

# Using historical accounts to assess the occurrence and distribution of small cetaceans in a poorly known area

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*Historical science may play an important role in helping understanding and shaping the future of the world's oceans and to comprehend present day effects and conditions. Regarding cetaceans, historical accounts may be extremely useful to add new data to their occurrence and distribution in poorly studied regions. In Portugal, historical sources indicate that toninhas (possibly common dolphins *Delphinus delphis*) were observed since the 13th Century and were captured in large numbers during the late 19th and 20th Centuries. Historical occurrences given by naturalists and scientific surveys conducted by biologists indicate their regular presence with particular preference for certain areas. Also, recent observations of opportunity resulted in the same kind of accounts. Between 1976 and 1978, a study on captured cetaceans along the Portuguese shore found at fish markets was conducted and resulted in a total count of 45 cetaceans. Most captures were of small cetaceans (87% common dolphins), even though four baleen whales were registered. These cetacean captures were part of a local non-industrial fishery, as they were not the main target, but rather opportunistic catches or even by-catches of other fisheries. Delphinids were not protected by law at the time and were caught with hand harpoons or accidentally drowned in fish nets, sometimes sold at major fish markets such as Sesimbra, Peniche and Póvoa de Varzim. In geographical areas where recent cetacean sightings are rare and information is sparse, such as Portugal, it becomes important to take advantage of alternative sources of data. Our contribution towards the compilation of relevant historical and 'forgotten' science such as old natural observations, whaling data and observations of opportunity stresses the relevance of using historical data to access past occurrence and distribution of cetaceans.*

**Keywords:** historical accounts, *toninhas*, *Delphinus delphis*, *Phocoena phocoena*, Portugal, occurrence, distribution

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## INTRODUCTION

History and other social sciences are poised to play an important helping role to comprehend and shape the future of the world's oceans and to provide understanding of present day effects and conditions. Studies on environmental history and historical ecology of marine ecosystems in a variety of cultural and environmental settings demonstrate the complex interplay between humans, their demography and technology, climate change, coastal productivity, and the biodiversity inherent in local marine ecosystems (Rick & Erlandson, 2008). Data on historical occurrences may provide more information on how communities, populations and species have shifted over long temporal scales (Tingley & Beissinger, 2009) or establish baseline datasets.

Regarding marine mammals the impact of history on current biological knowledge is much greater than we can immediately imagine and questions commonly arise such as which species occurred in the past, where and how abundant

they were. Also, studying the historical influence of fishing and other human activities on natural populations of marine mammals proves to be a useful tool to understand and manage marine ecosystems. These systems are very complex and historical insight adds time dimension and interaction between humans and sea (Holm, 2003).

Until very recently little effort has been invested on documenting the occurrence and distribution of cetaceans frequenting or occasionally occurring along the Portuguese mainland shores. An exception is the resident population of bottlenose dolphins (*Tursiops truncatus*) in the Sado Estuary (e.g. dos Santos, 1998). Most accounts of cetaceans for the late 20th Century have been given by anecdotes and a couple of non-systematic studies (e.g. Sequeira, 1988; Wise *et al.*, 2005). Nevertheless, there are indications that *toninhas* were observed and captured in large numbers at mainland Portugal since several centuries ago and mainly during the late 19th and 20th Centuries. Several Portuguese authors refer to *toninhas* as common dolphins (*Delphinus delphis*), for almost all the Portuguese coast (e.g. Nascimento, 1945; Gama, 1957) but this word may also refer to harbour porpoises (*Phocoena phocoena*) (e.g. Reiner, 1981).

Generally, common dolphins are considered the most abundant cetacean off Portugal (e.g. Teixeira & Duguy,

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1981; Sequeira, 1988). Surveys between 1997 and 1999 also presented small cetaceans distribution (Wise *et al.*, 2005, 2007) and data from 20th century stranding records (Sequeira *et al.*, 1996, 1997) indicate the regular presence of common dolphins and harbour porpoises along the Portuguese coast. These references provide a good case-study for the use of available historical information on small cetaceans' occurrence.

Most historical or baseline information regarding cetaceans in Portugal has been obtained from whaling records and fishing statistics. The commercial exploitation of large whales was an important activity off mainland Portugal since the Middle Ages and continued for centuries, even though there were peaks at certain times (Brito, 2009). These accounts are still under analysis but until now there is no indication of a regular and directed capture of small cetaceans. This paper contributes to the understanding of historical occurrence of small cetaceans through a review of a wide range of data available for mainland Portugal and emphasizes the importance of using historical information by showing number of presences in time and space. Old data from the 13th to 19th Centuries add to other references such as captures and surveys during the 20th Century and recent observations of opportunity. Our contribution towards the compilation of relevant 'forgotten science', such as old naturalists observations on the wild, whaling data, grey literature and observations of opportunity, will contribute with new data to the study of cetaceans in a poorly known region.

## MATERIALS AND METHODS

Historical research was conducted to obtain old records about the occurrence of cetaceans, and the importance of fishing and whaling activities along Portuguese shores, since the 13th Century. A search on Portuguese documents was conducted at the National Library of Portugal (Lisbon) and other regional libraries and historical archives (Nazaré, Peniche, Sesimbra, Setúbal and Faro). Our investigation included historical sources and old accounts mainly village charters, royal privileges and levying of tithes, between the 12th and 17th Centuries. Scientific articles, newspapers, illustrations, maps, unpublished scientific reports and some other grey literature such as unpublished theses, from the 18th Century onwards were taken into consideration. We did not include recent information already published elsewhere. National statistics books and fishing statistics since the end of the 19th Century were also consulted in the National Institute of Statistics (Lisbon).

There are some difficulties in finding original relevant sources and afterwards to select useful historical information on species occurrence. Frequently, secondary sources are a first step to find the initial publications on coastal or oceanic biological aspects and related historical conservation issues. Here we used the definition of historical occurrence by Tingley & Beissinger (2009), where observed detection provides evidence of true presence of individuals of a species at a certain location. Although there was available information for other cetaceans, we only used the presence of *toninhas* due to the existence of several references over a long time frame. Also, the word *toninhas* can be assigned to a species (common dolphins and/or harbour porpoises) as the word *golfinho* (dolphin) that appeared a couple of times may refer to any delphinids. These presences were considered as

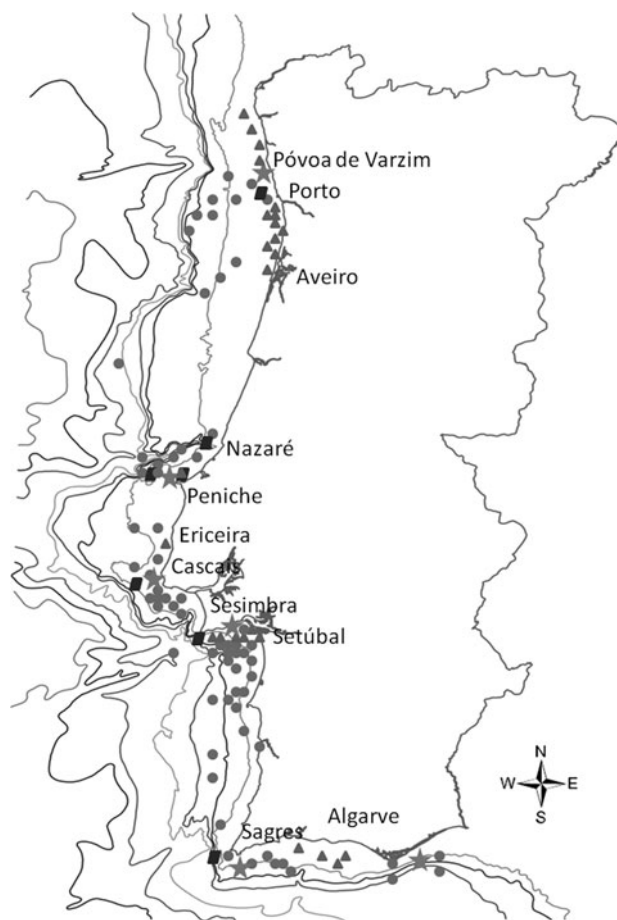


Fig. 1. Map of Portugal mainland showing approximate geographical location of the fishing villages referred to in the present study and of all different types of accounts regarding the occurrence of common dolphins through their approximate geographical position over bathymetric lines (N = 165): ▲, historical accounts/sightings/strandings; ●, 20th Century scientific sightings following Teixeira & Duguy (1981) and Sequeira (1988); ★, 20th Century local captures following Teixeira (1979); ■, recent observations of opportunity.

sightings and over time were classified as follows: historical account (any type of event; from the 13th to the 18th Centuries); historical sighting (observation at sea; from the 19th Century to mid-20th Century); historical stranding (described stranding; from the 19th Century to mid-20th Century); captures or by-catches (20th Century); scientific sightings (20th Century).

A search for recent observations of opportunity was also conducted based on information given by nature photographers, SCUBA divers and biologists. We only used positive identifications from photographs and/or 100% secure personal observations together with respective approximate geographical location (all 21st Century). Modern reports of sightings and strandings of small cetaceans were not used and are published elsewhere (e.g. Sequeira *et al.*, 1996; Brito *et al.*, 2009).

## RESULTS

### Historical accounts

We obtained a total of 165 independent accounts of *toninhas* common dolphins over time (from the 13th Century to the

present) in several locations along the mainland Portuguese coast (Figure 1). It is important to note that each mark indicates one of the 165 records collected and does not indicate the number of individuals. These accounts resulted from a compilation of 8 historical references, 17 historical stranding/sighting records, 45 capture records, 67 scientific sightings and 28 recent observations of opportunity (Table 1).

## Captures over time

Most historical sightings refer to captures, dolphin use and related legislation. In the early 20th Century *toninhas* were frequently captured off Sesimbra as indicated by the number

of individual hand harpoons registered in the national statistics books. Fishing data indicate that, at least, between 1896 and 1906, dolphins might have been captured, but there only are references to 1902, 1904, and 1906 when respectively 39, 41, and 41 harpoons were officially listed. Although data are only available for some years, their absence does not mean there were no harpoons in other years, probably confirming the lack of registered information found on that specific fishery.

Between 1976 and 1978, a study on captured cetaceans along the Portuguese shore found in fish markets was conducted (Teixeira, 1979) and resulted in a total count of 45 cetaceans (Figure 2). Most captures were of small cetaceans

**Table 1.** Records of the occurrence of *toninhas* common dolphins over time in Portugal mainland (N = 165), according to historical accounts, historical sightings and strandings, captures, scientific surveys and recent observations of opportunity (♦, indicates number of sightings, but more than one individual may have been observed; ▲ record of the observation of 3 individuals, one adult and 2 calves, indicates a certain degree of detail in early 'scientific' observations; ■ number of records is the same as number of individuals).

Date	Region	Records	Type of sightings	Reference
1201	Sesimbra	1♦	Historical account: <i>almadrava da toninha</i> (referring to siege nets for dolphins)	Monteiro (2001)
1258	Porto	1♦	Historical account: 'fishers must pay the king for the whale fishing and other animals such as toninhas and dolphins'	Castro (1966)
1305	Algarve	1♦	Historical account: 'a lown of 1500 dobras to be paid through a part of the value of captured tunas, swordfishes and toninhas'	Castro (1966)
1375	Sesimbra	1♦	Historical account: 'between Sines and Sesimbra we fish tuna, swordfish, dolphins, <i>toninhas</i> , some whale or small whale or <i>serea</i> or <i>coca</i> or <i>roaz</i> or <i>musaranha</i> or other large fish'	Silva (1953)
1378	Aveiro	1♦	Historical account: 'a discussion about two dolphins in which the Monastery asked for the third part and fishermen have confessed'	AUC
16th Century	Ericeira	1♦	Historical account: 'in the 16th century, rays, hakes and other fishes were the most common captures, besides the <i>toninhas</i> '	Alves (1993)
1728	Sesimbra	1♦	Historical account: 'fishers must pay to the church from all fishes and sardines and toninhas, that they fish and take from the coast of the sea'	<i>Livro do Tombro da villa de Cezimbra</i>
1751	Porto	1♦	Historical account: 'the dolphin ( <i>delfinus</i> Gen.) followed us for all the sea'	Cavanilles (1801)
1828	Leirosa	1■	Historical stranding: information on sex and size	n.a.
1888	Buarcos	1■	Historical stranding: information on sex and size	n.a.
1889	Buarcos	1■	Historical stranding: information on sex and size	n.a.
1895	Algarve	1▲	Historical sighting: indication of number of individuals, behaviour and other aspects	Nobre (1895)
1896	Setúbal	1■	Historical stranding: identification and measures	Teixeira (1977)
1897	Porto	1■	Historical stranding	Nobre (1900)
1935	Âncora; Viana; Póvoa de Varzim, Leça da Palmeira; Foz do Douro; Buarcos; Peniche; Setúbal; Sesimbra; Faro; Algarve	11♦	Historical sighting	Nobre (1935)
1976/1978	Póvoa de Varzim; Peniche; Cascais; Sesimbra; Anção; Sagres	45■	Incidental captures or bycatches	Teixeira (1979)
1980	S. Martinho do Porto; Peniche; Ericeira; Sesimbra; Sines	9♦	Scientific sightings	Teixeira & Duguy (1981)
1987	Mainland Portugal	58♦	Scientific sightings	Sequeira (1988)
2002/2008	Póvoa de Varzim; Nazaré; Peniche; Cascais; Sesimbra; Sagres	28♦	Observations of opportunity	Personal communication to the authors

n.a., not applicable.

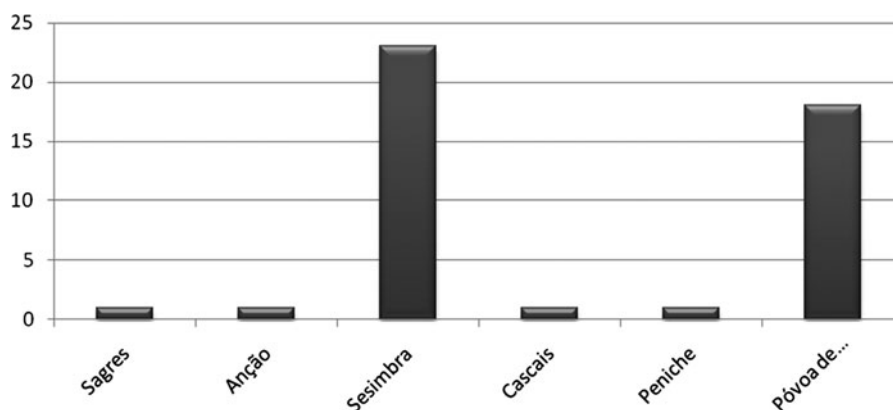


Fig. 2. Number of captured common dolphins in some fishing villages along the Portuguese coast (N = 45), between 1976 and 1978.

(87% common dolphins), although other odontocetes and four baleen whales were also registered (Figure 3). These captures occurred all along the coastline using hand harpoons. Captured individuals were sold at the beach fishing markets together with all the captured fish (Figure 4). These captures were part of a local non-industrial fishery and not its main target, but rather opportunistic catches or even by-catches of other fisheries (Figure 5). Delphinids were not protected by any law at that time and were caught with hand harpoons or accidentally drowned in fish nets, and sometimes were sold at major fish markets, for instance Sesimbra, Peniche and Póvoa de Varzim.

### Science over time

After that period two separate data sets are available (1980 and 1988) regarding recent historical scientific surveys conducted for cetacean detection and study. In both situations, which included dedicated boat-based and opportunistic surveys (Teixeira, 1979; Sequeira, 1988) and an aerial survey

(Sequeira, 1988), common dolphins are reported to be the most frequently sighted cetacean off mainland Portugal. More recently a compilation of observations of opportunity was also made (Brito *et al.*, 2009) and common dolphins comprise 60% of the total occurrences. Harbour porpoises are also reported but in much smaller number and in very restricted areas.

### DISCUSSION

For a long time misunderstanding has existed regarding the vulgar name of common dolphins (*Delphinus delphis*) and harbour porpoises (*Phocena phocoena*) in Portugal (Nobre, 1900; Gama, 1957). However, generally, the word *toninhas* is used for common dolphins (Nascimento, 1945). Although assuming that accounts of *toninhas* were common dolphins and/or harbour porpoises, we need to keep in mind that other species occurred in the region. Moreover, it is very difficult to establish species identification on medieval and early

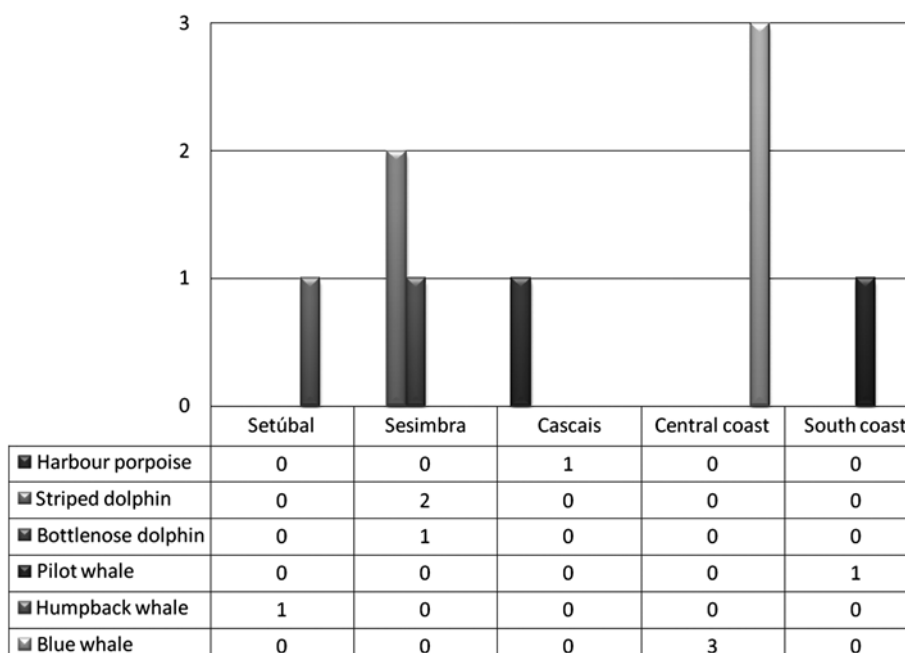


Fig. 3. Number of captures of other cetaceans species along fishing villages in Portugal mainland (N = 9), between 1976 and 1978.





**Fig. 4.** Photograph of the fish market in the village of Sesimbra at the beach, in the 1960s, showing six captured common dolphins (image obtained from the Historical Archive of Sesimbra, Portugal).

accounts. Anyhow, our main objective was not to identify a particular species but rather to present a case-study for the use of historical accounts to assess past occurrence and distribution of small cetaceans.

Regular information on past and present numbers of dolphins living in this region is unavailable but our qualitative assessment on existing literature indicates that, most probably, common dolphins have been regular elements of coastal fauna, at least, since the 13th Century. In case of cetaceans' historical occurrence, increase of the number of identified

species, as well as number of events and sightings, reflect directly the effort dedicated to those types of events. Over time more people became interested in this subject and different activities developed around whale and dolphin presence in Portuguese coastal waters. During medieval times only small coastal populations of fishermen would be in contact with dolphins, but since the 18th Century, naturalists, zoologists and people with curiosity were also involved in reporting accounts. During the 20th Century whalers, whale watchers, scientists, politicians and lately the public were aware of nature and marine conservation which is clearly reflected by the increasing number of sightings and events.

Early historical sources mostly refer to captures and use of dolphins while the more recent historical data most commonly refer to sightings or strandings. This does not mean that captures of small dolphins stopped in recent times. On the contrary they were continuous and large numbers of animals are referred as having been captured during the 20th Century. Rather it shows an emergence of a natural/scientific perspective since the late 19th Century. Although historical records of common dolphins mainly refer to their presence during captures of other cetaceans or their economic value, they give us an idea of where and when this species occurred in the past. The same applies for recent historical sightings and strandings, which were made by zoologists or other researchers of the time; in those cases dolphins were spotted at sea or beaches and their approximate location was recorded. Legislation protecting cetaceans came into force in 1981, and since then only sporadic reports of captures or by-catches are available.

This paper as with other studies (e.g. Bearzi *et al.*, 2004) stresses the importance of documenting past events and historical trends that usually go unnoticed, owing to factors such as difficult access to relevant literature and scarcity of quantitative reports. In this case-study we try to show that long-term information can be constructed from several types of historical material. Long temporal patterns of occurrence as well as some spatial gradients were determined, which may indicate new and important spots for the future study and assessment of small cetaceans.

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**Fig. 5.** Photograph of a by-caught harbour porpoise in fishing nets, 1977 in Caminha (photograph made available by António Teixeira).

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