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# First record of the long-beaked common dolphin in Ecuador

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The common dolphin (*Delphinus* spp.) is widely recognized as one of the most abundant and geographically widespread cetacean species worldwide, inhabiting both coastal and oceanic waters across tropical and temperate regions (Jefferson et al., 2008; Perrin, 2018; Braulik et al., 2021). Taxonomic classification and nomenclature have been subjects of ongoing debate due to the species' variability in color pattern, morphology, size, and ecological preferences. This debate centers on distinguishing between at least three distinct morphs and ecotypes: the offshore, broadly distributed short-beaked form; the more locally distributed long-beaked form, which globally includes several distinct populations evolved separately, and tends to prefer cool coastal waters (Banks & Brownell, 1969; Jefferson et al., 2008; Perrin, 2018); and thirdly, a strictly tropical form, not present in the Southeast Pacific, with an exceptionally long rostrum (Jefferson & Van Waerebeek, 2002; Perrin, 2018).

Historically, the long-beaked common dolphin was considered a separate species, referred to as either *D. bairdii* or *D. capensis*, based on specimens from California and South Africa, respectively (Banks & Brownell, 1969; Heyning & Perrin, 1995). The exceptional long-beaked form found in the tropical Indian Ocean and Southeast Asia has been proposed as a subspecies, *D. c. tropicalis* (Jefferson & Van Waerebeek, 2002). Currently, the Committee on Taxonomy of the Marine Mammal Society (2024) recognizes a single species, Delphinus delphis Linnaeus, 1758, with four subspecies: *Delphinus delphis delphis* (short-beaked common dolphin), *D. d. bairdii* (Eastern Pacific long-beaked common dolphin), *D. d. ponticus* (Black Sea common dolphin), and *D. d. tropicalis* (Indo-Pacific common dolphin). Recent molecular and morphometric studies and investigations into the life histories of these forms in the northeastern and southeastern Pacific have provided support for distinguishing *D. bairdii* as a separate species (Jefferson et al., 2024).

The two forms of the common dolphin, short- and long-beaked, were first documented inhabiting the NE and SE Pacific by, respectively, Banks & Brownell (1969) and Van Waerebeek et al. (1994 a,b). Externally, both forms look similar, which makes their identification at sea often difficult. The length of the beak and the ratio of rostral length to zygomatic width are the cranial characteristics most commonly used for distinguishing between both forms (Banks & Brownell, 1969; Van Waerebeek et al., 1994a, b; Heyning & Perrin, 1995; Santillán et al., 2023; Jefferson et al., 2024) but in free-ranging animals variations of the coloration pattern and the shape of the head are used for this purpose (Heyning & Perrin, 1995; Perrin, 2018). The short-beaked form is more abundant and widely distributed in oceanic waters, whereas the long-beaked form is primarily found in highly productive coastal areas associated with the California and Humboldt currents (Banks & Brownell, 1969; Llapapasca et al., 2018). More than 99% of common dolphins taken in upwelling-modified coastal waters off Peru in the 1980-90s belonged to the long-beaked form (Van Waerebeek et al., 1994b).

In the NE Pacific, a long-beaked population ranges from California in the USA through Baja California and the Gulf of California in Mexico (Heyning & Perrin, 1995; Jefferson et al., 2008).

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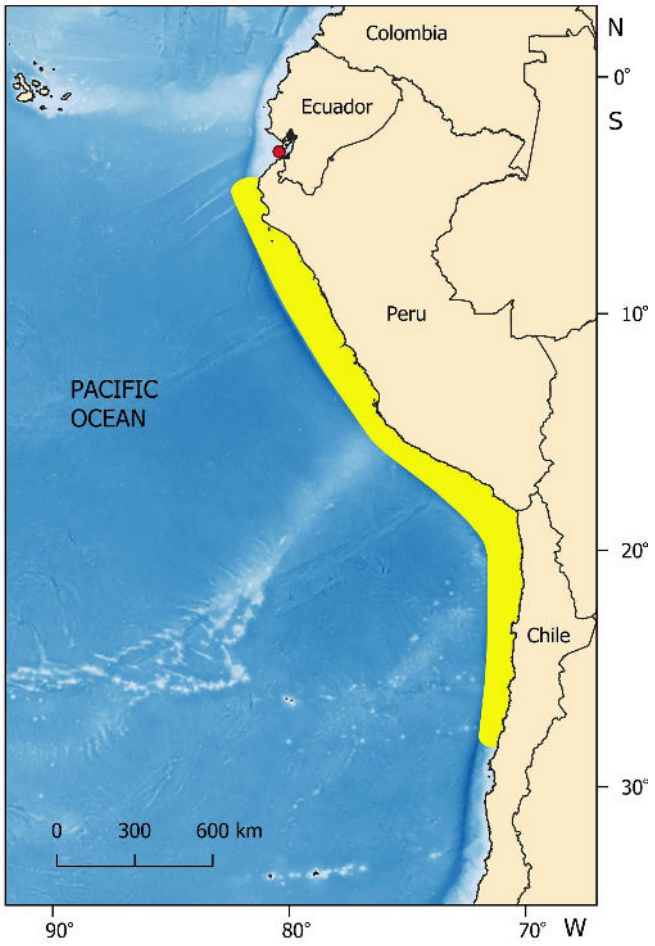


**Figure 1.** Known distribution of the Humboldt Current long-beaked common dolphin (*Delphinus bairdii*) (yellow shaded area) and the extralimital record at Santa Clara Island in Ecuador (red dot).

In the SE Pacific, long-beaked specimens were documented from Parachique (05°44′ S, 80°52′ W), Piura, in northern Peru, south to Laguna Grande (14°10′ S, 76°13′ W) (Van Waerebeek & Reyes, 1994). Silva-Buse (2016) and Pacheco et al. (2019) presented photos of both long- and short-beaked common dolphins off Los Organos (04°11′ S, 81°07′ W), Piura, and indicated that the long-beaked morph is frequently sighted and appears in groups of thousands, relatively close to land, during winter and spring, only to disappear in summer. Such seasonality is explainable by a prey-related link with the cool Humboldt Current and is also consistent with a habitat modeling effort that suggested a distribution along the coasts of Peru (04° S – 18° S) (Llapapasca et al., 2018). Sighting data collected during an IWC/SOWER cruise extended the long-beaked form distribution south to 28°50′S in Chile (Sanino et al., 2003). Long-beaked common dolphins in both hemispheres exhibit a parapatric distribution, with limited gene flow between populations (Jefferson et al., 2024).

Along the coast of Ecuador (1.5° N – 3.5° S), the short-beaked common dolphin is widely distributed, although its presence is primarily documented through stranding and bycatch records due to its preference for oceanic habitats (Chiluiza et al., 1998; Félix et al., 2011; Castro & Van Waerebeek, 2019). It is also reported as abundant among odontocetes around the Galapagos Islands (Denkinger et al., 2013; Alarcón et al., 2023). The short-beaked common dolphin is particularly vulnerable to incidental capture by Ecuadorian artisanal fishing fleets, constituting between 86% and 88% of marine mammal bycatch in certain ports (Félix & Samaniego, 1994; Coello et al., 2010).

Despite extensive research efforts in coastal areas, no prior records of the long-beaked common dolphin have been documented in Ecuador. Here, we present photographic evidence confirming the presence of the long-beaked form in the country for the first time, marking the northernmost sighting of this species in the eastern South Pacific.

On 29 November 2022, one of us (RM) photographed a group of 100 - 200 common dolphins around Santa Clara Island (3°10′ S, 80°25′ W) during a control and surveillance monitoring in the Santa Clara Island Marine Reserve, southwest Ecuador. Santa Clara Island is located in the southern part of the Gulf of Guayaquil, just 24 km north of the Peruvian border (Fig. 1). The collected data includes 21 photographs and five videos (68 seconds). Although most of the photographs were backlit, they clearly show that the rostrum length is considerably greater compared to photos of short-beaked common dolphins taken by the first author in the northern Gulf of Guayaquil, in February and March 2024 (Fig. 2). The optimal frames were extracted from the videos and contrast was enhanced with Photopea® to better observe the coloration pattern of the dolphins (Fig. 3). The speed of one of the videos was reduced to 70% and 1080p resolution with Clipchamp ® and the video included as Supplementary Material (S1).

Using the available photographic material, we conducted a comparative analysis of three external characteristics between long-beaked common dolphins observed near Santa Clara Island and short-beaked common dolphins from the northern part of the Gulf of Guayaquil, following Heyning & Perrin (1995). These characteristics include the shape of the melon, the flipper stripe, and the thoracic patch. The short-beaked form typically has a relatively shorter but broader head, giving the melon a rounder appearance, as observed in specimens C and D in Fig. 2. In contrast, the long-beaked form displays a more flattened melon shape (specimens A and B in Fig. 2). Heyning & Perrin (1995) noted that in short-beaked common dolphins the flipper stripe merges with the lip patch at one-third to one-half of the mandible, whereas in the long-beaked form this fusion occurs posteriorly, closer to the corner of the mouth, visible in Figs 2 and 3. Concerning the yellow-brown thoracic patch, Heyning & Perrin (1995) describe a sharper contrast between the dark gray or black spinal field and the thoracic patch in the short-beaked form compared to the long-beaked form, as depicted in Fig. 2 and supplementary video S2. Also, in the short-beaked form the white of the abdominal field extends forward above the flipper stripe (Fig. 2 A, D), whereas in both Californian (Heyning & Perrin, 1995) and Humboldt Current long-beaked forms (Fig. 2 A, B; Fig. 3) a dark flipper-to-anus stripe stands out. According to Jefferson et al. (2024), the most reliable difference between short- and long-beaked in the eastern Pacific is the presence of a dark stripe from the gape/eye to the anus in long-beakeds, but we were unable to use it because the available photographs do not show the full flank of the animals.

Our findings confirm that the distribution range of the Humboldt Current long-beaked common dolphin extends at least to 3°S, within the southern Gulf of Guayaquil, the area with the highest

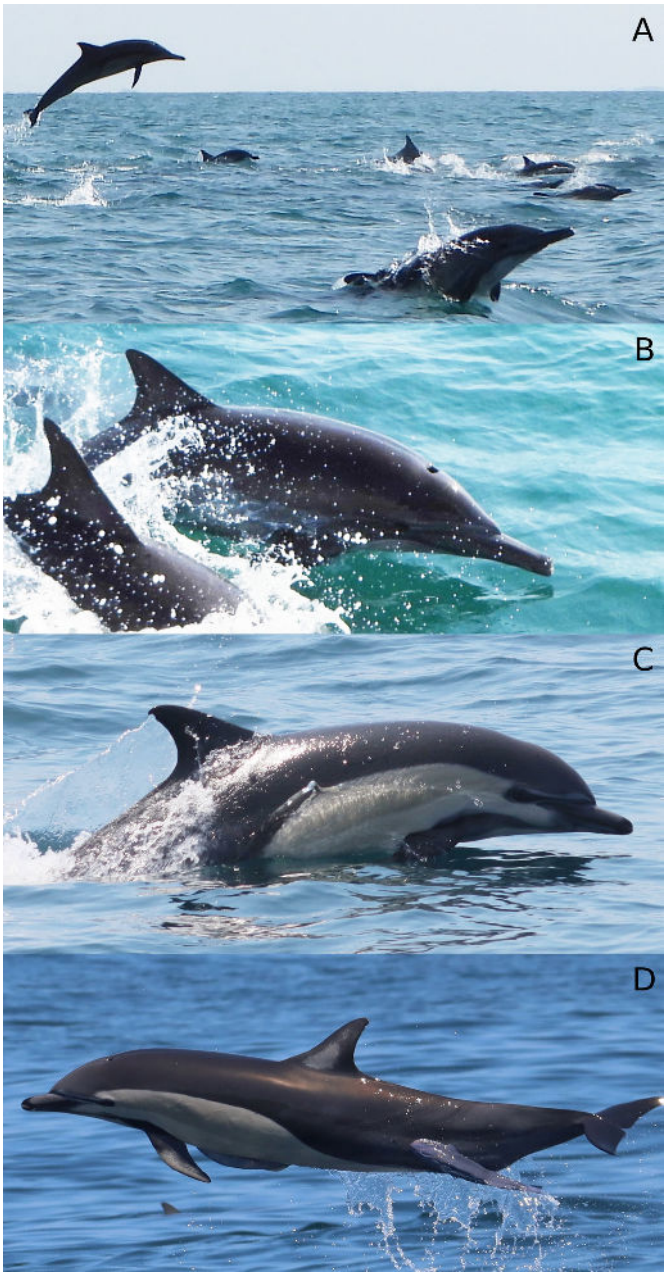


**Figure 2.** Long-beaked common dolphins (*Delphinus bairdii*) photographed off Santa Clara Island in November 2022 (A and B) and short-beaked common dolphins (*Delphinus delphis*) photographed in the northern part of the Gulf of Guayaquil in 2023 (C and D). Note the remora (family Echeneidae) attached to the lower flank of the short-beaked dolphin (D).

**Figure 3.** Frames extracted from the videos of long-beaked common dolphins (*Delphinus bairdii*) taken around Santa Clara Island, Ecuador, in November 2022.

primary productivity on the coast of Ecuador (Chinacalle-Martínez et al., 2021). Despite our analysis not including specimens for in-depth morphological or genetic comparisons, some external morphological and coloration patterns described in the long-beaked common dolphin of the California Current (Heyning & Perrin, 1995; Jefferson et al. 2024) are visibly present in the specimens recorded around Santa Clara Island, which are identical to Peruvian long-beaked specimens (K. Van Waerebeek, unpublic. data). While our record extends approximately one degree (111 km) north of the long-beaked common dolphin's known distribution limit (Pacheco et al., 2019), its ecological and conservation relevance is underscored by the need for the involvement of an additional Range State in population conservation and management efforts.

The presence of the long-beaked common dolphin in Ecuadorian waters could be related to favorable oceanographic conditions at the time of the record (November 2022). The northernmost sighting occurred during the cold phase of the El Niño Southern Oscillation (ENSO) event, La Niña, when the sea surface temperature in the SE Pacific was 1°C cooler on average due to the increasing intensity of the SE Pacific anticyclone (ERFEN, 2022). The species' range would also be sensitive to temperature increases during El Niño years. Ecological niche models suggested a potential retraction of the habitat of the long-beaked common dolphin in northern Peru (4°S-14°S) during El Niño 1997-98 (Llapapasca et al., 2018). Such a change would be associated with reduced prey

availability, in particular Peruvian anchovy *Engraulis ringens*, the main prey (70% by number) of long-beaked common dolphins off Peru (García-Godos et al., 2007). The Peruvian anchovy is highly sensitive to changes in water temperature (Ñiquen & Bouchon, 2004). Changes in the distribution of both short- and long-beaked common dolphins were recorded off the coast of California, during the 1970s and 1980s and associated with El Niño. Between 1970 and 1982, 84.4% of stranded common dolphins were short-beaked and in the period 1983-1988 the proportion reversed and 88.2% of stranded common dolphins were long-beaked (Heyning & Perrin, 1995).

Alternatively, the presence of the long-beaked common dolphin in southern Ecuador could be regular, but not recorded given the limited monitoring of cetaceans in the Gulf of Guayaquil, a situation similar to in Tumbes, Peru's northernmost department. So, it is not ruled out that the long-beaked common dolphin occurs habitually in that border area, at least seasonally (in winter). Increased monitoring efforts are required in the southern Gulf of Guayaquil and adjacent Tumbes to understand distributional and ecological aspects associated with this and other poorly known cetacean species associated with the Humboldt Current.

Given its coastal-neritic habit and restricted distribution in the northern area of the Humboldt Current (Van Waerebeek & Reyes, 1994; Sanino et al., 2003; Llapapasca et al. 2018; Santillán et al., 2023), the long-beaked common dolphin faces important conservation challenges. It is one of four most affected cetacean species in Peruvian fisheries either as bycatch or direct takes, with thousands of animals taken each year in at least 1990-2007 (Van Waerebeek & Reyes, 1990, 1994; Mangel et al., 2010). Despite regulations implemented by the Peruvian fishing authorities, dolphin mortality continued (Van Waerebeek & Reyes, 1994; Tzika et al., 2010; Van Waerebeek et al., 2018). Only at Salaverry port (08°14′ S) the annual mortality of long-beaked common dolphins was estimated at 973 (CI 541–1550) individuals in the period 2002 - 2007 (Mangel et al., 2010), which is only a small part of the problem given the scale of the Peruvian fisheries (Alfaro-Shigueto et al., 2010). Like other species of small cetaceans affected by fisheries in the Humboldt Current, effective measures are required to reduce mortality rates of common dolphins in Peruvian and Ecuadorian fisheries. In that sense, a recent study in Peru is encouraging, indicating that the mortality of common dolphins decreased by 44% in gillnets with the use of acoustic devices (Mangel et al., 2013). Nevertheless, the challenge remains to scale up the initiative nationally.

Although taxonomy is not the focus of this article, we cannot ignore the proposal by Jefferson et al. (2024) based on new information on eastern Pacific common dolphins to upgrade the status of the long-beaked form to species level. We concur with that statement. In their work, Jefferson et al. (2024) also highlighted that the long-beaked form from the Humboldt Current has some unique characteristics such as a wider skull than that off California, and that it could be a subspecies of *D. bairdii*. Van Waerebeek et al. (1994a, b) previously demonstrated distinct morphological differences between the Humboldt and the California long-beaked common dolphins and proposed they are different subspecies. Notably, skulls of adult male Humboldt long-beaked dolphins have a 2.53cm greater condylobasal length, averaging 498.9 mm (range 473–531 mm) compared to 473.6 mm (range 446–498 mm) in the California long-beaked. A similar size difference (2.31 cm) was found in adult females (Van Waerebeek et al., 1994b). Additionally, adult males of the Humboldt long-beaked common dolphin are larger, averaging 235.7 cm (range 222 - 258 cm) (Van Waerebeek et al., 1994a, b) versus 219.1 cm (range 202 - 235 cm) in their California counterparts (Heyning & Perrin, 1995). The Humboldt long-beaked common dolphins also show differences in body length compared to the long-beaked common dolphins from the Gulf of California, Mexico (up to 264.7 cm), considered the largest long-beaked form in the world (Vidal and Reynoso, 2012; Jefferson et al., 2024). Further morphological and genetic studies are needed to define the distinctiveness of the Humboldt Current long-beaked common dolphin, considering that their coastal distribution is disjunct from the Californian (US), Baja California (Mexico) and Gulf of California long-beaked common dolphins; which also strongly suggests reproductive isolation.

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