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## **First Record and Trace Element Concentration in Humpback Whale (*Megaptera Novaeangliae*) Stranding on the Coast of Algeria (Southwestern Mediterranean Sea)**

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### **Abstract**

Humpback whale distribution is widespread over all the oceans, and this species embarks on extensive seasonal migrations, there are a few reported occurrences of humpback whales in the Mediterranean. Cetacean species are indeed present in Algerian waters, ten species of cetaceans have been listed in these waters, nine of them are in a regular way, and one is considered as accidental species. The present paper provides information on the stranding of a humpback whale (*Megaptera novaeangliae*) in the coast of Algeria, these stranding were considered 'rare' in this area. On October 31, 2012, a humpback whale, measured 9.30m long, is found dead on the Algerian coast (AinTemouchent). The present study constitutes the first confirmed record of whale stranding on the coast of Algeria. The animal was identified as a juvenile male with no external fractures of the body. Internal dissection revealed a normal blubber thickness of 8cm.

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This data suggests that the whale had been in good health with a good nutrition. Additionally, traces elements concentrations of zinc (Zn), lead (Pb), cadmium (Cd) Nickel (Ni), Chromium (Cr) and Manganese (Mn), were measured in the blubber and muscle of this humpback and found generally lower than those reported in other marine mammals in difference area. In conclusion, the most likely cause of mortality for this juvenile whale is attributed to the lost of the mother.

**Keywords:** Cetacean; Stranding; *Megaptera novaeangliae*; Coast of Algeria; Traces Elements.

## 1. Introduction

The humpback whale used to be considered rare in Mediterranean [1], but the number of records in the last 20 years has increased [2].

The explanation for humpback whale entries in the Mediterranean can only be the subject of speculation [2].

Aguilar (1989) indicate that, the presence of the whale in the Mediterranean Sea is conducted by the pursuit of food or by specific water temperature gradients.

The humpback whale is heavily exploited by the whaling industry for several centuries. Because of its coastal distribution, it is often the first species to be hunted in a newly discovered area. As a result, the humpback is considered as an endangered species [3].

Since 1973, the program of marine mammals stranding was monitored on Algerian coasts by the team of the Environmental Monitoring Network Laboratory.

According to our present knowledge, 10 species considered as belonging, now or in the past, to the Algerian coasts: *Tursiops truncatus*; *Delphinus delphis*; *Stenella coeruleoalba*; *Grampus griseus*; *Globicephala melas*; *Physeter catodon*; *Ziphius cavirostris*; *Balaenoptera physalus*; *Balaenoptera acutorostrata* and *Kogia previceps* [4,5,6,7,8,9].

The present study carried out on the first stranding of Humpback whale (*Megaptera novaeangliae*) and their levels of trace element concentration in Algerian coast of the Southwestern Mediterranean Sea.

## 2. Material and methods

On Wednesday October 31, 2012, a humpback whale (*Megaptera novaeangliae*), measured 9.30 m long, was found dead on the Algerian coast (Ain Temouchent) (35°26'03.0"N 1°14'27.1"W) (Fig.1).

The information was transmitted to the team of our laboratory (LRSE: Environmental Monitoring Network Laboratory of the University of Oran-1) by the local people.

All measurements of the body were taken following [10] methods: The total length (Snout to Flukes), snout to tip of dorsal fin, snout to eye, mouth length, snout to anterior insertion of flipper, flipper length, flipper width,

flukes width, snout to genital slit, snout to anus.

The animal was stranded on latero-dorsal recumbency making easier the post mortem examination (Fig. 2). The dissection took place on the beach between 19h00 and 22h00 in the night.

The sexual maturity was estimated from body length, for toxicological analyses, a part of blubber and muscle was taken depending on carcass condition, and frozen at -20 °C for a range of trace elements, according to previously established and fully validated protocols [11].

The concentration of Heavy metals (zinc (Zn), lead (Pb), cadmium (Cd) Nickel (Ni), Chromium (Cr), Manganese (Mn) were measured after hot mineralization samples.

Approximately 1 g of wet weight (w. wt.) was digested in 4 ml of concentrated nitric acid (Merck Suprapure) at 95°C for 1 hour. The metal contents in acid solutions were determined by using a flame atomic absorption spectrophotometer equipped with a graphite furnace (Perkin Elmer AAnalyst-100-Version 1.10).

Detection limits were determined with blank analyses, and the quality controls were made using standard reference materials (Mussel Tissue Standard Reference Material (SRM 2976), National Institute of Standards and Technology). These standards were treated and analysed under the same conditions as the samples and results were in good agreement with the certified values.



**Figure 1:** The location of stranding Humpback whale (*Megaptera novaeangliae*) in Targa on the Ain Temouchent coast. (Indicated by red arrow).

### 3. Results and discussion

We started on site, the sampling: First, we identify the sex of the whale, he was a male (Fig. 3 f).

The condition of the carcass indicated that the animal was dead for no longer than 2-3 days.

The whale's external morphology and color patterns agreed with those described in the literature (Fig. 2).

Photographs of dead animal were taken and the following morphometric measurements were conducted (Tab. 1), (Fig. 3 a, b, c), all measurements are expressed in meters, and the investigation at post-mortem to allow a cause of death.

Humpback whales are renowned for the distinctive long pectoral fins and the photographs taken during the stranding indicate that the stranded whale was indeed a humpback (*Megaptera novaeangliae*) (Fig. 3 c).

The shows the black and white coloration on the abdomen, and the shows white coloration and marks of the fluke underside that is potentially very useful for individual identification (Fig. 2; 3 b).



**Figure 2:** The Humpback whale *Megaptera novaeangliae* stranding in Targa on the Ain Temouchent coast

At close range, humpback whales are easily distinguished from any other large whale by their remarkably long flippers, which are approximately one-third the length of the body.

The Humpback whale was a juvenile male. The total body length was 9.30 m; the mean length of physical mature male and female Humpback whales is 13.0 m and 13.9 m, respectively [12]. At the end of lactation, lasting 5 months, the calves are between 7, 5 and 9 m long [13]. Mean lengths at the average age at attaining sexual maturity (Five years) were 11.8 m for males and 11.9 m for females [14]. The present animal was estimated between 1 and 2 years old. The whale had a good the nutritional status, the average blubber thickness of 8 cm being normal in humpback [13] (Fig. 3 d).

**Table 1:** External measurements (in meters) of the Humpback whale stranded in Ain Temouchent coast.

<b>External measurements</b>	<b>In meters</b>
<b>Total length</b>	9.30 m
<b>Snout to tip of dorsal fin</b>	5.87 m
<b>Snout to eye</b>	1.70 m
<b>Mouth length</b>	1.48 m
<b>Snout to anterior insertion of flipper</b>	2.40 m
<b>Flipper length</b>	2.54 m
<b>Flipper width</b>	0.70 m
<b>Flukes width</b>	2 .66 m
<b>Snout to genital slit</b>	7 m
<b>Snout to anus</b>	7.58 m

The humpback whale used to be considered rare in Mediterranean [1], but the number of records in the last 20 years has increased [2].

The explanation for humpback whale entries in the Mediterranean can only be the subject of speculation [2].

Aguilar (1989) indicate that, the presence of the whale in the Mediterranean Sea is conducted by the pursuit of food or by specific water temperature gradients.

The Humpback whale is not regularly present in the Mediterranean Sea, where it is considered an occasional or visitor species [2, 15], the occurrences of the Humpback whale in the Mediterranean Sea are presented in table 3.

Since 1990, the number of Humpback whale observations in the Mediterranean Sea has increased and the range of sighting locations has expanded to cover both basins of Mediterranean Sea [2].

However, some results as heavy metal concentration are presented in table 2. The small number of specimens available in this kind of studies is very common, and it is for this reason that studies do not offer statistical analysis data.

Due to the rarity of the references of the concentrations of traces metals in tissues and organs of humpback whale, it is difficult to compare the results obtained in this study.

However, can be critically evaluated with those levels recorded by [16] in Soft Tissues of Short-Beaked Common Dolphins (*Delphinus delphis*) stranded along the Algerian West Coast.

The specie showing the lowest concentrations are *Balaenoptera physalus*, which is in agreement with literature



[17,18] and *Physeter catodon* [19] and *Delphinus delphis* [16].



**Figure 3:** A Humpback whale (*Megaptera novaeangliae*) stranding in Targa Beach Algeria: **a**, measurement of total length; **b**, measurement of flukes width; **c**, measurement of flipper length; **d**, blubber thickness; **e**, a sample of skin, blubber and muscle; **f**, The male genital apparatus.

**Table 2:** Tissue analysis for heavy metals concentrations (mg /l wet weight) in humpback whale (*Megaptera novaeangliae*) stranded on the coast of Algeria.

Contaminant	Blubber	Muscle
<b>Cd</b>	< 0,001	< 0,001
<b>Cr</b>	0, 21	0, 42
<b>Mn</b>	39,11	43,61
<b>Ni</b>	0,13	0, 34
<b>Pb</b>	0, 11	0, 32
<b>Zn</b>	57,50	63,93

**Table 3:** Records of the Humpback whale (*Megaptera novaeangliae*) occurrence in the Mediterranean Sea (adapted from Notarbartolo di Sciara and Birkun, 2010)

Date	Location	Sex	Size	Notes	Reference
Nov 1885	Toulon, France		6.8 m	By-caught	[1]
14Mar 1986	Majorca, Balears, Spain			Sighting of two individuals, female with calf	[1]
Mar 1990	Bay of Aiguablava, Catalonia, Spain			Sighting of one adult	[2]
2 Oct 1992	Gulf of Gabés, Tunis		8 m	By-caught	[21]
21 May 1993	Cavalaire, France	F	7 m	By-caught	[22]
Aug 1993	Toulon, France			Sighting of two individuals	[2]
24 Jan 1998	Gulf of Oristano, W. Sardinia, Italy		7-8 m	Sighting	[2]
17 Apr 2001	Bay of Tolo, Myrtoon Sea, Greece		8-11 m	Sighting	[2]
19 Jul 2002	Lefkada Island, Greece			Sighting	[2]
4 Aug 2002	Senigallia, Italy			Sighting	[23]
5 Apr 2003	Tartous, Syria	M	7.85 m	Stranded dead	[24]
17 Feb 2004	Corfu Island, Greece	F	7.2 m	By-caught	[2]
2 Apr 2004	Siracusa, Sicily, Italy		About 10 m	By-caught alive and released	[25]
Feb-Apr 2009	Slovenian waters , Gulf of Trieste		10-12 m	Repeated sightings	[26]
8 Aug 2010	Bay of Algeciras, Spain		8 m	Sighting	[20]
26-28 Aug	Eastern Ligurian Sea ; off		About	Repeated sighting of	[20]

2010	Versilia and Sestri levante, Italy		10-13 m	the same individual	
14 Sep 2010	Between Cape San Antonio and Cap San Martin, Alicante, Spain			Sighting of 2	[20]
31 Oct 2012	Targa's Beach, Ain Temouchent, Algeria	M	9.30 m	Stranded dead	Present study

#### 4. Conclusion

The aim of the present paper is to report on the stranding of a humpback whale (*Megaptera novaeangliae*) and their levels trace elements concentration in Algerian waters.

A significant point to highlight in this study is the first stranding record of this specie in this area, according to the authors' knowledge and bibliography.

There was no evidence of the humpback whale in the northwestern Mediterranean basin until recently.

The whale had a good the nutritional status, the average blubber thickness of 8 cm.

The concentrations of traces elements in the tissues of this specie were generally lower than those reported, muscle tissues of other marine mammals which is in agreement with literature in difference area. The causes of mortality for this juvenile whale were attributed to the lost of her mother.

#### Acknowledgments

We thanks the Targa's local people also to all volunteers for their helpful. Thanks to laboratory of SONATRACH (GNL1).

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