

Assessment of catch statistics during the land-based whaling in Portugal

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Whaling has been known in Portugal since the 12th Century. However, the significant commercial interest of this activity began in the 19th Century and carried on through the 20th Century on the mainland and on the archipelagos of the Azores and Madeira. The purpose of this study is to conduct a global review of Portuguese whaling data and to obtain information on coastal catches of whales by the Portuguese land-based fleet during the 20th Century. Different periods of whaling can be discriminated considering the three Portuguese geographical locations but, globally, 89 years of land-based whaling in Portugal gave a total capture of 29,180 great whales. Captures included sperm, fin, humpback, sei, right and minke whales. Decline of the land-based whaling industry followed the decline of species in the exploited grounds.

INTRODUCTION

The presence of whales in the coastal waters of Portugal has been known since the 12th Century as their products were already used in several fishing villages (Calado, 1994). However, in these early times, it is not certain if whales were being hunted or only exploited for their stranded remains. Later on, during the 13th and 14th Centuries whaling was a reality in several locations on the continental coast (Castro, 1966; Alves, 1993). Following the discovery of the archipelagos of Madeira and Azores in the 15th Century whaling activities started to be conducted overseas in all the Atlantic colonies, mainly in Brazil (e.g. Ellis, 1969).

In contrast to the Basque whaling that took place within the coastal waters of the Bay of Biscay (Spain) from the 11th Century and lasted until the end of the 18th Century (Sanpera & Aguillar, 1992), the Portuguese land-based whaling industry peaked and decreased at certain times. So, after the 15th Century whaling became again an important and economically viable industry in the 19th Century (Clarke, 1954; Puim, 2001). The first statistical reference on captured whales and gallons of obtained oil dates back to 1892 for the Azorean Archipelago (Anonymous, 1899). However, these data are very much incomplete. From this time forward land-based whaling occurred in Portugal until 1984—intermittently in the mainland; during a period in Madeira and continuously in Azores—and more detailed data about captures were registered.

Accurate information on the catch history of whales is very important for assessing the ecological effects of whale fisheries (Smith, 2002) mainly in much exploited grounds. The objective of this study, starting with general fishing statistical data, is to conduct an assessment on catch statistics in Portuguese land-based whaling. It was intended to obtain numerical and biological information to complement the North Atlantic perspective of great whale exploitation.

MATERIALS AND METHODS

In the present study for a global understanding of this activity and its impact on natural populations the information on captures in mainland and Portuguese Atlantic archipelagos was collected all together. Portugal (mainland) is located at the western extreme of Europe in the Iberian Peninsula facing the Atlantic on the west and south, and having borders with Spain in the east and north; the archipelagos of Madeira and the Azores are located in the north-eastern Atlantic.

A review of historical data obtained from fishing statistics since the end of the 19th Century through the 20th Century was conducted to gather information on whaling in Portugal. Data on captures only refer to land-based whaling by Portuguese whalers and companies registered in the national statistic books.

Fishing statistics, whaling included, have been published for many years in several different publications, such as the *Annual Statistics of Portugal* (Anonymous, 1899), *Statistics of the Maritime Fisheries of the Continent and Adjacent Islands* (Anonymous, 1897–1942), *Industrial Statistics* (Anonymous, 1943–1964), *Agriculture and Feeding Statistics* (Anonymous, 1965–1968) and *Fishing Statistics* (Anonymous, 1969–1985). Although the shore-based whaling had started in the Azores in the 1830s, the analysis is only achieved from 1896 onwards, since when national fishing statistics have been available. In all the literature we always found similar information which included the

number of captured whales (a few times referring if they were sperm whales or rorquals, most times just referred as whales), the amount of obtained oil and the economic value of both products. In a few cases, in mainland Portugal, there were indications on the quantity of produced meat and other whale sub-products. Detailed species information came from the International Whaling Commission (IWC) Secretariat, from 1921 to 1987.

RESULTS

Capture numbers

Eighty-nine years of land-based whaling in Portugal resulted in a total capture of 29,180 great whales. Several periods of whaling can be discriminated considering the three Portuguese geographical locations (see Table 1). Industrial whaling in the Azores occurred since 1896, at least, until 1984 without interruptions (the three last captures took place in 1987); in Madeira between 1941 and 1981; and in mainland Portugal for two distinct and shorter periods, 1925 to 1927 and 1944 to 1951.

In the first year considered (1896), 37 whales were only captured in Azores. Fifty-two years later took place a peak of 1,001 captured whales in Azores, Madeira and the mainland, all together. In 1984, 63 whales were captured in Azores again. As can be seen in Figure 1 it was in the mid-Twentieth Century, more exactly in 1948, that took place a peak on the captured whales, which corresponds to the beginning of whaling in Madeira and the new whaling season in mainland.

Species captured

Portuguese statistics books only discriminate the captures as sperm whales and other whales, with no other clarification (except in a couple of circumstances). In the period between 1921 and 1987, the IWC Secretariat has discriminated information on captured species by different Portuguese geographical regions. While in the Azores only sperm whales were captured, in Madeira and the mainland there also were occurrences of fin whales, and in lesser quantity of humpback, sei, right and minke whales. During this period 27,116 great whales were captured as described in Table 2 and another source (Kraus & Rolland, 2007) includes captures of right whales in Azores and Madeira.

Considering just sperm whales, their capture followed the total amount of whale captures, especially in Azores and Madeira (Figure 2). The decline of the land-based whaling industry followed the decline of species abundance in the exploited grounds. Captures in Azores were always much higher than in Madeira and the mainland, and by the end of whaling the numbers were similarly low.

Table 1. Discrimination of the different whaling periods in the Azores, Madeira and Portuguese mainland by numbers of captured whales, in each period and in each Portuguese geographical region. The total amount of 89 whaling years, for each region, is given in the last row.

Period of years	Azores	Madeira	Portuguese mainland	No. of years
1896 to 1924	2669	0	0	29
1925 to 1927	519	0	587	3
1928 to 1940	3821	0	0	13
1941 to 1943	1522	232	0	3
1944 to 1951	4583	920	584	8
1952 to 1981	10231	3332	0	30
1982 to 1987	180	0	0	2
1896 to 1987	23525	4484	1171	89

Table 2. Discrimination of the different species of great whales captured between 1873 and 1987 in each Portuguese geographical region. The total amount of this period, by species, in all areas is given in the last row.

First year	Last year	Land station	Sperm	Fin	Humpback	Sei	Right	Minke
1873	1888	Azores	0	0	0	0	7	0
1921	1987	Azores	21304	0	0	0	0	0
1941	1981	Madeira	4483	13	1	0	3	0
1925	1927	Mainland	77	645	0	1	0	0
1944	1951	Mainland	191	390	0	0	0	1
1873	1987	All areas	26055	1048	1	1	10	1

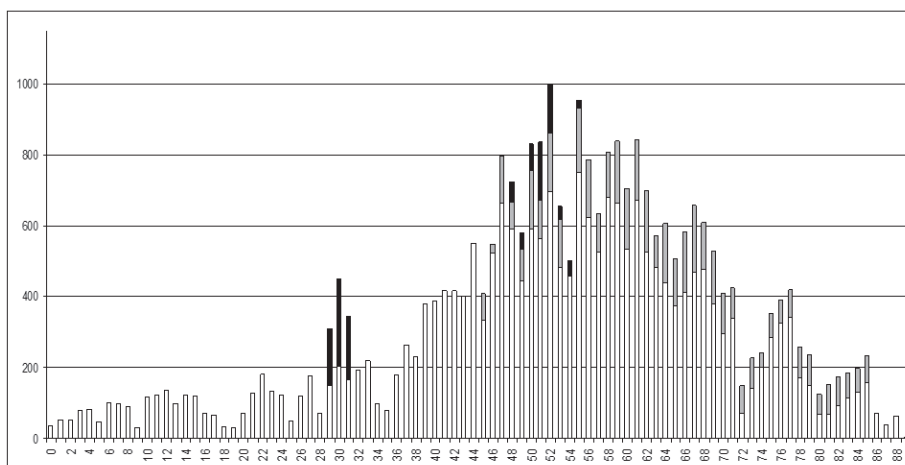


Figure 1. Total captures of whales in Portugal during 89 years of land-based whaling, accumulating captures from the Azores (white bars), Madeira (grey bars) and the mainland (black bars). A peak occurred in 1948 (52nd year) and after that a decrease was observed.

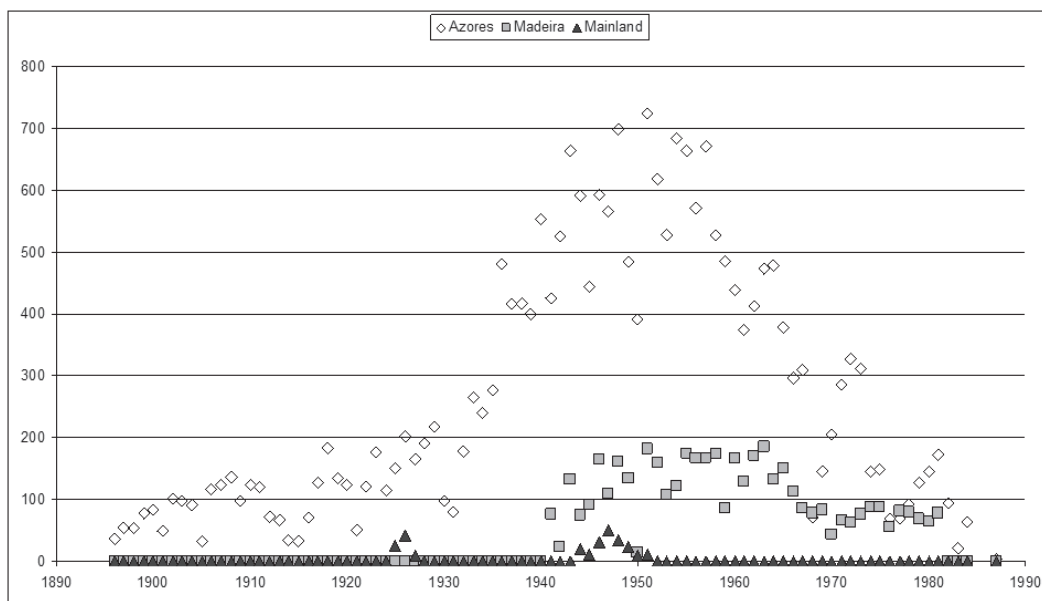


Figure 2. Number of captured sperm whales in the three Portuguese geographical regions (Azores, Madeira and mainland Portugal) between 1896 and 1987.

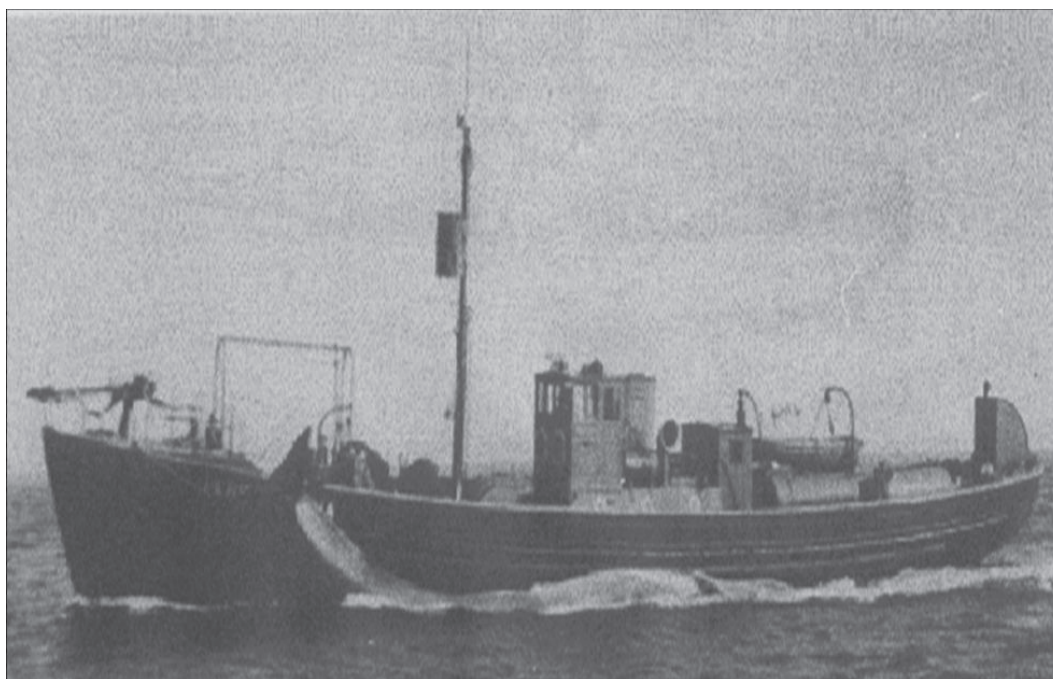


Figure 3. Whaling boat off Sesimbra, Portuguese mainland, pulling a captured whale on the side and showing one deck-mounted cannon; from Marques (2000).

DISCUSSION

Data collected from fishing statistics do not indicate characteristics of whaling trips, places of capture and other biological information such as logbooks usually do. For this study only the number of captured whales and different species were considered, even so some patterns do emerge.

From the statistical data on land-based Portuguese whaling two different and completely opposite tendencies on the number of captured whales emerged. Since 1896, the number of captures increased until reaching a peak and afterwards the number of captured whales decreased for the lifetime of the whaling activity. Further data analysis on the amount of produced oil and collected ambergris may indicate if the size of captured whales was also decreasing. This would mean they were capturing fewer and smaller whales, indicating the animals were not growing until reaching mature size. Considering the close of this industrial activity it was observed that in Azores whaling finished by 1984 (with the three last official captures in 1987) but in one of the archipelago's islands (Santa Maria) it ended much earlier in 1966 (Brito & Carvalho, 2007). After 30 years of uninterrupted whaling off Santa Maria and following the abrupt decrease of captured sperm whales and the price of the oil as well, the activity ceased (Puim, 2001). In Madeira whaling started later than at the other

Portuguese regions (1941) and occurred continuously until 1981, with also reduced captures by the end. In mainland Portugal after the first whaling period which began in 1925, the Portuguese Society for Cetacean Fishery restarted operations in 1944 (Anonymous, 1943–1964) at the same land factory, a station settled on the beach of Troia in Setubal, which had been abandoned in 1927. During the second period catches were similar to those in the Strait of Gibraltar in Spain (Sanpera & Aguillar, 1992), but much inferior to the captures on the Madeira and Azores archipelagos. In 1951 whaling in mainland Portugal ended definitely since the catches soon decreased as a result of overexploitation as also stated by Sanpera & Aguillar (1992). In fact during the last eight years of whaling (1944–1951) in this region were captured around the same number of great whales (584) as the ones captured twenty years before (587) during three years (1925–1927) only.

Regarding the captured species sperm whales were the main target for industry, especially in Azores and Madeira. In Azores sperm whales were the only targeted species, so fluctuations in captures indicated natural shortages of animals in that region. It is interesting to note that already in 1961, the Azorean fishermen and whalers (Anonymous, 1961) had been confronted with the need to adopt conservation measures to maintain the number of sperm whales in the Azorean waters. By that time there was noted a 'progressive decrease in the results of the sperm whale fishery in the archipelago' and the possibility of 'ending all land based whaling due to the few available animals'. This was exactly what happened within a couple of decades. In mainland Portugal most important captures were fin whales, probably related with the frequency of these species close to the continental shores. In the mainland during both periods an early decline of land based whaling occurred due to a rapid decrease in captures. This may be a consequence of the low abundance of great whales in this region, as well as the operational use of steam catchers' boats with deck-mounted cannons firing explosive harpoons (Marques, 2000) (Figure 3), in a stark contrast with the old-style whaling in the archipelagos carried out with open oar or sail boats using hand harpoons (Clarke, 1954). This major internal variability in the Portuguese land-based whaling fleet might have caused an effect on the size of exploited areas, the target species and number of individuals that could be taken. It should be stressed that right whales probably were the main target of early inshore fisheries in Portugal and references exist to a couple of sightings in Portugal: Madeira in 1967 and Cape St Vicente, Portuguese mainland in 1995 (Martin & Walker, 1997).

This assessment only considers land-based whaling in Portugal, ignoring concurrent whaling by Spain (e.g. Aguilar & Assumpció, 2007), Morocco and even the United Kingdom which occurred simultaneously in the area in the 19th and 20th Centuries. In this context neighbouring whaling operations preyed upon the same migrating stocks so the Portuguese whaling effort cannot be looked upon in isolation. Although the surveyed operations were all Portuguese, it must be taken into consideration that they cover areas geographically distinct. Thus, they might exploit very different populations in different periods. This is particularly critical for Madeira which is located more southerly than the Azores and the mainland. The present research is intended to be a contribution towards a fuller understanding on whaling statistics along the whales' migration routes in the entire north-eastern Atlantic. Moreover, future studies will need to include accurate data on species, size, sex and other information about the captured individuals, to understand the impact of whaling in the biology of whale populations.

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