



SHORT ARTICLE

First confirmed record of the rough-toothed dolphin in Ecuadorian mainland waters

Primer registro confirmado del delfín de dientes rugosos en aguas continentales ecuatorianas

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Abstract

We report the first confirmed occurrence of the rough-toothed dolphin (*Steno bredanensis*) in mainland waters of Ecuador. The species is widely distributed in the Eastern Pacific but is rare south of the equator and even around the Galápagos Islands, where only a handful of records exist. A group of approximately 30 dolphins was observed about 12 km west of the Bajo Copé (01°46' S, 81°10' W), in waters over 500 m deep with a pronounced slope. The species was identified based on external coloration including a narrow black cape along the dorsal area, the head shape, a long whitish snout, and a tall dorsal fin. We recommend increasing pelagic monitoring off the Ecuadorian coast during different seasons to improve our knowledge of the cetacean fauna.

Keywords: Rough-toothed dolphin, Ecuador, behavior, sighting.

Resumen

Reportamos el primer registro confirmado del delfín de dientes rugosos (*Steno bredanensis*) en aguas continentales del Ecuador. Si bien la especie se distribuye ampliamente en el Pacífico oriental, es poco común al sur del Ecuador e incluso alrededor de las islas Galápagos, donde

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solo existen unos pocos registros. Un grupo de 30 delfines fue observado 12 km al oeste de Bajo Copé (01°46' S, 81°10' O), en aguas de 500 m de profundidad con una pendiente pronunciada. La especie fue identificada por su coloración externa, que incluye una angosta capa negra a lo largo del área dorsal, la forma de la cabeza, un largo hocico blanquecino y una aleta dorsal alta. Recomendamos incrementar el monitoreo pelágico en la costa ecuatoriana durante diferentes temporadas para mejorar nuestro conocimiento de la fauna de cetáceos.

Palabras clave: delfín de dientes rugosos, Ecuador, conducta, avistamiento.

INTRODUCTION

The rough-toothed dolphin (*Steno bredanensis*) is widely distributed in tropical and subtropical oceanic waters around the world (Jefferson et al., 2008). It is primarily an oceanic species usually found beyond the continental shelf, but in the eastern and western Atlantic it has also been reported in coastal waters (Kiszka et al., 2020; Lodi & Hetzel, 1998), and seems resident around some oceanic islands (Baird et al., 2008; Oremus et al., 2012). Genetic studies show population structure within ocean basins and high differentiation between the Indian/Pacific and Atlantic populations, meeting the criteria to be considered subspecies (Albertson et al., 2022; Barragán-Barrera et al., 2023). Globally, its conservation status is listed as Least Concern (Kiszka et al., 2020). The species derives its common name from the fine vertical grooves on its teeth, which give them a rough appearance (Miyazaki & Perrin, 1994).

The rough-toothed dolphin can reach up to 265 cm in length and is relatively robust compared to other oceanic dolphin species (Miyazaki & Perrin, 1994). Although its overall coloration is gray, a narrow black cape runs along the dorsal side, passing low over the eye, arching high toward the dorsal fin, and then sweeping downward at midbody (Miyazaki & Perrin, 1994). This contrasts with the dark gray flanks and a white or pinkish belly, although the extent of this coloration may vary by geographic region (Miyazaki & Perrin, 1994). The species is also characterized by a long, conical beak that in adults often takes on a whitish or pinkish hue, and a gently sloping melon (Jefferson et al., 2008; Miyazaki & Perrin, 1994). The dorsal fin is tall and set on a broad base (Leatherwood et al., 1988). Typically, rough-

toothed dolphins are found in small groups of up to 50 individuals (Jefferson et al., 2008; Leatherwood et al., 1988).

One of the regions where the distribution and abundance of this species is best known is the Eastern Tropical Pacific, thanks to the Cetacean and Ecosystem Assessment Cruises conducted by the United States Southwest Fisheries Science Center (SWFSC) between 1986 and 2003 (Hamilton et al., 2009). The species is continuously distributed from southern Baja California, Mexico (25° N), to southern Colombia (01° N), in both oceanic and neritic waters, and extends to approximately 12° S in oceanic waters, although it is less abundant south of the equator (Barragán-Barrera et al., 2023; Hamilton et al., 2009; Miyazaki & Perrin, 1994). The estimated abundance in the Eastern Tropical Pacific is approximately 145,900 (CV = 0.32) dolphins (Wade & Gerrodette, 1993).

In the Southeast Pacific, the species is poorly known and rarely observed, even in deep waters. The first record from the west coast of South America was made in Botija (24°30' S), northern Chile, where the mummified remains of a 201 cm-long dolphin were found (Van Waerebeek & Guerra, 1988). Since then, only a few records of stranded individuals have been reported from central and southern Peru (Reyes, 2009). The species is also rarely observed in oceanic waters, with only five sightings reported in the Galapagos Islands between 1993 and 2010 (Denkinger et al., 2013; Merlen, 1995; Palacios & Salazar, 2002). Additionally, two other records exist in oceanic waters between the Galapagos Islands and mainland Ecuador, and other records further west beyond longitude 100°W—approximately 1,000 km west of the archipelago—documented during SWFSC cruises (Hamilton et al., 2009).

Osteological material of the species is also extremely scarce in South America. Notably, three skulls or partial remains have been found in the Galapagos Islands, two of which are housed at the Charles Darwin Research Station (Palacios et al., 2004), and one at the Centro Peruano de Estudios Cetológicos (CEPEC) in Pucusana, Peru (Koen Van Waerebeek, personal communication). The first record of the species in the Galapagos dates to 21 February 1964, during the Galapagos International Scientific Project expedition, when a skull with mandibles, 12 vertebrae, and one rib were found at Tortuga Bay, Santa Cruz Island (0°45'S, 90°20'W) (Orr, 1965). Although listed among rough-toothed dolphin remains in the Galapagos (Palacios et al., 2004), the specimen is currently part of the collection at the California Academy of Sciences.

THE SIGHTING

On March 23, 2025, while conducting pelagic cetacean monitoring in central Ecuador, between Puerto López (01°33' S) and Salinas (02°12' S), a group of rough-toothed dolphins

was observed approximately 45 km offshore (01°46' S, 81°10' W) at a depth of 500 m and concluded at 700 m, along the continental slope where bathymetry increases abruptly to reach 2000 m depth (Figure 1). We have been conducting these trips since 2023 aboard a 12 m fiberglass boat with an upper deck 2 m above the waterline. The crew scanned the horizon on both sides of the boat, searching for cetaceans *ad libitum*. Upon detection, the boat cautiously approached the animals to collect data on group size, age/sex composition, and behavior. Photographic documentation was obtained with a Canon EOS90D ® camera equipped with a 100–400 mm lens. Additionally, videographic records were obtained using mobile devices in 4K quality to document behavioral patterns.

This is the first time the species is recorded in mainland waters of Ecuador. The encounter lasted 34 minutes. The group size was estimated at 30 dolphins and contained individuals of all ages and sexes, including a very small calf. The dolphins were distributed in four to six sub-groups within a radius of about 100 m heading in northerly direction. The swimming speed was

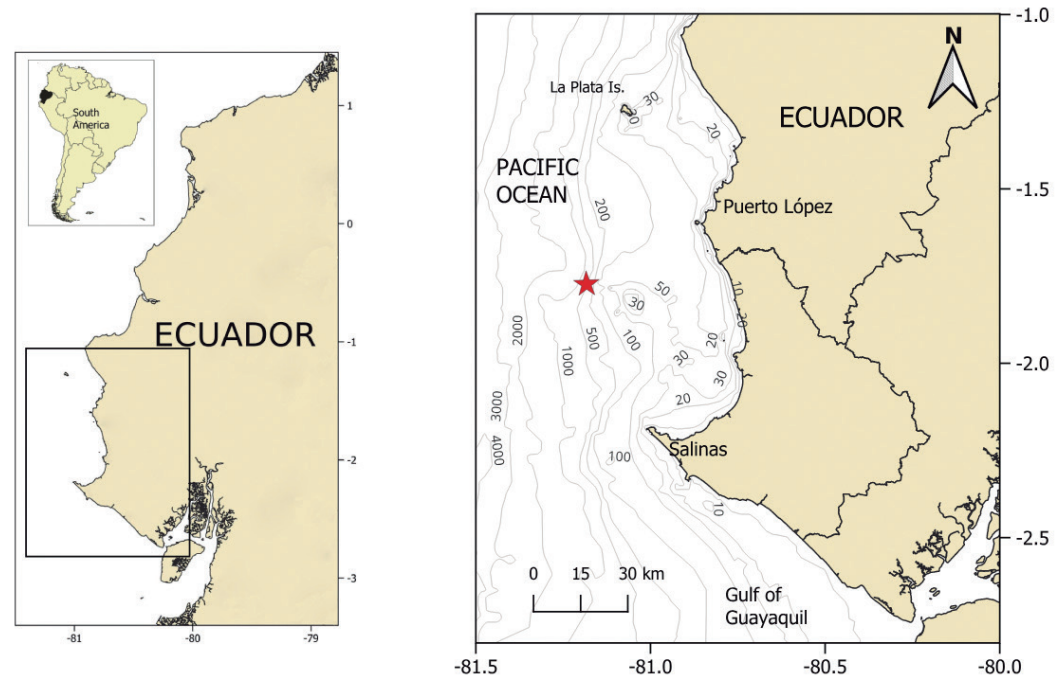


Figura 1. Sighting of the rough-toothed group on the central coast of Ecuador (red star).

relatively slow (5.6 km/h) compared to other oceanic dolphin species. They surfaced quickly at a low angle, sliding the front part of their bodies along the surface and displacing more water than usual. Some individuals approached the boat to bowride, but most maintained a distance between 20 and 50 m. Various subgroups exhibited coordinated formations in horizontal lines. Additionally, several animals exhibited surface behaviors such as vertical half-jumps followed by forceful contact with the water surface with the anterior part of the body. Others performed side half-jumps or forward full jumps. A video of the event can be reached in this link: <https://youtu.be/gFvvWcaOK3U>

Photographs of dorsal fins were taken for individual identification and behavioral analysis. A total of 24 different individuals were identified, six of which were considered calves or juveniles due to having fewer scars on their dorsal fins. Species identification was based on external characteristics, including the narrow black cape over the dorsal area, the shape of the head, a long whitish or pinkish snout, and a tall dor-

sal fin (Figure 2). The youngest animals still had grayish snouts. Some individuals exhibited numerous white lineal scars on their bodies, often interpreted as rake marks, while others showed no distinct pattern. Three dolphins had white-tipped dorsal fins, with the white coloration extending along the posterior edge of the fin. This coloration appeared to be associated with healed wounds, although a natural phenotypic variation cannot be ruled out.

One female, observed with the youngest calf, had a cluster of pseudo-stalked barnacles (*Xenobalanus globicipitis*) on the left side of her jaw, suggesting an injury that exposed part of her teeth and caused jaw deviation. Her calf was the only individual in the group with *X. globicipitis* attached to its dorsal fin, suggesting the possibility of transmission through direct contact.

DISCUSSION

Certainly, the presence of this species during the survey was unexpected, as it had not been reported in continental waters or in records of



Figura 2. A couple of rough-toothed dolphins recorded off mainland Ecuador on March 23, 2025. Note the black narrow cape on the dorsum, irregular white lineal scars on the flank, a gently-sloped melon and the different colors of mandibles, white in the adult and gray in the juvenile. Photo by F. Félix.

marine mammal strandings along the coast of Ecuador (e.g., Chiluita et al., 1998; Chocho et al., 2025; Félix et al., 2011). However, there is some anecdotal evidence suggesting the species may have been observed before. In 2008, a stranded specimen in Pedernales, northern Ecuador, was tentatively identified as either *Steno bredanensis* or a ziphiid, but remained inconclusive (Castro & Van Waerebeek, 2019). Additionally, a sighting off Esmeraldas during an oceanographic cruise was reported (Narvaez et al., 2015), but its validity remains uncertain, as no voucher evidence or details other than group size was provided.

This occurrence may be related to the presence of a warm water mass off the Ecuadorian coast between January and April 2025. In the Eastern Pacific, the species is typically associated with waters above 25°C (Leatherwood et al., 1988), and during the period in question, sea surface temperatures in central Ecuador reached 28°C in March, approximately one degree above the seasonal average (ERFEN, 2025).

However, favorable temperature conditions for the species are regularly present off the coast of Ecuador between January and April, when sea surface temperatures range between 27 and 29.9 °C (Chinacalle-Martínez et al., 2021). During this season, the Equatorial Front reaches its southernmost position off southern Ecuador (Wyrski, 1966). This front is formed by the convergence of the cold, nutrient-rich Humboldt Current from the south and the warm Panama Current from the north, and extends westward toward the Galapagos Islands (Wyrski, 1966). The Equatorial Front marks the boundary between two biogeographic regions: the Peru-Chilean and the Panamanian Provinces (Toonen et al., 2016). Beginning in May, the strengthening of the Southeast Pacific anticyclone shifts the Equatorial Front northward, reaching north-central Ecuador (near the equator) and the sea temperature in central and southern Ecuador drops to 19.5–24°C (Chinacalle-Martínez et al., 2021), creating a thermal barrier for rough-toothed dolphins. A similar thermal barrier has been observed off southern Brazil, in the convergence zone between the Falklands Current and the southern Brazilian

coast, which defines the southern distribution limit of the rough-toothed dolphin in that region (Lodi & Hetzel, 1998). Consequently, the probability of encountering rough-toothed dolphins between mainland Ecuador and the Galapagos Islands decreases sharply south of the equator during the cold season (May–December).

The seasonal presence of the species is likely also associated with prey movements. Rough-toothed dolphins in Hawaii are known to feed primarily on adult mahimahi, locally known as dorado (*Coryphaena hippurus*) (Baird 2008; Pitman & Stinchcomb, 2002), a warm-water species that is present in Ecuadorian waters mostly during the warm season (Martínez-Ortiz & Guerrero-Verduga, 2013). It is possible that rough-toothed dolphins may be observed more frequently in northern Ecuador, where sea surface temperatures remain above 25°C year-round and the continental shelf is narrower than in the south, allowing the species to occur closer to the coast.

The presence of a deep-water species off central Ecuador may be favored by the local bathymetry, as the depth at the observation site drops abruptly from 500 to 2000 m within just 8 km. Additionally, some 12 km west of the sighting location, the Bajo Copé shoal rises, generating local upwelling due to the interaction of marine currents that collide with the 20–30 m deep feature. Because of its productivity, this area hosts the highest concentration of manta rays in the world (Harty et al., 2022) and is well known for both commercial and sport fishing (MAAE, 2021; Romero et al., 2019). The Bajo Copé, located 30 km from the coast, was declared a marine reserve in 2016, covering an area of approximately 40,000 ha (MAE, 2020). Water surrounding the Bajo Copé may also be important for other oceanic cetacean species, and we recommend increased monitoring in the area.

The distinctive surfacing behavior observed, characterized by rapid, low-angle emergence with marked water displacement, and the group structure, in which individuals form subgroups, swim in close proximity, and perform synchronous movements, align with previous descriptions of the species' diagnostic behaviors (e.g., Baird et al., 2008; Cardoso et al., 2019; Lodi & Hetzel, 1998; Ritter, 2002). These traits are asso-

ciated with group cohesion and potentially cooperative activities and are key characteristics used to identify the species. However, little is known about their social behavior due to the challenges of studying this species in oceanic waters, although important advances have been done in Hawaii (Baird et al., 2008) and Brazil, where the species also inhabits coastal areas (Cardoso et al., 2019; Lodi & Hetzel, 1998). The multi-generational composition of the group recorded in Ecuador, including a neonate calf, suggests a stable social unit rather than a temporary aggregation, which is comparable with reported in other better-known populations (Baird et al., 2008; Lodi & Hetzel, 1998; Oremus et al., 2012).

Our record underscores the importance of conducting pelagic cetacean monitoring off the coast of Ecuador through different times of the year. Given the oceanographic dynamics of the region, primarily driven by the position and strength of the Equatorial Front, the cetacean megafauna will likely continue to yield unexpected findings. We also emphasize the need for genetic studies on this species to identify management units in the eastern Pacific, given the population structure shown by the species elsewhere (Albertson et al., 2022; Barragan-Barrera et al., 2023; Oremus et al., 2012).

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