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

Valerio Manfrini[1], Tatiana Fioravanti[2], Adriano Madonna[3], Nicola Maio[4]

[1]Independent Researcher, 44022 Comacchio (Ferrara)
[2]Dipartimento di Scienze della Vita e dell'Ambiente, Università Politecnica delle Marche, Via Brecce Bianche, 60131 Ancona
[3]Scuola Superiore di Tecnologia per il Mare – ITS "G. Caboto", Via Annunziata, 58 - 04024 Gaeta (Latina)
[4]Dipartimento di Biologia, Università degli Studi di Napoli Federico II

Valerio Manfrini - 0000-0002-8659-2697
Tatiana Fioravanti - 0009-0000-3172-7235
Nicola Maio - 0000-0002-2304-5565

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 occurred in 2010 off the Israeli coast. Furthermore, we investigate and discuss the ancient and modern data from the Mediterranean Sea and the possible reasons accounting for the presence of this specimen in an area so far from its usual geographical range.

Keywords: Mediterranean Sea, Eschrichtius robustus, Gray Whale, Eschrichtiidae, Italian waters.

Received: 2023-09-27
Revised: 2023-11-16
Accepted: 2023-11-16
Final review:

Short title
Gray Whale in Italian waters

Corresponding author
Nicola Maio
Dipartimento di Biologia, Università degli Studi di Napoli Federico II; email: nicomaio@unina.it
Phone: 081679236

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 & 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) (European Mammal Assessment team, 2007) 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.

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 (Holzel et al., 2021). On 7 March 2021, a juvenile Gray Whale was recorded in the port of Rabat, Morocco (SOSdolfijn, 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.

Fig. 1

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 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) 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 8.5 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.

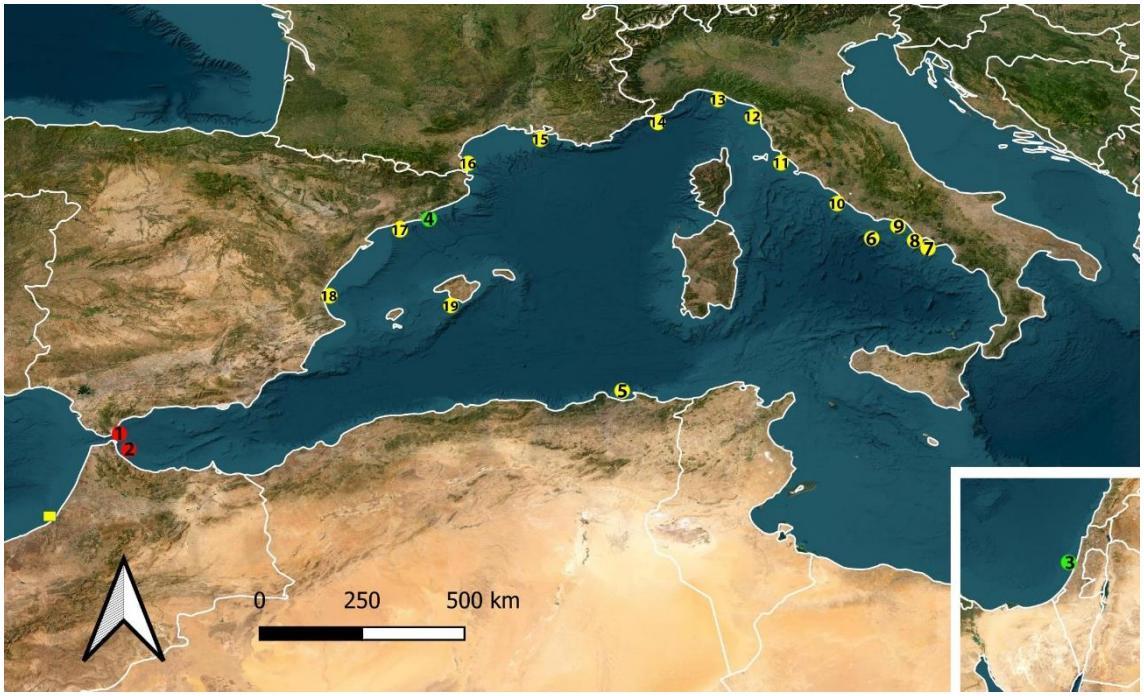

Fig. 2

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 habitats, 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). However, 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.

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	Founding in archaeological site	Half vertebra	(Rodrigues et al., 2018)
2	Late Roman. Stratigraphy: AD 400-450. Radiocarbon analyses: AD 71-245	Tetouan, Morocco	Founding 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		The same individual sighted in Israel, confirmed by photo-identification	(Scheinin et al., 2011)
5	04 April 2021	Off Skikda, Algeria		1 young specimen	(Observation.org, 2021)
6	14 April 2021	Off Ponza Island, Latium, Italy		7.70 m young specimen	(Talignani, 2021; Redazione FregeneOnline, 2021)
7	17 April 2021	Sorrento, Campania, Italy		The same individual as above	(Redazione Positanonews, 2021)
8	18 April 2021	Baia (Bacoli) Pozzuoli Bay, Campania, Italy			(Anonymous, 2021a)
9	19 April 2021	Harbour of Gaeta, Latium, Italy			(De Luca, 2021)
10	21 April 2021	Off Tiber estuary, near "Vecchio Faro", Fiumicino, Latium, Italy			(Montagna, 2021)
11	23 April 2021	Castiglione della Pescaia, Italy			(Anonymous, 2021b)
12	25 April 2021	Viareggio, Tuscany, Italy			(Anonymous, 2021c)
13	26-27 April 2021	Sestri Levante Liguria, Italy			(Bacci, 2021)
14	28 April 2021	Imperia, Liguria, Italy			(Michero, 2021)
15	29-30 April 2021	Port-Saint-Louis-du-Rhône (Bocche del Rodano), Harbour of Sète, Frontignan (Hérault), Provencal coasts, France			(Anonymous, 2021d)
16	4-6 May 2021	Cost of Argeles-Sur-Mer, France			(Martinengo, 2021)
17	8-9 May 2021	Catalan coast, off Barcellona and Calafell, Spain			(Anonymous, 2021e)
18	14 May 2021	Off Valencia, Spain			(Anonymous, 2021e)
19	20 May 2021	Close to Santa Ponça, South-West of Maiorca, Balearic Islands, Spain			(Mancuso, 2021)

Acknowledgements

We are grateful to the personnel of the Coast Guard of Ponza, Fiumicino, and Gaeta (for Lazio Region) and the Coast Guard of Sorrento (for Campania Region) for sharing photos/videos of the whale and information about the first sightings. We also thank Sandro Mazzariol (CERT), Sabina Airoldi, and Maddalena Jahoda (Tethys Institute of Milan) for updates about Gray Whale travel, and Salvatore Viglietti (ARPA Campania) for making the map. Finally, we thank the reviewers for their suggestions, and we are grateful to the teacher, Maria Cristina Caracciolo, for the English language revision.

This work is dedicated to the memory of Professor Gianni Pavan (University of Pavia, Italy).

References

Alter S.E., Meyer M., Post K., Czechowski P., Gravlund P., Gaines C., Rosenbaum H.C., Kaschner K., Turvey S.T., Van der Plicht J., Shapiro B., Hofreiter M., 2015. Climate impacts on transocean dispersal and habitat in Gray whales from the Pleistocene to 2100. Mol. Ecol. 24(7): 1510-1522. doi: https://doi.org/10.1111/mec.13121

Anonymous, 2021a. Napoli, avvistata una balena grigia al largo dei porto di Baia. 18 aprile 2021. Available from: https://www.lastampa.it/cronaca/2021/04/18/news/napoli-avvistata-una-balena-grigia-al-largo-dei-porto-di-baia-1.40168407/ [accessed: 9 June 2023].

Anonymous, 2021b. Balena grigia nel mar Tirreno, l'avvistamento in Toscana. 23 Aprile 2021. Available from: https://www.lanazione.it/grosseto/cronaca/video/balena-castiglione-pescaia-1.6281549 [accessed: 9 June 2023].

Anonymous, 2021c. La balena grigia avvistata a Viareggio. 23 Aprile 2021. Available from: https://www.lanazione.it/viareggio/cronaca/balena-grigia-1.6289479 [accessed: 9 June 2023].

Anonymous, 2021d. La balena grigia smarrita cerca l'uscita dal Mediterraneo. 7 maggio 2021. Available from: https://www.bluewin.ch/it/attualita/diversi/la-balena-grigia-smarrita-cerca-luscita-dal-mediterraneo-697699.html [accessed: 9 June 2023].

Anonymous, 2021e. Wally, la balena grigia smarrita, è stata avvistata in Spagna. 4 maggio 2021 Available from: https://www.bluewin.ch/it/attualita/diversi/wally-la-balena-grigia-smarrita-e-stata-avvistata-in-spagna-710007.html [accessed: 9 June

2023].

Bacci A., 2021. La balena grigia Wally arriva in Liguria: avvistata a Sestri Levante. 27 aprile 2021. Available from: https://telenord.it/la-balena-grigia-wally-arriva-in-liguria-avvistata-a-sestri-levante [accessed: 9 June 2023].

Brüniche-Olsen A., Westerman R., Kazmierczyk Z., Vertyankin V.V., Godard-Codding C., Bickham J.W., De Woody J. A., 2018. The inference of Gray Whale (*Eschrichtius robustus*) historical population attributes from whole-genome sequences. BMC Evol. Biol. 18: 1-12. doi: https://doi.org/10.1186/s12862-018-1204-3

Bryant P. J., 1995. Dating Remains of Gray whales from the Eastern North Atlantic. J. Mammal. 76 (3): 857-861.

Cooke J. G., 2018. *Eschrichtius robustus*. The IUCN Red List of Threatened Species 2018: e.T8097A50353881. Available from: https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T8097A50353881.en. [Accessed: 9 June 2023].

Cooke J.G., Taylor B.L., Reeves R., Brownell Jr. R.L. 2018. *Eschrichtius robustus* (western subpopulation). The IUCN Red List of Threatened Species 2018: e.T8099A50345475. Available from: https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T8099A50345475.en. [Accessed: 9 June 2023].

De Luca P., 2021. Wally batte ancora un colpo: avvistata a Gaeta. 20 aprile 2021. Available from: https://napoli.repubblica.it/cronaca/2021/04/20/news/wally_batte_ancora_un_colpo_avvistata_a_gaeta-297225559/ [accessed: 9 June 2023].

Garrison E.G., Morgan G.S., Mc Grath K., Speller C., Cherkinsky A., 2019. Recent dating of extinct Atlantic Gray Whale fossils, (*Eschrichtius robustus*), Georgia Bight and Florida, western Atlantic Ocean. PeerJ. 7: e6381. doi: 10.7717/peerj.6381

Hoelzel A.R., Sarigol F., Gridley T., Elwen S.H., 2021. Natal origin of Namibian grey whale implies new distance record for in-water migration. *Biol. Lett.* 17: 20210136. doi: https://doi.org/10.1098/rsbl.2021.0136

Lindquist O., 2000. The North Atlantic Gray Whale (*Eschrichtius robustus*): an historical outline based on Icelandic, Danish-Icelandic, English and Swedish sources dating from ca 1000 AD to 1792. University of St. Andrews, St. Andrews, UK.

Loy A., Aloise G., Ancillotto L., Angelici F. M., Bertolino S., Capizzi D., Castiglia R., Colangelo P., Contoli L., Cozzi B., Fontaneto D., Lapini L., Maio N., Monaco A., Mori

E., Nappi A., Podestà M., Russo D., Sarà M., Scandura M., Amori G., 2019. Mammals of Italy: an annotated checklist. *Hystrix It. J. Mamm.* 30 (2): 87–106. doi: https://doi.org/10.4404/hystrix-00196-2019

Macé M., 2003. Did the Gray Whale, *Eschrichtius robustus*, calve in the Mediterranean? Lattara. 16: 153–164.

Mammal Assessment team, 2007. *Eschrichtius robustus* (Europe assessment). The IUCN Red List of Threatened Species 2007: e.T8097A12885185. Available from: https://www.iucnredlist.org/species/8097/12885185. [Accessed: 9 June 2023].

Mancuso F., 2021. Il triste destino di Wally, la balena grigia avvistata a Ponza è arrivata anche a Maiorca e rischia di morire. 21 Maggio 2021. Available from: https://www.greenme.it/animali/wally-balena-grigia/ [accessed: 9 June 2023].

Martinengo A., 2021. "Salviamo Wally", balena grigia smarrita e affamata cerca l'uscita dal Mediterraneo. 13 maggio 2021. Available from: https://www.farodiroma.it/salviamo-wally-balena-grigia-smarrita-e-affamata-cerca-luscita-dal-mediterraneo-di-a-martinengo/ [accessed: 9 June 2023].

Michero S., 2021. La balena grigia Wally avvistata in provincia di Imperia, l'esemplare scortato verso la Francia "Non va avvicinato". 28 aprile 2021. Available from: https://www.sanremonews.it/2021/04/28/leggi-notizia/argomenti/altre-notizie/articolo/la-balena-grigia-wally-avvistata-in-provincia-di-imperia-lesemplare-scortato-verso-la-francia-non.html [accessed: 9 June 2023].

Montagna C., 2021. Balena grigia nel mare di Fiumicino. 21 Aprile 2021. Available from: https://www.ilfaroonline.it/2021/04/21/balena-grigia-nel-mare-di-fiumicino-incanta-i-pescatori/409599/ [accessed: 9 June 2023].

Noakes S.E., Pyenson N.D., McFall G., 2013. Late Pleistocene Gray whales (*Eschrichtius robustus*) offshore Georgia, USA, and the antiquity of Gray Whale migration in the North Atlantic Ocean. *Palaeogeogr. Palaeoclimatol. Palaeoecol.*. 392: 502–509. doi: 10.1016/j.palaeo.2013. 10.005

Observation.org, 2021. Balena grigia *Eschrichtius robustus* (Lilljeborg, 1861). Available from: https://observation.org/observation/211419906/ [accessed: 9 June 2023].

Redazione Fregene Online, 2021. La balena grigia avvistata a Ponza. 16 aprile 2021. Available from: https://www.fregeneonline.com/la-balena-grigia-avvistata-a-ponza/ [accessed: 9 June 2023].

Redazione LR Positano News, 2021. Sorrento, balena grigia avvistata nel Golfo: accertamenti in Corso. 17 aprile 2021. Available from: https://www.positanonews.it/2021/04/sorrento-una-balena-grigia-avvistata-nel-golfo-in-corso-accertamenti/3483662/ [accessed: 9 June 2023].

Rodrigues A. S. L., Charpentier A., Bernal-Casasola D., Gardeisen A., Nores C., Pis Millán J. A., McGrath K., Speller C. F., 2018. Forgotten Mediterranean calving grounds of grey and North Atlantic right whales: evidence from Roman archaeological records. *Proc. Royal Soc. B*, 285 (1882): 20180961. doi: http://dx.doi.org/10.1098/rspb.2018.0961

Rodrigues A.S., Horwitz L.K., Monsarrat S., Charpentier A., 2016. Ancient whale exploitation in the Mediterranean: species matters. *Antiquity*. 90(352): 928–938.

Rondinini C., Battistoni A., Teofili C. (compilers), 2022. Lista Rossa IUCN dei vertebrati italiani 2022. Comitato Italiano IUCN e Ministero dell'Ambiente e della Sicurezza Energetica, Roma.

Scheinin A.P., Kerem D., MacLeod C.D., Gazo M., Chicote C.A., Castellote M., 2011. Gray Whale (*Eschrichtius robustus*) in the Mediterranean Sea: anomalous event or early sign of climate-driven distribution change? *Mar. Biodiv. Rec.* 4: e28. doi: 10.1017/S1755267211000042

SOSdolfijn, 2021. Grijze walvis gemeld bij Marokko. 07 maart 2021. Available from: https://www.sosdolfijn.nl/nieuws/archief/grijze-walvis-gemeld-bij-marokko [accessed: 9 June 2023].

Stoch F., Grignetti A., 2021. IV Report Direttiva Habitat: Specie Animali. In: Ercole S., Angelini P., Carnevali L., Casella L., Giacanelli V., Grignetti A., La Mesa G., Nardelli R., Serra L., Stoch F., Tunesi L., Genovesi P. (Eds), 2021. Rapporti Direttive Natura (2013-2018). Sintesi dello stato di conservazione delle specie e degli habitat di interesse comunitario e delle azioni di contrasto alle specie esotiche di rilevanza unionale in Italia. Serie Rapporti 349/2021. ISPRA, Roma. [in Italian].

Swartz S.L., 2018. Gray Whale *Eschrichtius robustus*. In: Wursig B., Thewissen J.G.M., Kovacs K. (Eds), Encyclopedia of Marine Mammals, 3rd Edition. Elsevier. 422-428. ISBN: 9780128043271. eBook ISBN: 9780128043813.

Talignani G., 2021. Ponza, avvistata per la prima volta una balena grigia in Italia. 15 aprile 2021. Available from: https://www.repubblica.it/green-and-

blue/2021/04/15/news/ponza_avvistata_per_la_prima_volta_una_balena_grigia_in_italia-296524495/ [accessed: 9 June 2023].

Taylor L., Abella J., Morales-Saldaña J.M., 2022. New fossil remains of the commensal barnacle *Cryptolepas rhachianecti* provide evidence of Gray whales in the prehistoric South Pacific. *J. Paleontol.*, 96(3): 583–590. doi: 10.1017/jpa.2021.113

Wolman A.A., 1985. Gray whale *Eschrichtius robustus* (Lilljeborg, 1861). In: Ridgway S.H., Harrison R. (Eds) Handbook of Marine Mammals, Vol. 3: The Sirenians and Baleen Whales. Academic Press, Orlando, FL. 67-90.

Figure captions

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

Fig. 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	Founding in archaeological site	Half vertebra	(Rodrigues et al., 2018)
2	Late Roman. Stratigraphy: AD 400-450. Radiocarbon analyses: AD 71-245	Tetouan, Morocco	Founding 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		The same individual sighted in Israel, confirmed by photo-identification	(Scheinin et al., 2011)
5	04 April 2021	Off Skikda, Algeria		1 young specimen	(Observation.org, 2021)
6	14 April 2021	Off Ponza Island, Latium, Italy		7.70 m young specimen	(Talignani, 2021; Redazione FregeneOnline, 2021)
7	17 April 2021	Sorrento, Campania, Italy		The same individual as above	(Redazione Positanonews, 2021)
8	18 April 2021	Baia (Bacoli) Pozzuoli Bay, Campania, Italy			(Anonymous, 2021a)
9	19 April 2021	Harbour of Gaeta, Latium, Italy			(De Luca, 2021)
10	21 April 2021	Off Tiber estuary, near "Vecchio Faro", Fiumicino, Latium, Italy			(Montagna, 2021)
11	23 April 2021	Castiglione della Pescaia, Italy			(Anonymous, 2021b)
12	25 April 2021	Viareggio, Tuscany, Italy			(Anonymous, 2021c)
13	26-27 April 2021	Sestri Levante Liguria, Italy			(Bacci, 2021)
14	28 April 2021	Imperia, Liguria, Italy			(Michero, 2021)
15	29-30 April 2021	Port-Saint-Louis-du-Rhône (Bocche del Rodano), Harbour of Sète, Frontignan (Hérault), Provencal coasts, France			(Anonymous, 2021d)
16	4-6 May 2021	Cost of Argeles-Sur-Mer, France			(Martinengo, 2021)
17	8-9 May 2021	Catalan coast, off Barcellona and Calafell, Spain			(Anonymous, 2021e)
18	14 May 2021	Off Valencia, Spain			(Anonymous, 2021e)
19	20 May 2021	Close to Santa Ponça, South-West of Maiorca, Balearic Islands, Spain			(Mancuso, 2021)

HYSTRIX
the Italian Journal of Mammalogy

HYSTRIX
the Italian Journal of Mammalogy

HYSTRIX
the Italian Journal of Mammalogy