

THE OCCURRENCE OF CUVIER'S BEAKED WHALE (*Ziphius cavirostris*) IN CROATIAN ADRIATIC WATERS

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POJAVLJIVANJE CUVIEROVOG KLJUNASTOG KITA (*Ziphius cavirostris*) U VODAMA HRVATSKOG JADRANA

SAŽETAK

Većina publikacija o fauni kitova (Cetacea) u hrvatskom Jadranu ne navodi prisutnost Cuvierovog kljunastog kita (*Ziphius cavirostris*) u tim vodama; vjerojatno stoga što nisu postojali očigledni podaci kao dokaz. Pregled povijesnih podataka i prirodoslovnih zbirki u Hrvatskoj te nedavno prikupljeni i neobjavljeni vlastiti podaci otkrivaju tri zabilježena pojavljivanja *Z. cavirostris* uz hrvatsku obalu Jadrana. Prvi zabilježeni primjerak uhvaćen je 1939. u blizini Cavata. Događaj je zabilježio Miroslav Hirtz koji ga je netočno odredio kao *Hyperoodon ampullatus*. Ovim radom po prvi puta prezentiramo reviziju postojećih podataka i slika pomoću kojih možemo utvrditi da se u stvarnosti radilo o *Z. cavirostris*. Drugi primjerak prvo je opažen u blizini Cavata u ožujku 2001. gdje je boravio tijekom više od mjesec dana nakon čega je uginuo. Ostaci posljednjeg zabilježenog primjerka pronađeni su u uznapredovanom starij raspadanja u veljači 2002 u Pupnatskoj luci na Korčuli. *Z. cavirostris* je vrsta skupine kitova zubana koja pravi duboke urone te je pronalaziemo uglavnom na otvorenom moru gdje se hrani velikim vrstama glavožanoca. Ovakvo mali zabilježeni broj životinja upućuje na zaključak da Jadransko more ne predstavlja značajno stanište ove vrste, no može se očekivati da je pojavljivanje kitajučih jedinki u dubljem srednjem i južnom Jadranu učestalije nego što upućuju podaci o pronađenim uginulim primjercima.

INTRODUCTION

With about 20 species, beaked whales (*Ziphiidae*) are the second largest family of the order Cetacea. They generally inhabit open waters off the continental shelf and around oceanic islands where the seabed shelves rapidly, with depths greater than 200 m. Their behaviour and habitat preference makes them one of the least known cetacean family and most of our knowledge on the species come from either strandings or opportunistic sightings at sea.

Within the beaked whales family, the Cuvier's beaked whale (*Ziphius cavirostris* G. Cuvier, 1823), is better known than others; this may be mostly due to its wide distribution and many recovered stranded animals (Heyning, 1989). Like other Ziphiids, *Z. cavirostris* is a deep diving, pelagic Odontocete with a particular preference for waters overlaying deep canyons. It is also the only beaked whale known to regularly occur throughout the entire Mediterranean sea with no notable difference in distribution between the western and the eastern basin (Notarbartolo di Sciarra and Demma, 1997; Notarbartolo di Sciarra, 2002), but does not occur in the Black Sea (Rice, 1998). Most sightings of Cuvier's beaked whales are of single animals or pairs, although there are records of larger groups ((Marini et al. 1996), (Jefferson et al. 1993)). Similar pattern can be seen in strandings where most of the strandings refer to single animals, while cases of strandings with more than four animals are very rare (Frantzi, 1998).

Due to the known habitat preferences of Cuvier's beaked whales, and to the relative shallowness of the Adriatic sea, the species does not seem to regularly inhabit this area.

MATERIALS AND METHODS

The material presented in this research refers to the Croatian coast of Adriatic sea, the northernmost part of the Mediterranean basin. Adriatic sea is a relatively small and closed sea with the surface area of 138,600 km², connected to the Mediterranean through the narrow, 72 km wide Strait of Otranto (Cushman-Rosin et al. 2001). The bathymetry of the Adriatic Sea is characterized by strong transversal (W-E) and longitudinal (N-S) asymmetries. The wide, shallow continental shelf in the Northern and Central Adriatic sub-basins (<200 m in depth) gradually decreases towards the

south. The 170 m deep Palagruža (Pelagosa) Sill separates these two shallow sub-basins from the much deeper Southern sub-basin with depths ranging between 200 m and slightly over 1,300 m (Cushman-Rosin et al. 2001). The *Z. cavirostris* records presented in this paper are based upon inspection of (i) museum collections (Croatian Natural History Museum in Zagreb, the Natural History Museum in Rijeka, the Natural History Museum in Split, the Natural History Museum in Dubrovnik and the Natural History Department of the City Museum in Zadar), (ii) published and unpublished literature (mainly books and newspapers), and (iii) original unpublished data. Morphological and osteological identification was carried out according to Notarbartolo di Sciarra (2002) and Jefferson et al. (1993).



Map 1. Locations of strandings of *Z. cavirostris* in the Adriatic Sea with bathymetric contours.

RESULTS AND DISCUSSION

Through inspection of the natural history collections of the Croatian museums we found no records or material that would refer to occurrence of *Z. cavirostris* in the eastern Adriatic waters.



Fig. 1. *Z. cavirostris*, (identified as *H. ampullatus*) caught on October 8th 1939, in the Tiha bay (Zupski bay) in the vicinity of Cavtat (picture taken from original paper)



Fig. 2. *Z. cavirostris*, (identified as *H. ampullatus*) caught on October 8th 1939, in the Tiha bay (Zupski bay) in the vicinity of Cavtat (picture taken from original paper)

A review of the older literature describing findings and occurrence of cetacean species and specimens in the Adriatic Sea revealed that the first historic record of a Cuvier's beaked whale from this area dates from 1939 (Hirtz, 1940). That specimen, however, was erroneously identified as *H. ampullatus*. In his short report "Northern bottlenose whale (*Hyperoodon ampullatus* Forst.) in the Adriatic Waters" Hirtz reported the capture of the "rare cetacean". The animal was caught on October 8th 1939 in the Tiha bay (Zupski bay) in the vicinity of Cavtat. It was found stranded alive and was killed by a local fisherman, who injected it with formalin in order to preserve it; then mount it on a truck and went on a trip around the country, showing it to people. Hirtz saw the carcass once in Zagreb, and his tardy description, based on direct observation of the mummified carcass and on the available literature, led him to conclude that it was *H. ampullatus*. The animal was 5.35 m long and weighed about 2 tons. It was "dark coloured", very likely due to a combination of post-mortem and preservation processes, and "had a particularly shaped beak, similar to duck's beak". As it can be seen on the photographs (Fig. 1 and 2), the head of the animal and its general appearance was that of *Z. cavirostris*, and its head lacked the bulbous aspect and prominent beak as in *H. ampullatus*. Unfortunately, no osteological material was preserved from that specimen, the skull having been destroyed already during the "catch". However, pictures, description and measurements of the animal were published. Based on that material, it was possible to conclude that that specimen was, in fact, a Cuvier's beaked whale.

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The two most recent strandings of a Cuvier's beaked whale occurred along the eastern Adriatic shores. The first whale was sighted alive in the Zupski Bay near Mlini and Srebreno in the vicinity of Cavtat on March 8th 2001. According to the local people the whale was already seen in the area several days before, having first been sighted around March 3rd. Based on original extensive photographic and video coverage, also provided with field notes, and on material published by local newspapers, we easily identified that as a Cuvier's beaked whale (Fig. 3 and 4). According to its behaviour, it was obvious that the animal showed signs of distress. The Ziphius remained in the shallow waters of Zupski bay for over a month, was emaciated and in poor physical condition with wounds and ectoparasites, swam in circles and allowed to be approached by boats and people. After the animal finally died on April 12th 2001, the autopsy, performed at the Veterinary faculty of the University of Zagreb, revealed that the animal had ingested several plastic bags and other plastic debris, however the proximal cause of death and the reason why it had ingested plastic debris remains unknown.



Fig. 3. Underwater photograph of *Z. cavirostris*, female, Mlini and Srebreno (Zupski Bay) sighted in the vicinity of Cavtat, March 8th 2001.



Fig. 4. *Z. cavirostris*, female, died on April 12th, 2001 near Mlini and Srebreno (Zupski Bay) in the vicinity of Cavtat

The remains of the latest specimen found in the study area washed ashore on the beach in the Pupnatska Luka bay, on the island Korčula, on February 7th 2002. The carcass was in an advanced state of decomposition, but again, the external morphology (including the presence of only two teeth in the lower jaw, and a total length of about 5m) allowed the unambiguous determination of the species (Fig. 5 and 6). The carcass was later recovered and is currently stored at the Veterinary Faculty in Zagreb.



Fig. 5. Remains of *Z. cavirostris*, washed ashore on the beach in the Pupnatska luka bay on the island Korčula on February 7th 2002.



Fig. 6. Lower jaw of *Z. cavirostris*, washed ashore on the beach in the Pupnatska luka bay on the island Korčula on February 7th 2002.

In total our data show that only three Cuvier's beaked whales have been found stranded in Adriatic waters. As a cetacean species that mostly occur in off-shore waters and along regions characterised by high depths, it is expected that most findings of the Cuvier's beaked whale would be in the Central and Southern Adriatic sea, where the depth reaches 1300 m. This assumption is actually in accordance with the presented data (Map 1).

Furthermore, our findings show that there is not any real evidence that the Northern bottlenose whale was ever found in the Adriatic sea.

The small number of findings of Cuvier's beaked whales in the Adriatic sea indicate that these waters in general do not represent an important habitat for this species. Nevertheless, in the Central and South Adriatic vagrant individuals of *Z. cavirostris* might be more regular than expected just by judging based on the stranding data as a reference.

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