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Short Communication

Encounters out of the blue: Strandings of dwarf sperm whale, *Kogia sima* (Owen, 1866) in Iranian waters of the Persian Gulf

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The family Kogiidae encompasses two extant species: the pygmy sperm whale *Kogia breviceps* (de Blainville, 1838) and the dwarf sperm whale *Kogia sima* (Owen, 1866). *Kogia* species are categorized as small to medium-sized toothed whales. Their heads are blunt and somewhat squarish (Best, 2007; Jefferson *et al*., 2015), and they forage both within the water column and on or near the benthic substrate, likely employing echolocation to capture prey (McAlpine, 2018). Their elusive nature causes kogiids to be often difficult to observe in the wild, leading to limited data on their behavioral ecology, population dynamics, and distribution (Willis and Baird, 1998; Baird, 2005). Due to the difficulty of observing these whales in their natural habitats, the study of stranding events provides a valuable opportunity to investigate the causes of mortality as well as to better understand their ecology (Geraci and Lounsbury, 2005). *Kogia sima* represents an intriguing example of relatively recent taxonomic clarification in marine mammalogy. This species was considered synonymous with *K. breviceps* for over a century until proper recognition of its distinct status in 1966 (Handley, 1966), hence some older records may require careful verification. *Kogia sima* inhabits continental shelf and slope waters in warm temperate and tropical seas worldwide (McAlpine, 2018; Kiszka and Braulik, 2020), The data suggest that both species primarily consume squid, with fish and crustaceans making up a smaller portion of their diet (Matsuda *et al*., 2023; Plön *et al*., 2023). The International Union for Conservation of Nature (IUCN) currently lists *K. sima* as Least Concern (Kiszka and Braulik, 2020). However, this

assessment may reflect a lack of data rather than a secure population status evaluation, as the species' evasive behavior makes population assessment extremely challenging. Despite its global distribution, the species' natural history remains poorly understood due to the rarity of live sightings, with most scientific knowledge derived from stranded specimens (Best, 2007; Plön *et al*., 2023).

In the Iranian waters of the Persian Gulf, 10 species of cetaceans have been documented and confirmed, but no *Kogia* spp. (Baldwin *et al*., 1999; Braulik *et al*., 2010; Ranjbar *et al*., 2016; Owfi *et al*., 2016; Dakhteh *et al*., 2017; Mohsenian *et al*., 2019). The dwarf sperm whale is considered one of the least understood and scarce cetacean species in the region. The two unique stranding records of *K. sima* from the UAE were both found in the Gulf of Oman (Natoli *et al*., 2024). Another three cases (sightings) were reported from the Sultanate of Oman (Baldwin *et al*., 1999; Collins *et al*., 2002). There is a notable lack of empirical evidence regarding its precise spatial and seasonal distribution, especially how the habitat preference of *K. sima* for deeper waters (Caldwell and Caldwell, 1989; Best, 2007; McAlpine, 2018) can be consistent with the recent observations in the shallow Persian Gulf.

This study aims to document two strandings of *K. sima* that occurred in the same month, one year apart, in two adjacent locations just 50 km apart in the northern Strait of Hormuz, Iranian Persian Gulf (Fig. 1).

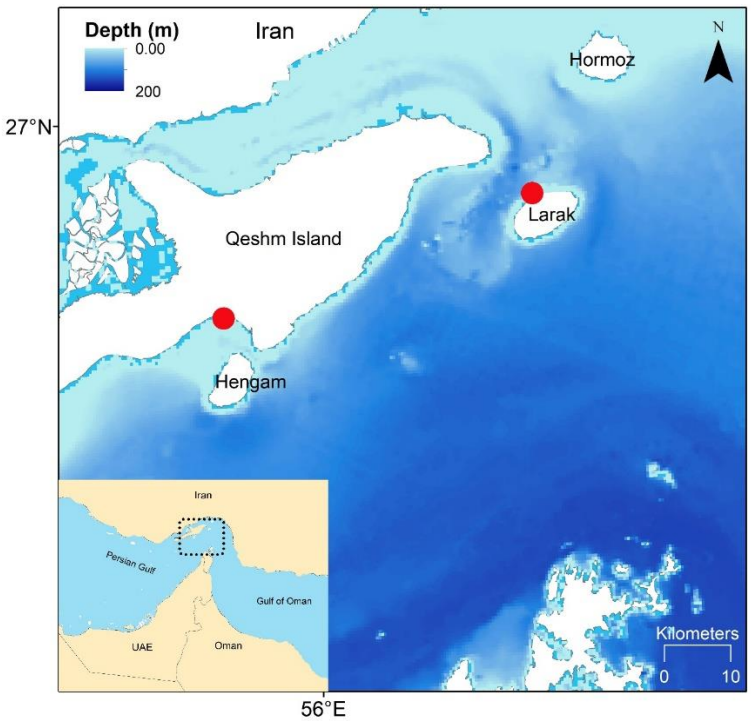

Figure 1: Map showing two stranding events of *Kogia sima* (red dots) recorded in the Strait of Hormuz, Persian Gulf, one at Larak Island in 2023 and a second at Qeshm Island in 2024. Note that relatively deeper water (100-200 m) can be found to the east of the stranding sites.

In both cases, the dorsal fin (DF) was positioned approximately at the midpoint of the standard body length (SL), distinct from *K. breviceps* whose fin is positioned well behind the midpoint of the back. Dorsal fin base was relatively long, with DF heights of 22 cm (9.4 % of SL) and 18 cm (7.7% of SL), for the first and second case, respectively, accounting for over 7% of SL. Given that this proportion exceeds 5% of SL, the maximum value for *K. breviceps* (Best, 2007; Maio *et al*., 2017; Carwardine, 2020), both kogiids were identified as *K. sima*.

The first stranding case occurred on 13 November 2023, at Larak Island (N 26°52′18″, E 056°20′4″). The SL of the dwarf sperm whale measured 235 cm (Fig. 2). It was found alive by beach campers who intervened to facilitate its return to the sea. However, the individual was stranded again and succumbed shortly thereafter. A few biometric measurements were obtained (Table 1). The carcass was subsequently buried in the area close to where it was found and will be collected.

Figure 2: Dwarf sperm whale *Kogia sima* stranded in Larak Island, Persian Gulf, in 2023, A. dorsal view and the large, pointed dorsal fin, B. blunt squarish head with no major injuries. The foamy white matter oozing from the mouth is of unknown origin, but may be vomited squid remains.

Table 1: External measurements of two stranded dwarf sperm whales from the Iranian part of the Persian Gulf, a specimen of unknown sex at Larak Island in 2023 and a male at Qeshm Island in 2024.

Measurements	Unit (cm)	
	Larak Island	Qeshm Island
Total body length (standard length)	235	233
Tip of rostrum to center of blowhole		15
Tip of rostrum to center of eye (right)		29
Tip of rostrum to center of eye (left)		28
Center of eye to center of blowhole (right)		27
Center of eye to center of blowhole (left)		19
Flipper length, tip to anterior insertion (right)	25	33
Flipper length, tip to anterior insertion (left)		31
Fluke span		62
Pectoral fin width maximum (right)		16
Pectoral fin width maximum (left)		15
Dorsal fin maximum height	22	18

The second dwarf sperm whale stranding was registered at Naqashe village in Qeshm Island (N 26°43′41″, E 55°50′22″) on 2 November 2024. The SL of this male measured 233 cm (Fig. 3). A scenario similar as in the first case was observed for this specimen. The whale stranded alive on a sandy beach, prompting immediate intervention by local community members who attempted to return it to the sea. Despite their efforts, the individual stranded again and was found dead shortly thereafter. As with the previous case, some biometric measurements were recorded (Table 1), and the carcass was subsequently buried on the beach for later retrieval. No necropsies were performed.

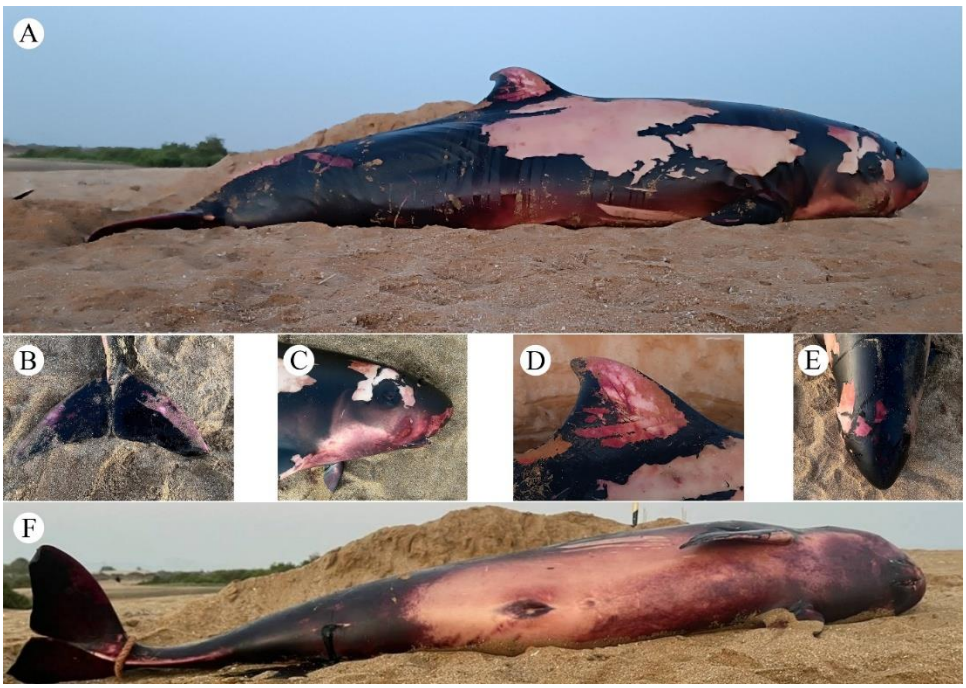

Figure 3: An adult male dwarf sperm whale *Kogia sima* stranded in Naqashe village on Qeshm Island, Persian Gulf, in 2024., A. lateral view with dorsal fin located about mid-body, B. flukes, C. squarish head with underslung lower jaw, D. relatively large, falcate dorsal fin, E. head and blowhole, F. ventral view.

In both cases, an opaque, reddish-brown intestinal fluid (feces) was expelled from the rectum (Caldwell and Caldwell, 1989) when still alive, apparently a defensive, anti-predator strategy (Best, 2007). No external injuries, ectoparasites, nor semi-stalked barnacles (*Xenobalanus globicipitis*) were evident on the whales. Some skin damage observed appeared to be post-mortem, *i.e.* the result of the carcasses being dragged ashore and subsequent exposure to sunlight.

This study marks the first documented records of the dwarf sperm whale in the Persian Gulf and in Iran, which becomes a new range state for *Kogia sima.* Notably, the two specimens were found almost exactly one year apart, in the vicinity of each other, within the Strait of Hormuz. Dwarf sperm whales are not known to migrate; however, strandings are seasonal

in some areas, which may indicate seasonal changes in distribution. For example, in the northeast Atlantic, strandings of *Kogia spp.*occur primarily in the fall and winter (McAlpine, 2018). Both Iranian strandings also occurred in the fall, near islands in the northern part of the Strait of Hormuz, at the very entrance of the Persian Gulf. Slightly to the east, from where the whales almost certainly originated, relatively deeper water is found (ca. 150-200 m depth, Fig. 1), while further to the west, the shallow environment of the wider Persian Gulf (Reynolds, 1993; Dakhteh *et al*., 2017) turns increasingly inhospitable to deep-diving *K. sima* (Caldwell and Caldwell, 1989; Jefferson *et al*., 2015). Indeed, McAlpine (2018) indicated that dwarf sperm whales are commonly sighted near continental shelf edges and within the continental slope waters surrounding islands. *Kogia* spp. appear relatively frequently in specific oceanic regions, such as the main Hawaiian Islands (Baird *et al*., 2013), Great Abaco in the Bahamas (Dunphy-Daly *et al*., 2008), and various Indian Ocean locations, including off Mayotte in the Mozambique Channel, waters around the Seychelles, the Pemba Channel in Tanzania, Gulf of Manner and Palk Bay in India (Kiszka *et al*., 2010; Laran *et al*., 2017; Braulik *et al*., 2018; Sadhukhan *et al*., 2022; Chandrasekar and Kumar, 2024). Such global findings underline the importance of further research in the Persian Gulf, to explore whether our observations are exceptional or indicative of a recurring ecological phenomenon, with dwarf sperm whale potentially resident in the Strait of Hormuz. Based on previous documentation, the SL of adult *K. sima* specimens ranges from 210 to 270 cm, with females generally being slightly smaller than males (Jefferson *et al*., 2015; Maio *et al*., 2017; McAlpine, 2018). Sexual maturity is typically reached at approximately 2 m in length. The specimens reported in this study, measuring 233 and 235 cm in total length, fall well within the established range for adult *K. sima*.

This report expands existing knowledge on the distribution of the dwarf sperm whale, documenting the first and second occurrence in the Persian Gulf,separated by a one-year interval. These data can contribute to comprehensive distribution mapping, addressing the current limitations in population size estimates for this data-poor region.

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Conflicts of interest

The authors declare no conflict of interest.

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