



Short Note

First sighting of Gray Whale *Eschrichtius robustus* (Lilljeborg, 1861) (Cetartiodactyla: Eschrichtiidae) in Italian waters and review of Mediterranean Sea records

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Abstract

Here, we report the sighting, which occurred in 2021, of a juvenile Gray Whale (*Eschrichtius robustus*) in the Tyrrhenian Sea along the coast of Lazio and Campania regions (Central-Southern Italy). It is the first record of this species in Italian waters and the second one in the Mediterranean Sea after the sighting of one specimen occurred in 2010 off the Israeli and Spain coasts. Furthermore, we investigate and discuss the ancient and modern data from the Mediterranean Sea and the possible reasons for explaining the presence of the specimen in an area so far from its usual geographical range.

The Gray Whale *Eschrichtius robustus* (Lilljeborg, 1861) inhabits exclusively the North Pacific Ocean with two distinct stocks, the eastern and western North Pacific populations. The species makes long migrations (up to 20,000 km and over 120 km per day), spending the winter months in the South and the summer months in the North, where the main feeding areas are located. The eastern population migrates along the Western coast of North America from Alaska to Baja California, while the western population migrates between the Sea of Okhotsk and southern South Korea (Cooke et al., 2018). Gray Whales mainly frequent the waters above the continental shelf and stay for long periods in very shallow waters, both in the areas where they feed and, above all, in the coastal lagoons where they reproduce. Its peculiarity is the way of feeding: with its mouth, it “dredges” a portion of the seabed and, filtering mud and sand with baleen, it collects the organisms it feeds on (e.g., crustaceans, mollusks, and fish eggs) and expels debris (Swartz, 2018).

This species is listed in Appendix I of CITES and Appendix III of the Bern Convention. It is also considered a “species in need of strict protection” in the European Union by Annex IV of the “Habitats Directive.” However, it is not included in the IV Report of Habitat Directive (2013–2018) of Mammals in Marine Mediterranean bioregion (Stoch and Grignetti, 2021). In Italy, the Law on the Protection of Fauna (Law n. 157 of 11 February 1992) protects Gray Whales, like other Cetaceans. Finally, the species is classified as “Least Concern” on the IUCN Red List of Threatened Species at the global assessment (v. 2022-2) (Cooke, 2018), and it is listed as “Regionally Extinct” at the European

level (Europe assessment) (v. 2022-2) (Gauffier, 2023) and not listed on the last national IUCN Red List (Rondinini et al., 2022).

In the past, the distribution range of *E. robustus* was wider than today. It also inhabited the waters of the South Pacific and North Atlantic. Evidence for Gray Whale migration in the South Pacific dates back to the Pleistocene, as demonstrated by fossil remains in sediments from Ecuador (Taylor et al., 2022). Sub-fossil material and archaeological specimens from the Middle Palaeolithic (about 50,000 years BP) to the 18th century have been collected in eastern North America (Florida to New England) (Macé, 2003; Noakes et al., 2013; Rodrigues et al., 2016; Garrison et al., 2019). In the eastern North Atlantic, remains of Gray Whales have been identified from Iceland, the English Channel, the North Sea, and the Baltic Sea and have been dated from more than 50,000 years ago to the late 17th century (Bryant, 1995; Lindquist, 2000). In addition, other specimens dating from the pre-Roman period (estimated 400–200 BC) have been found in northern Spain (Rodrigues et al., 2018).

During the late Roman period (AD 400–525), the extinct North Atlantic Gray Whale population probably had a distribution range that included the Mediterranean Sea. Bone remains found in archaeological sites in the region east of the Strait of Gibraltar, together with knowledge of the ecology of the species, suggest that Gray Whales entered the Mediterranean Sea to calve (Rodrigues et al., 2018). The presence of this coastal and highly accessible species along the coasts of the Roman Empire even suggested that Gray Whales might have formed the basis of a forgotten whaling industry (Rodrigues et al., 2018). Modern whaling has probably caused the extinction of the North Atlantic population in the late 18th century, as this species has not been recorded since then despite the increase in available whaling documentation.

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Figure 1 – Some of the first photos of Gray Whale taken in Italian waters (Ponza Island). Photo by Coast Guard of Ponza.

The first record of a Gray Whale in the Atlantic Ocean and Mediterranean Sea was reported in May 2010 off the Israeli coast and a few weeks later off Barcelona (Spain), after centuries of absence. The individual was most likely a vagrant from the North Pacific Ocean (Scheinin et al., 2011). Furthermore, the unique recent record of the species in the Southern Hemisphere was that of a male sighted off Walvis Bay (Namibia) in May 2013 and recognized as belonging to the western North Pacific population (Hoelzel et al., 2021). On 7 March 2021, a juvenile Gray Whale was recorded in the port of Rabat, Morocco (SOS Dolfijn, 2021; Observation.org, 2021). Presumably, it was the same individual sighted on 4 April 2021, by the same organization (Stichting SOS Dolfijn) off the coast of Skikda, Algeria (Observation.org, 2021). On 14 April 2021, the Coast Guard of Ponza in front of Frontone Beach (central Tyrrhenian Sea, Lazio, Italy) sighted a large cetacean. Thanks to the photos and videos taken by Coast Guard personnel, it was possible to identify the species. We observed some distinctive features: head narrow and tapering, no central ridge,

barnacle encrustations common, dorsal fin absent, low bumps series along the posterior dorsal midline, and skin mottled gray (Wolman, 1985) (Fig.1). The individual was likely to be the same one previously sighted in the port of Rabat. After the first sighting, the whale was sighted near Baia (Bacoli)/Sorrento, in the Bay of Naples, and then near Gaeta (Lazio), Fiumicino (Lazio), Viareggio (Tuscany), in the Ligurian Sea, along the Provençal coast (France), and off Valencia (Spain). The last sighting was recorded on 20 May, near the Balearic Islands (Spain). Data are reported in Tab. 1 and Fig.2.

During its stay in Italian waters, it often swam in shallow waters (even 3 meters deep), as it was reasonable to expect given the feeding habits of this species. Along the coast, it approached the boats and interacted with boaters or recreational fishermen, as evidenced by the many photos and posts on social networks. This evidence has led biologists to spread a code of conduct to protect the Gray Whale from anthropic disturbance, stress, or potential incidents. Indeed, all movements of the cetacean were followed by many Italian and foreign experts

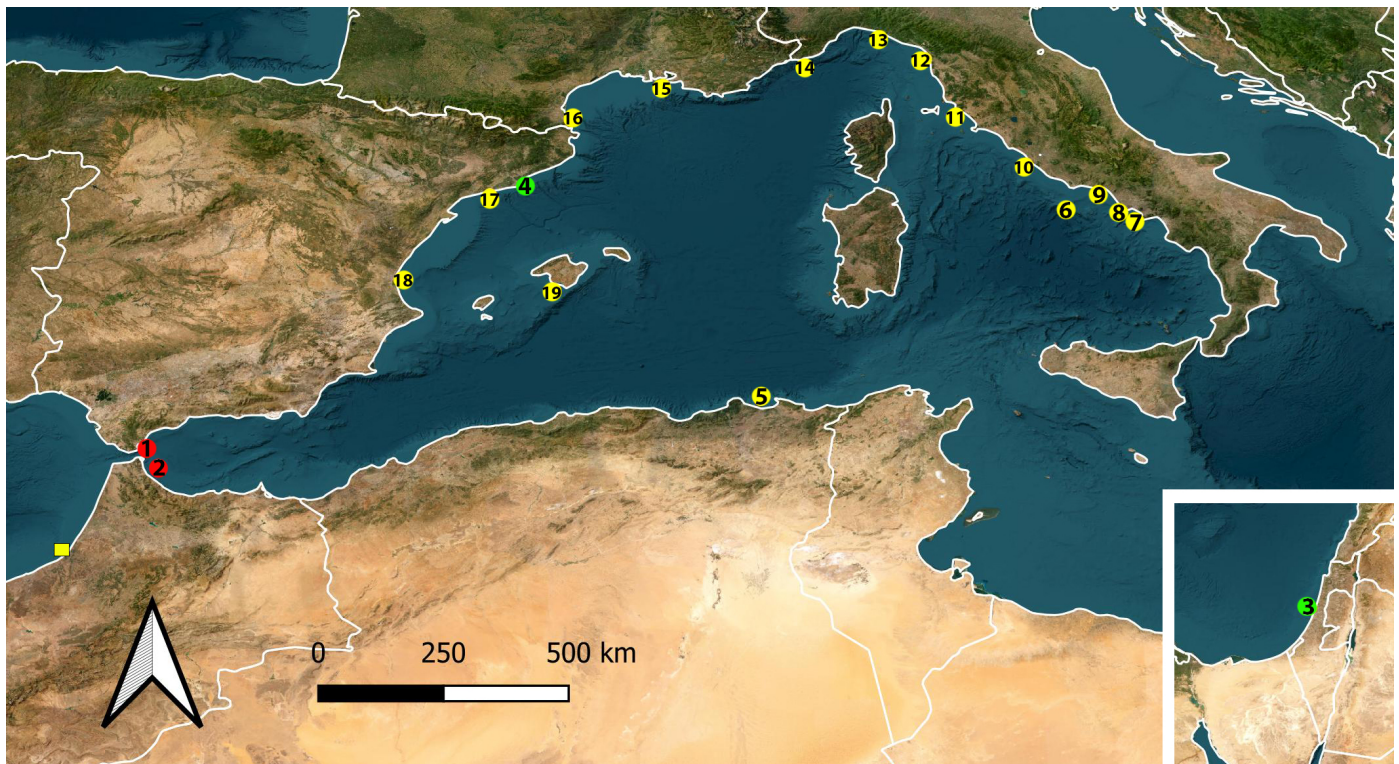


Figure 2 – Known occurrences of Gray Whales in the Mediterranean Sea. Historical Data (red dots), recent data (green dots), sightings reported in this work (yellow dots), and outside the Mediterranean (yellow square).

Table 1 – Reports concerning the presence of Gray Whales in the Mediterranean Sea.

| N | Period/Date | Location | Event | Specimen (gender, size) | Reference |
|----|--|--|--------------------------------|--|---|
| 1 | Late Roman Stratigraphy: AD 475–525 Radiocarbon analyses: AD 251–422 | Algeciras, Spain | Finding in archaeological site | Half vertebra | (Rodrigues et al., 2018) |
| 2 | Late Roman Stratigraphy: AD 400–450 Radiocarbon analyses: AD 71–245 | Tetouan, Morocco | Finding in archaeological site | Bone fragment | (Rodrigues et al., 2018) |
| 3 | 08 May 2010 | 2 km off Herzliya Marina, Israel | Sighting | 13 meters long (estimated with the ship length) | (Scheinin et al., 2011) |
| 4 | 30 May 2010 | 0.9 km from the coast. Barcelona, Spain | Sighting | The same individual sighted in Israel, confirmed by photo-identification | (Scheinin et al., 2011) |
| 5 | 04 April 2021 | Off Skikda, Algeria | Sighting | 1 young specimen | (Observation.org, 2021) |
| 6 | 14 April 2021 | Off Ponza Island, Latium, Italy | Sighting | 7.70 m young specimen | (Talignani, 2021; Redazione Fregene Online, 2021) |
| 7 | 17 April 2021 | Sorrento, Campania, Italy | Sighting | The same individual | (Redazione LR Positano News, 2021) |
| 8 | 18 April 2021 | Baia (Bacoli) Pozzuoli Bay, Campania, Italy | Sighting | | (Anonymous, 2021a) |
| 9 | 19 April 2021 | Harbour of Gaeta, Latium, Italy | Sighting | | (De Luca, 2021) |
| 10 | 21 April 2021 | Off Tiber estuary, near “Vecchio Faro”, Fiumicino, Latium, Italy | Sighting | | (Montagna, 2021) |
| 11 | 23 April 2021 | Castiglione della Pescaia, Italy | Sighting | | (Anonymous, 2021b) |
| 12 | 25 April 2021 | Viareggio, Tuscany, Italy | Sighting | | (Anonymous, 2021c) |
| 13 | 26–27 April 2021 | Sestri Levante Liguria, Italy | Sighting | | (Bacci, 2021) |
| 14 | 28 April 2021 | Imperia, Liguria, Italy | Sighting | | (Michero, 2021) |
| 15 | 29–30 April 2021 | Port-Saint-Louis-du-Rhône (Bocche del Rodano), Harbour of Sète, Frontignan (Hérault), Provençal coasts, France | Sighting | | (Anonymous, 2021d) |
| 16 | 4–6 May 2021 | Cost of Argeles-Sur-Mer, France | Sighting | | (Martinengo, 2021) |
| 17 | 8–9 May 2021 | Catalan coast, off Barcellona and Calafell, Spain | Sighting | | (Anonymous, 2021e) |
| 18 | 14 May 2021 | Off Valencia, Spain | Sighting | | (Anonymous, 2021e) |
| 19 | 20 May 2021 | Close to Santa Ponça, South-West of Maiorca, Balearic Islands, Spain | Sighting | | (Mancuso, 2021) |

who remained in contact with each other to share information and operative protocols. In Italy, the Tethys Institute of Milan and the Cetacean Stranding Emergency Response Team (CERT of Padua) have coordinated the monitoring. When the whale arrived in Liguria, the Tethys Institute, with the support of the Coast Guard, measured its total length (7.70 m) using the drone telemetry technique; it was a juvenile about one year old. The average body length of calves is 4.6–5 m, while for adults, it is 11–15 m, weaning is 8.50 m (Wolman, 1985). Since its first sighting in Ponza, the animal had dramatically lost weight. No sightings have been recorded after 20 May, so it was assumed that the animal died a few days later.

The Gray Whale does not belong to the common cetaceans of the Italian seas, neither it is among the rare or casual species of the Mediterranean Sea (Loy et al., 2019). The species currently inhabits the North Pacific exclusively, while having been extirpated from the Atlantic Ocean, so it seems unlikely that Gray Whales recently sighted in the Atlantic range belong to a remnant population (Scheinin et al., 2011). A North Pacific origin has been hypothesized for the Gray Whale sighted in Israel in 2010 (Scheinin et al., 2011) and confirmed by genomic analysis for the individual found in Namibia in 2013 that belonged to the endangered population of the western North Pacific (Hoelzel et al., 2021). Therefore, the individual sighted in the Mediterranean waters most likely comes from the North Pacific and probably reached the Atlantic Ocean through an ice-free passage in the Arctic area. The aptitude of the species to migrate over long distances could have induced this individual to reach the Mediterranean Sea. This specimen was probably not weaned yet, so the diet was mixed (milk and solid). Overall, the absence of the mother can almost certainly lead to death. In addition, the thousands of miles travelled, different habit-

ats, diet, pathogen infections, and other aspects worsened its health and lead it to death.

The history of the Atlantic and Pacific Gray Whale population has been influenced by Pleistocene-Holocene climate changes, as suggested by genetic analysis combined with an environmental modeling approach, leading to hypotheses about how this species will respond to ongoing climate change (Alter et al., 2015; Brüniche-Olsen et al., 2018). Past phases of population decline have been associated with glacial periods, while the reduction of the Arctic ice sheet during warmer periods would have favoured connections between different populations, even allowing individuals from the Pacific to reach the Atlantic Ocean (Alter et al., 2015; Brüniche-Olsen et al., 2018). As a result, it has been estimated that sightings of Gray Whales outside their normal range will increase due to melting ice sheets as a consequence of global warming, which lead to the recolonization of the Atlantic area (Scheinin et al., 2011; Alter et al., 2015; Brüniche-Olsen et al., 2018; Hoelzel et al., 2021). As proof of this, a Gray Whale was sighted off Sunny Isles Beach, South Florida, in December 2023 (Rodriguez, 2023), and another sighting was made off Massachusetts, 30 miles South of Nantucket, on the 1st of March 2024 (Snyder, 2024) (probably the one filmed off Florida in December 2023). The supposed positive effect due to the habitat expansion and population size may not be sufficient to guarantee the species survival. Indeed, the Atlantic areas identified as suitable for Gray Whales are currently affected by human activities (Alter et al., 2015). Monitoring extra-limit sightings and implementing conservation measures that consider future distribution scenarios will be essential to prevent the extinction of Gray Whales and the same approach can be applied to all species. ☞

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