters of the Seaflower Biosphere Reserve and the border between Costa Rica and Nicaragua (Barragán-Barrera et al., 2019), it is expected that these species’ presence in Costa Rican waters could be confirmed in the near future. Finally, we emphasize the importance of educating the public about marine conservation and the contribution of citizen science initiatives to advance the knowledge of marine biodiversity, as in this case, where the support of citizen science was critical to provide the pieces of evidence for the description of this Clymene dolphin.

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