Aquatic Mammals 2022, *48*(6), 652-655, DOI 10.1578/AM.48.6.2022.652

Observations of the First Documented Indian Ocean Humpback Dolphin (*Sousa plumbea*) in the Northernmost Red Sea Gulf of Aqaba

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On 3 January 2021, an apparently healthy adult female Indian Ocean humpback dolphin (*Sousa plumbea*), accompanied by her seemingly thriving nursing calf, was observed in the Eilat Marina in the Gulf of Aqaba, Israel (Figure 1a-c). The adult female was named "Ella," and on 14 January 2021, following a southern gale, Ella was sighted alone and was assumed to have lost her calf. Since then and until her last sighting on 14 June 2022, she had been sighted during daytime hours almost daily in sandy shallow coastal waters along a 2.1-km narrow strip from Eilat Marina to Eilat North Beach lagoon and to Aqaba Marina, Jordan, with most of her observations in the Eilat Lagoon (Figure 2b). She had not been documented in the vicinity of coral patches in Eilat or in Aqaba. She had also never been documented associating with local Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) or with the three free-ranging Black Sea common bottlenose dolphins (*Tursiops truncatus*

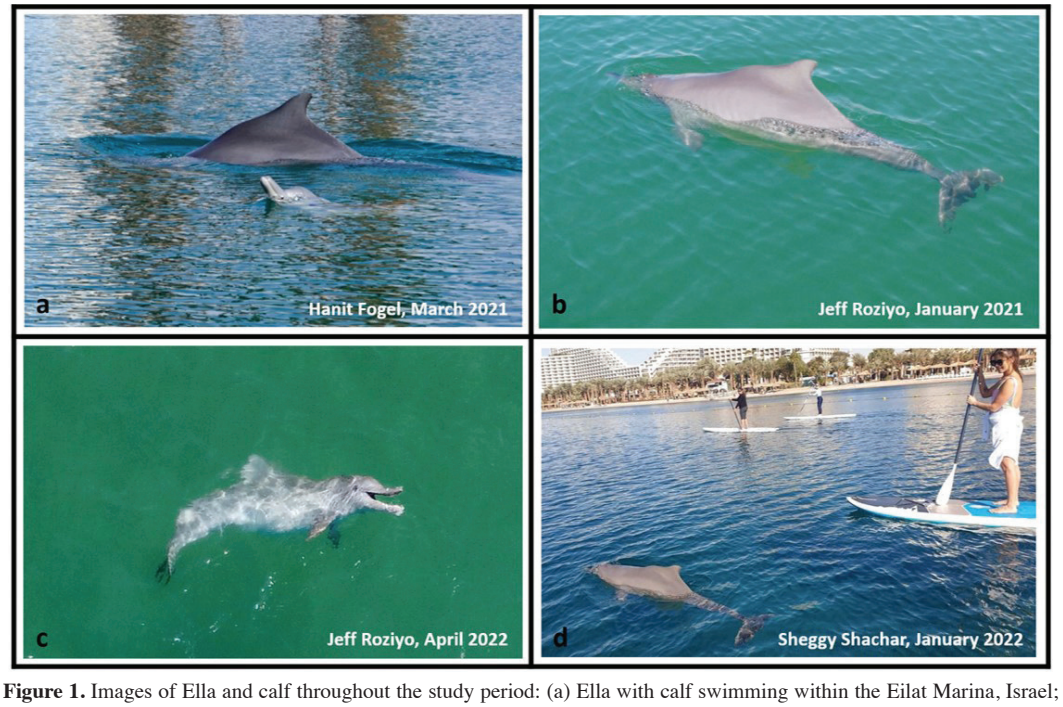

Figure 1. Images of Ella and calf throughout the study period: (a) Ella with calf swimming within the Eilat Marina, Israel; (b) calf in apparent good body condition; (c) Ella in apparent good body condition during recorded foraging behavior; and (d) Ella approaching and swimming alongside stand-up paddleboarding (SUP) surfers in the northern beaches of Eilat.

ponticus), residents of Eilat Dolphin Reef, which regularly frequented the same area. Ella was also clear of scars and tooth rakes that might have indicated unobserved interspecific contact.

Israel Marine Mammal Research & Assistance Center (IMMRAC) staff conducted sporadic surveys to search for Ella from a 5 m vessel with an outboard motor; however, to cause minimal disturbance, most observations of Ella were made at a distance with a drone (DJI Mavic Mini 2, 4K @30 fps resolution camera) or with a telephoto DSLR camera. IMMRAC staff also received and collated citizen-science anecdotal information of Ella sightings from fishermen, swimmers, SCUBA divers, sailors, lifeguards, and stand-up paddleboarding (SUP) surfers. Video clips loaded onto social media sites in Aqaba complemented sightings in Eilat. Over the 16 mo since Ella arrived, 91 sightings were documented. Citizen-science sightings were only included when accompanied by species-identifiable photographs/videos, though they were accepted with and without individual photo-ID matching because we assumed she was the only humpback dolphin in the area.

The collected data indicated that Ella spent much of her daytime hours foraging. Of the 91 sightings, 19 were classified as foraging, and 11 of these involved active hunting bouts in which fish and shrimp were documented. The rest were interpreted to be foraging *sensu* (Shane, 1990)—that is, repeated dives in varying directions in one location, often making tailstock or flukes-up dives, with mud occasionally stirred up. Active hunting included three main methods (see Supplementary Video Part 1: drone photography; the supplementary video footage for this paper is available in the "Supplemental Material" section of the *Aquatic Mammals* website: https://www.aquaticmammals-journal.org/index.php?option=com_content&view=article&id=10&Itemid=147):

1. *Mud plume feeding* – Ella formed a roughly circular mud plume with her flukes that rose

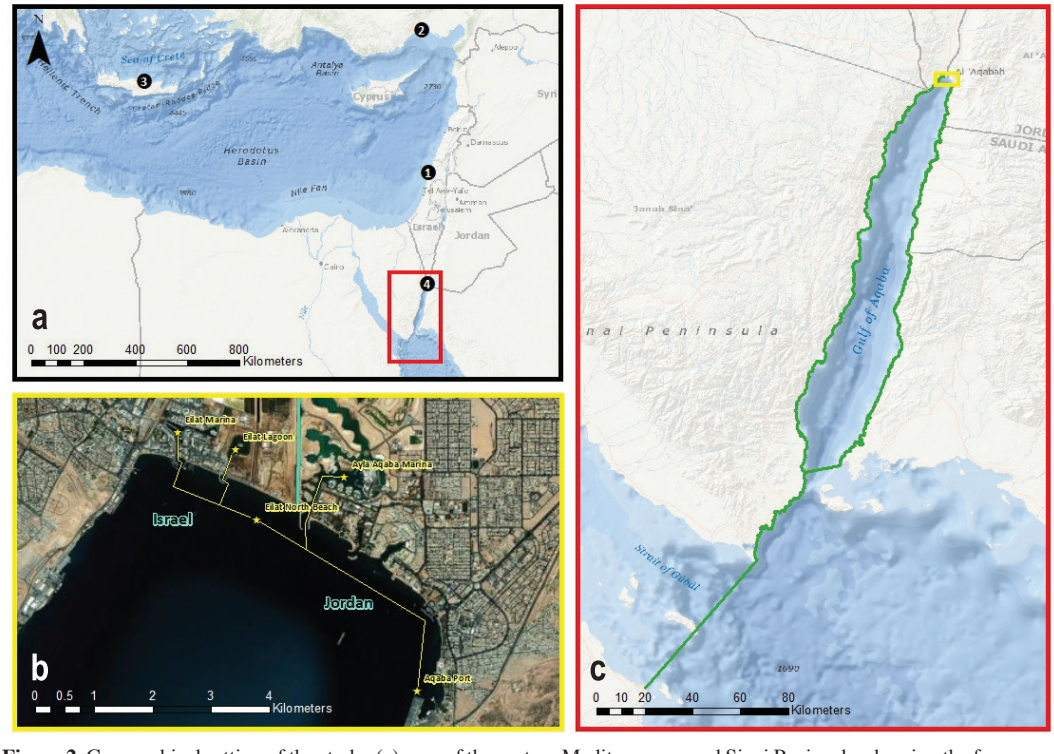

Figure 2. Geographical setting of the study: (a) map of the eastern Mediterranean and Sinai Peninsula, showing the four cases of extreme vagrancies reported for *Sousa plumbea*: (1) Israeli Mediterranean coast; (2) Mersin Bay, Turkey; (3) northern Crete, Greece; and (4) Eilat/Aqaba, Israel/Jordan; (b) enlarged map of the tip of the Gulf of Aqaba—all sightings of Ella occurred within the area between the yellow line and the coast. Yellow stars from left to right are Eilat Marina, Eilat Lagoon, Eilat North Beach, Ayla Aqaba Marina, and Aqaba Port; and (c) enlarged map of the Sinai Peninsula—depicted in green are the two potential courses Ella might have travelled to reach Eilat and Aqaba.

to the surface, and then charged up through the plume's center.

2. *Rush feeding* – Ella chased fish below the surface in a meandering course that included circles and hairpin turns, often on her side or back.

3. *Tail slapping* – Ella exhibited tail slapping just at and below the water's surface, performed amid a chasing bout.

Potential prey items identified from video clips were fringelip mullet (*Crenimugil crenilabrus*), Red Sea houndfish (*Tylosurus choram*), a species that is likely either wide-banded hardyhead silverside (*Atherinomorus lacunosus*) or Samoan silverside (*Hypoatherina temminckii*) (H. Agranati, pers. comm., 20 April 2022), and an unidentified dendrobranchiate shrimp (D. Edelist, pers. comm., 15 April 2022).

A unique above-water episode, documented inside the Eilat Marina, included "headstands" followed by tail slaps on the water's surface and in-air summersaults ending with a flat-bodied crash on the surface (Supplementary Video Part 2: telephoto camera photography). Such behavior may have been to "show off," but since disturbances on the water surface indicated intense underwater activity, a hunting mode that used noise to disorient prey seems like a viable possibility.

Ella fit the definition of a solitary yet sociable dolphin (Lockyer & Müller, 2003). She had never been observed approaching a sailboat or motor vessel, but since May 2021, she had begun to interact with SUP surfers, approaching their boards from below and swimming in formation (Figure 1d). Beginning in July 2021, she had begun to interact with swimmers and snorkelers, and often she was highly vocal in the process (Supplementary Video Part 3: underwater camera photography with sound recording). None of these interactions included physical contact.

Vagrancy

In a review of Red Sea cetaceans, Notarbartolo di Sciara et al. (2017) remarked that the Indian Ocean humpback dolphin, although not abundant, occurred along the entire African and Arabian coasts of the Red Sea, wherever suitable shallow habitat exists. They further commented that while the lack of records of this species from certain areas might be due to lack of reporting observers, the complete lack of sightings from the steep-shored Sinai coast of the Gulf of Aqaba, despite a reasonable observer effort and reporting system, likely reflects the real situation. While Indian Ocean humpback dolphins are probably not residents here, occasional vagrants may take advantage of the narrow fringing reefs, with occasional sand fans at wadi mouths, that extend along the Gulf coasts. For a nursing mother, this could be quite a feat.

The closest point in the Red Sea where residency of the species is confirmed is the Hurghada–El Gouna area, Egypt (Notarbartolo di Sciara et al., 2017). The shortest distances from Hurghada to Eilat/Aqaba up the Arabian coast and up the Sinai coast are 376 and 353 km, respectively (Figure 2b). They are somewhat above the maximum distance of 275 km covered by a female and calf as documented (by catalog matching) for the species in South Africa (Vermeulen et al., 2017). With a conservative travel rate of 12 km/d reported by Vermeulen et al. (2017), these distances would be covered in roughly 30 d.

Other members of this obligatory coastal species have proven to be quite far ranging, with two or possibly three odysseys into the eastern Mediterranean through the Suez Canal (Figure 2a). Sightings occurred in northern Israel (Kerem et al., 2001); Mersin Bay, Turkey (Ozbilgin et al., 2018); and northern Crete (Frantzis, 2018), with estimated covered distances, hugging the coast where possible, of 300, 1,000 and 2,330 km, respectively. To reach Crete, passages over deep open water totaling 75 km are required (Frantzis, 2018).

Diet and Foraging

Information on the diet of the Indian Ocean humpback dolphin is scant. In all areas studied, stomach contents and foraging observations suggest this species is a generalist piscivore feeding on reef-associated, demersal, and estuarine fish (Plön et al., 2015), with occasional cephalopods and crustaceans (Baldwin et al., 2004). Data on foraging/hunting behavior are even more scarce. Herding bonefish onto exposed sand banks, both singly and cooperatively, and deliberately beaching to seize the prey was described by Peddemors & Thompson (1994) and by Baldwin et al. (2004). The hunting modes utilized by Ella are newly described for this species, but each had been documented for bottlenose dolphins (*Tursiops* sp.): mud plume feeding (Lewis & Schroeder, 2003), circle and hairpin rush feeding (Leatherwood, 1975; Shane, 1990), and subsurface tail slaps (Shane, 1990).

Sociality

Some Indian Ocean humpback dolphins in the Hurgadha–El Gouna area of Egypt's Red Sea coast have been observed associating with Indo-Pacific bottlenose dolphins (A. Ziltener, pers. comm., 18 March 2021). As far as we know, Ella

was not involved in such an interaction. The Gulf of Aqaba/Eilat has a history of hosting solitary-sociable dolphins (Goffman et al., 2022). Ella's behavior towards humans progressed somewhat beyond the "Stage 2" level of interaction expressed by solitary-sociable dolphins (Wilke et al., 2005), but any further potential evolution of her sociability was cut short by her disappearance.

Acknowledgments

We thank the Asulin fishermen family from Eilat, Israel, for granting use of their vessel for the research; Ron Asulin, Junio Fabrizio Borsani, and Sophie Donio of Dolphin Reef Eilat; Sheggy Shachar of Sheggy SUP & Cycling Eilat; Hanit Fogel, Itamar Nadgar, and IMMRAC volunteers for collecting the data; Angela Ziltener of Dolphin Watch Alliance for sharing information on the species in Egyptian waters; Haim Agranati and Dor Edelist for assistance with identification of prey fish species; and the Drora and Joseph Goffman Memorial Research Foundation for financial support.

This anecdotal entry is dedicated to Ella, who suddenly appeared and as suddenly left—sharing moments of her life and thereby enriching ours.

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