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Sightings of blue whale (*Balaenoptera musculus*) along the southeastern Arabian Sea

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Short Communication

Abstract

Observations on the sighting of blue whale, *Balaenoptera musculus,* in the wild are infrequent and serve as key indicators of oceanic ecosystem health. Here, we document three live blue whale sightings in the southeastern Arabian Sea, based on the visual observations from the Fishery Oceanographic Research Vessel, Sagar Sampada, during March-June 2024. The coordinates of the sightings were: 09° 06′ N, 74°18.84′ E; 08° 59.58′ N, 65° 0.18′ E and 08° 32.16′ N, 73° 28.48′ E. Two solitary adult whales were observed in the first two sightings, while a group of three adults were recorded in the third. These observations enhance our knowledge of blue whale distribution in this region, helping to address the scarcity of data on this species.

Keywords: *Baleen whale, Balaenoptera musculus, cetacea, ship-based observation, Indian EEZ*

Introduction

The *Balaenoptera musculus* (Linnaeus, 1758) is the largest known animal on Earth and plays a crucial role in maintaining the health and balance of the marine ecosystem as an apex predator. Research indicates that blue whales are the most commonly sighted large cetacean species in the Northern Indian Ocean (NIO) (Leatherwood *et al.,* 1989; Branch *et al.,* 2007; Priyadarshana *et al.,* 2016). However, ongoing research efforts and comprehensive data regarding the presence, abundance, distribution, and migratory behaviour of these species in Indian waters along the Arabian Sea remain insufficient. This critical knowledge gap poses significant challenges in contributing data to strengthen conservation and management efforts for cetaceans.

According to the International Union for Conservation of Nature (IUCN) "Red List of Threatened Species-2020," blue whales in the NIO are listed as "not assessed," with an unspecified population trend (IWC, 2020). Globally, blue whales are classified as "endangered" with populations still significantly below pre-whaling levels due to past extensive commercial exploitation. In the NIO, blue whales were subjected to whaling activities off the coasts of Somalia, the Maldives, Sri Lanka, and Oman; however, they were not as severely impacted as their counterparts in the Antarctic region (Clapham and Ivashchenko, 2009). Recent observations suggest a gradual increase in the NIO population (Anderson and Alagiyawadu, 2019).

Their presence in the Arabian Sea is confirmed with recorded sightings in the Gulf of Oman, along the coasts of Pakistan and India, as well as in the Maldives and Kenya, particularly prevalent in the pristine waters off Sri Lanka (Minton *et al.,* 2010; Anderson *et al.,* 2012; Barber *et al.,* 2016; Sutaria *et al.,* 2016; Moazzam and Nawaz, 2019; Willson *et al.,* 2019; Chandrasekar *et al.,* 2021). Two subspecies of blue whales, namely the Pygmy blue whale (*Balaenoptera musculus brevicauda*) and the Indian Ocean blue whale (*B. m. indica*), have been identified in the NIO; however, their taxonomy is not fully resolved (Ilangakoon and Sathasivam, 2012). The classification of these subspecies is challenging, as they lack clear morphological and behavioural distinctions (Anderson *et al.,* 2012). Furthermore, the International Whaling Commission Scientific Committee recognises that Indian Ocean blue whales are mainly distinguished by their song types, which vary across different regions, including Oman, Sri Lanka, Madagascar, the Kerguelen Islands, and from Indonesia to Australia (IWC, 2022a).

Within India's Exclusive Economic Zone (EEZ), an impressive array of 25 cetacean species has been documented as part of the marine living resource programme of the Ministry of Earth Sciences, Government of India, highlighting the diversity among marine mammals (Afsal *et al.,* 2008; Vivekanandan and Jeyabaskaran, 2012; Jeyabaskaran *et al.,* 2024). This includes various members of the Delphinidae family, known for their intelligence and social behaviour, as well as the elusive Kogiidae, massive Physeteridae, deep-diving members of the Ziphiidae family, and the smaller Phocoenidae family. Notably, six species from the Balaenopteridae family, commonly known as rorquals, are characterised by their elongated bodies and distinctive feeding methods. Among them are the majestic *B. musculus* (Blue whale), the streamlined *B. physalus* (Fin whale), the robust *B. edeni* (Bryde's whale), the nimble *B. acutorostrata* (Common minke whale), the elusive *B. omurai* (Omura's whale), and the iconic *Megaptera novaeangliae* (Humpback whale) (Kumaran, 2002; Vivekanandan and Jeyabaskaran, 2012; Jefferson *et al.,* 2015; Jeyabaskaran *et al.,* 2024). Despite their presence, our understanding of the blue whale's distribution and seasonal behaviours in the Arabian waters off the Indian coast remains notably sparse. Most of the existing data has been derived from unfortunate strandings (Kumaran, 2002; Anderson *et al.,* 2012), with only a singular live sighting recorded off the Gujarat coast in northwest India along the Arabian Sea (Chandrasekar *et al.,* 2021). Furthermore, acoustic monitoring has revealed the vocalisations of pygmy blue whales (*B. m. brevicauda*) around the Lakshadweep Islands, indicating their elusive presence in these vibrant waters (Panicker *et al.,* 2020).

Here, we report a series of surveys conducted aboard the Fisheries and Oceanographic Research Vessel 'Sagar Sampada,' where a trained marine mammal observer has documented sightings of blue whale (*B. musculus*) in the Lakshadweep archipelago and adjacent seas along the Arabian Sea.

Material and methods

Surveys were conducted aboard the Fisheries and Oceanographic Research Vessel 'Sagar Sampada' during cruises 404 and 407, as part of the Deep Ocean Mission programme of the Ministry of Earth Sciences, Government of India, titled "Technological innovations for exploration and conservation of deep-sea biodiversity". Opportunistic surveys in the daylight were conducted from 21 March to 10 April 2024, and from 27 May to 15 June 2024, covering approximately 280 hours of active visual observation and cruising 3,200 nautical miles of track line. Data collection was undertaken using a Nikon D5 DSLR camera with a 400 mm lens. Detailed records of each sighting were systematically documented, including date, time, GPS coordinates, water depth, sighting location, distance to the sighting, sea state, wind direction, visibility, and surface water temperature. Observations were made under maritime conditions corresponding to Beaufort scale ratings of 0 to 5. The approximate overall length of the observed whales was estimated at 20–25 m, consistent with adult blue whales. Species identification was done at the time of observation or subsequently verified through photographs and field notes, and confirmed using the field guide "Marine Mammals of the World" (Jefferson *et al.,* 2007; 2015) and relevant literature (Vivekanandan and Jeyabaskaran, 2012). These efforts adhered to rigorous protocols designed to minimise disturbance to the animals while gathering invaluable observational data.

Results

Over a total of 41 days, the observer recorded three sightings of a total of five individual blue whales (Fig. 1). The first sighting was on 9 April 2024, at 09:10 Indian Standard Time (IST). A single blue whale was observed at coordinates 09° 06′ N, 74° 18.84′ E, approximately 225 km off the coast of Kerala and 162 km east of Minicoy, at a station depth of 2,797 m. Initially spotted 1.5 km away, the whale approached the vessel, which was travelling at 4 knots on a 350° bearing, ultimately coming within 500 meters. The sighting lasted for 30 minutes, concluding at 09:40 IST. The sea was calm, featuring glassy conditions (Beaufort scale 0) and a recorded sea surface temperature (SST) of 28 °C amid low atmospheric pressure. The whale surfaced six times, remaining visible for approximately three minutes before diving. Observed features included the rostrum, splashguard, shoulders, and a tall blow measuring 5–6 m. Before diving deeper, the whale exhibited a distinctive lift of the caudal peduncle, with its tail flukes visible above the surface.

The second sighting was on 5 June 2024, at 18:25 IST. An individual blue whale was observed at 08° 59.58′ N, 65° 0.18′ E, roughly 1,240 km off Kerala and 915 km west of Minicoy at

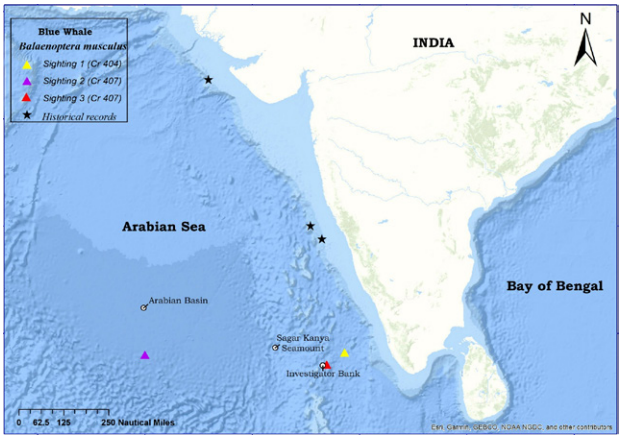

Fig. 1. Map highlighting the sighting location of the blue whale (*B. musculus*), Southeastern Arabian Sea, India

a station depth of 4,480 m. Initially sighted at a distance of 2 km, the whale was observed moving northward at 320° before changing course to 290° westward. The vessel, travelling at 3 knots on a 330° bearing, maintained proximity, with the whale eventually approaching within 1 km before disappearing at 18:45 IST, resulting in a 20-minute sighting. Sea conditions were rough, with winds of 15–20 knots and a sea surface temperature (SST) of 29 °C, and whitecaps were visible on the water surface. The whale surfaced eight times, remaining visible for 1 minute after each dive. Notable features included the snout, splashguard, shoulders, and a distinctive single lesion on its body. A prominent blow, reaching 6–8 m, was observed, accompanied by the caudal peduncle and tail flukes being raised before deep dives.

The third sighting was on 11 June 2024, at 09:04 IST, a pod of three adult blue whales was observed at 08° 32.16′ N, 73° 28.48′ E, located approximately 330 km off the coast of Kerala and 56 km from Minicoy at a station depth of 2,568 m. Initially spotted 3 km away, the whales moved northward at 330° before shifting westward at 300°. The vessel, moving at 4 knots on a 270° bearing, observed the whales coming within 2 km before they disappeared at 09:40 IST, resulting in a sighting duration of 36 minutes. Rough seas, characterised by 20–25 knot winds and a sea surface temperature (SST) of 29 °C, produced visible whitecaps. Despite these challenging conditions, the whales surfaced three times, each maintaining an approximate distance of 100 m from the others. Observations included a tall blow reaching 6–8 m, although diagnostic features such as the rostrum and splash guard were difficult to distinguish due to unfavourable weather conditions.

The observed blue whales exhibited key morphological traits that are crucial for accurate species identification (Fig. 2). They possess a streamlined, slender body, accompanied by a broad, U-shaped head that appears flat from a lateral view. Additionally, their small and variably-shaped dorsal fin is located near the back, supported by a sturdy caudal peduncle and a mottled blue-to-grey dorsal surface. Notably, the tail flukes have a broad, relatively straight trailing edge characterised by a distinct notch. Furthermore, the blue whales' blows, reaching impressive heights of 6–8 m, correspond with the studies made by Vivekanandan and Jeyabaskaran (2012) and Jefferson *et al* (2015). This comprehensive understanding of blue whale morphology not only aids in species identification but also fills the data gaps in their abundance trends.

Discussion

The first documented sighting of a blue whale in India dates back to 1874, when a beached specimen was discovered, and its skeleton was subsequently displayed at the Madras Museum, presently known as the Chennai Museum (Kumaran, 2012). Additionally, with few reports of blue whale strandings along India's western coast, including the Lakshadweep Islands (Dudhat *et al.,* 2022), the incidence of live sightings of blue whales is rare. The current paper reports the live sightings of blue whales off the Indian waters, occurring at depths ranging from 2,568 to 4,480 meters. The infrequency of these encounters along the Indian coastline is likely due to limited deep-sea survey efforts conducted thus far (Panicker *et al.,* 2020).

The Lakshadweep, consisting of diverse habitat types, also offer a vast biodiverse landscape for cetaceans, which includes Arabian Sea humpback whales (*M. novaeangliae*), Bryde's whales (*Balaenoptera edeni*), and various toothed whale species (Anderson *et al.,* 2012; Pomilla *et al.,* 2014). This area lies within the Indian Ocean Whale Sanctuary, established by the International Whaling Commission (IWC, 2019) to protect its critical breeding grounds. Previous studies report 23 cetacean species in nearby Maldivian waters, 21 species in the western tropical Indian Ocean and 27 species in the seas off Sri Lanka and the southeastern Arabian Sea (Afsal *et al.,* 2008; Anderson *et al.,* 2012; Ilangakoon, 2012.) Stranding and bycatch records (Burton, 1941; Alling, 1986; James and Panicker, 1990; Afsal *et al.,* 2008; Kumaran, 2012; Sajikumar *et al.,* 2014; Panicker *et al.,* 2020; Jeyabaskaran *et al.,* 2024) suggest that at least 12 cetacean species inhabit the western coast of India. Although numerous studies indicate the presence of different cetacean species in the surrounding waters, significant gaps in knowledge exist regarding their habitats.

The habitat of the blue whale is intricately connected to the presence of euphausiids, its primary food source, as well as a variety of oceanographic and topographic elements that shape its environment (Reilly and Thayer, 1990; Branch *et al.,* 2007). In the northern Indian Ocean, the dynamics of biological productivity are significantly influenced by the seasonal monsoon patterns, specifically the southwest and northeast monsoons, which facilitate the movement of low-oxygenated freshwater from the Bay of Bengal into the Arabian Sea during upwelling processes (Prasannakumar *et al.,* 2004). These productive ecosystems not only support a diverse range of marine life but also sustain various top predators, including marine mammals, as documented in the present study, thus maintaining the delicate balance of the marine food web (Ballance *et al.,* 2006). Notably, our sightings were further associated with the seamounts and the Arabian Basin in the Lakshadweep archipelago. Seamounts are biodiversity hotspots, attracting a wealth of prey species like fish, squid, and plankton. This makes them attractive feeding locations for marine mammals, especially during

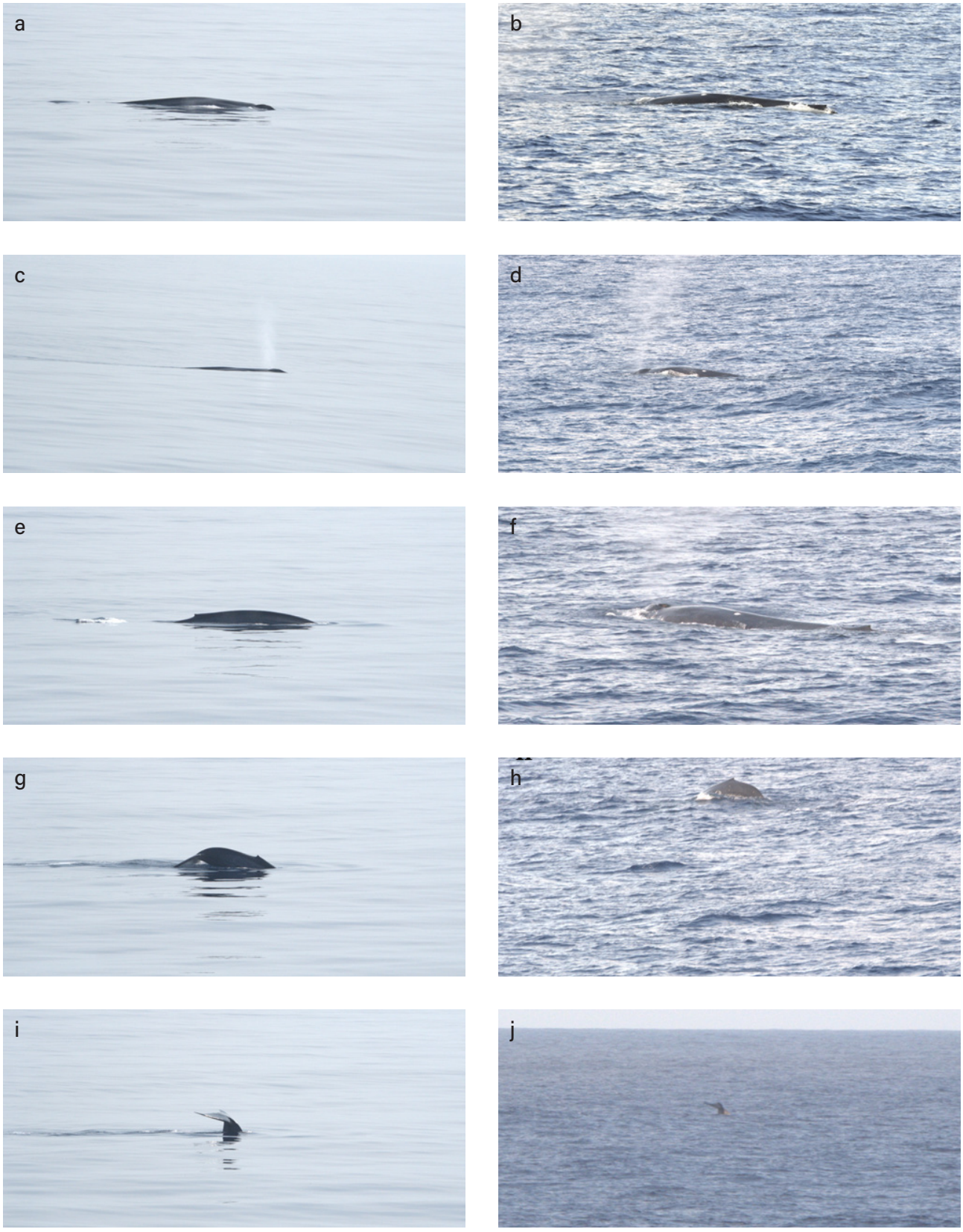

Fig. 2. (A, C, E, G and I) Images of a blue whale (*B. musculus*) photographed on 9 April 2024, and (B, D, F, H, and J) on 5 June 2024. Key characteristics include (A and B) small curved dorsal fin located near the back; (C and D) tall, column-like spout about 6–8 m high; (E and F) mottled blue-grey colouration on the dorsal and sides; (G and H) caudal peduncle raised out of the water before a longer dive; (I and J) tail fluke visible above the surface

migrations or breeding seasons (Rogers, 2012). The first sighting took place at a distance of 70 nautical miles from the Investigator Bank, whereas during the second sighting, the animal was around 359 nautical miles from the Sagar Kanya Seamount. During the third encounter, the animal was only 10 nautical miles away from the Investigator Bank, while the Sagar Kanya Seamount was 151 nautical miles distant. These features not only create unique topographies but also serve as critical habitats for marine life. Previous reports document the presence of Arabian humpback whales (*M. novaeangliae*) and Omura's whales (*Balaenoptera omurai*) in these regions, underscoring the ecological importance of these ecosystems (Anderson *et al.,* 2012; D'Souza *et al.,* 2023; Joshi *et al.,* 2023).

Given the rarity of live sightings of blue whales, even a single sighting can serve as a valuable impetus to understand more about them. The sighting events provide significant insights into the abundance and distribution of the Northern Indian Ocean population, which has historically lacked comprehensive information about this endangered and often overlooked species. Their presence in the vicinity of seamount regions suggests that blue whales may exhibit flexibility in their migratory routes, potentially adapting from established paths to exploit areas rich in food resources for opportunistic feeding and socialising. This documentation highlights the need for continuous monitoring of this species in the offshore environments of the Indian Exclusive Economic Zone. Such studies will enhance our understanding of their habitats and behaviours while filling the knowledge gaps, bolstering conservation efforts in the region.

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Author contributions

Conceptualization: SSC, KG; Methodology: KG; Data Collection: KG; Data Analysis: KG; Writing Original Draft: KG; Writing Review and Editing: SSC; Supervision: SSC

Data availability

The data supporting this study are publicly available at the repository [Name: Marine Mammal Sightings from Northern Indian Ocean, archived in Ocean Biodiversity Information System (OBIS), 2025].
URL: https://ipt.iobis.org/indobis/resource?r=mammal_sightings

Conflict of interest

The authors declare that they have no conflict of financial or non-financial interests that could have influenced the outcome or interpretation of the results.

Ethical statement

No ethical approval is required as the study does not include activities that require ethical approval or involve protected organisms/ human subjects/ the collection of samples/ protected environments.

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