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The aim of this study was to compare the biometrical traits and describe an anatomical pattern of vertebral column in some toothed whale species. The studied material consisted of the skeletons of the vertebral columns from the following species: *Lagenorhynchus acutus*, *Globicephala melaena*, *Tursiops truncatus* (Family Delphinidae), and *Phocaena phocaena* (Family Phocaenidae). The measurements of the material resulted in 3612 values, grouped under eight variables, and processed through multivariate statistical methods. For each species, the vertebrae assembled in five groups according to the similarity among them. The variables that most differentiated among these groups were the total vertebral height and the width of the vertebral foramen. According to the discriminant analysis, this biometrical-based classification was 88.9% correct. Vertebral traits could also distinguish the studied species. In this sense, the most important variables were the vertebral thickness, disk height and width. The percent of correct classification of species was 87.1%. Biometrical-based vertebral regions did not totally coincide with the classical, topographic ones. Vertebral metric traits differentiated the studied species. This research could further extend to other marine mammals from different areas.

#### PA-08

#### STRESS AND OIL SPILLS IN *DELPHINUS DELPHIS*

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The increase of stress and mortality in cetaceans is directly related to the maritime human activities that are affecting to the mammals populations and the maritime environment in general. Oil spills caused by maritime transport of petroleum products are still an important source of ocean pollution, especially in main production areas and long major transports routes. The English Channel and waters around Galicia in Spain were the areas with most accidents in European Atlantic, maritime transport waters has been to continue increasing. Our study compares stress between *Delphinus delphis* (L.) populations from the northern coast of the United Kingdom, as well as from the English Channel and the Galician coast (NW of Spain). This is done by using fluctuate asymmetry calculated from the differences between right and left hemisphere measures of bilateral characters founded on the skull as an expression of the stress suffered during the growth. This stress can be mainly due to ecological disasters such as oil spills, acoustic pollution, etc...

#### PA-09

#### ADAPTATION TO UNDERWATER LIFE: HOW DOLPHIN DEVELOPED AUDITION

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Among the dolphin's sensory systems, audition is the most important and best adapted to marine environment. The goal of this work is to contribute to the Knowledge in odontocete auditory system, not yet completely investigated. Our attention focused on middle ear adaptation to marine environment. We worked on six striped dolphin (*Stenella coeruleoalba*) in good condition of preservation. A first anatomical observation was followed by histological analysis. Each auditory meatus and tympanic bulla was dissected and fixed. Common histological staining as Haematoxylin-eosin and Azan were adopted. The most important adaptation studied by us was the presence of a thick mesh of erectile tissue inside the middle ear cavity. This work, by comparing anatomical and histological data shows its following functions: 1) barotraumas preventing system; 2) muco-secernent erectile tissue; 3) volume and pressure regulating system. All this characterises are necessary for a correct function of dolphin auditory system in a marine environment.

#### PA-10

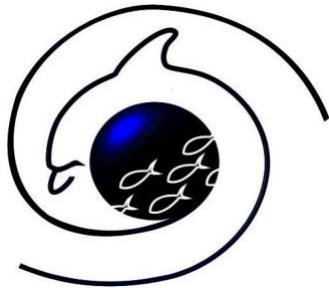
#### INTRAFIBER LIPID DROPLETS IN SWIMMING SKELETAL MUSCLE OF STRANDED CETACEANS IN CANARY ISLANDS

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The present study is focused on the analysis of swimming skeletal muscle samples (*Longissimus dorsi*) from 15 different species of 86 stranded cetaceans in Canary Islands from 1996 to April 2004. The purpose of this study was to evaluate the presence of spherical intrafiber lipid droplets to explain the aerobic capacity of skeletal muscles under the hypoxic conditions of diving. The previously fixed tissue in 10% neutral buffered formalin solution was post fixed in 1% osmium tetroxide, dehydrated in graded ethanol series and embedded in paraffin. Sections (5 mm in thickness) were cut, treated with picric acid for 24 hours and stained with hematoxylin-eosin. As result 19 of the 86 animals (22%) belonged to 7 of the 15 species of cetaceans presented different degree of intrafibrillar droplets with the osmium tetroxide method. The percentages exhibited for each specie were the following: *Globicephala macrorhynchus* (n=8) 38%; *Kogia breviceps* (n=5) 20%; *Kogia simus* (n=2) 50%; *Mesoplodon densirostris* (n=2) 100%; *Physeter macrocephalus* (n=7) 43%; *Stenella*

*frontalis* (n=12) 8% and *Ziphius cavirostris* (n=10) 70%. According to the results described above we may conclude that swimming skeletal muscle of deep, long-duration divers species showed a greater amount of lipid intrafiber droplets than swimming skeletal muscle of short-duration divers species.



## SURVEY / ABUNDANCE

### SA-01

#### ABUNDANCE ESTIMATE OF RISSO'S DOLPHINS (*GRAMPUS GRISEUS*) IN THE WESTERN LIGURIAN SEA THROUGH PHOTOGRAPHIC MARK-RECAPTURE

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Risso's dolphins are frequently found along the slope area of the western Ligurian Sea. A photo-identification study was carried out from 1990 to 2000, mostly during the summer months, in an area of about 24000 km<sup>2</sup>. Approximately 69% of the photographed individuals had long-term natural marks suitable for individual photo-identification. A total of 178 Risso's dolphins were identified: 103 from both sides, 41 from the right side and 34 from the left side. Of these 159 individuals (89%) we resighted during the study period. Within-year recaptures (59%) occurred 17 times, while resightings in different seasons (41%) ranged between 1-6 times, with a maximum interval of 7 years. For the purposes of the mark-recapture analysis, the dataset with the most homogeneous sampling effort was chosen, *i.e.* 1998-2000. Single field seasons were considered as sampling units and only recaptures in different years were taken into account. Two photographic sets, the right (R; n=120) and the left (L; n=127) collections of dorsal fins were analysed separately. The software CAPTURE was used to perform a model selection and abundance estimate. The analysis provided an estimate of 242 individuals for the R dataset (SE= 37.4; 95% CI=188-339; CV=0.15) and 267 individuals for the L dataset (SE= 42.0; 95% CI=206-376; CV=0.16). The close agreement between the two estimates supports the

reliability of these results. These are the first estimates of Risso's dolphin abundance in any Mediterranean area, and they represent an important baseline for Risso's dolphin conservation in the Cetacean Sanctuary.

### SA-02

#### BALEEN WHALES OCCURRENCE IN MADEIRA ARCHIPELAGO INCLUDING RECORDS OF TWO NEW SPECIES FOR THE AREA

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Until 1995 the information of baleen whales in Madeira Archipelago (NE Atlantic) is scarce. Only few confirmed observations were known, namely, from the whaling period (1940-1981), published data from 1990 and one stranding in 1992. In order to gather data on cetaceans' occurrence in Madeira, an opportunistic sightings and stranding data base was created in 1995 by the Madeira Whale Museum. The analysis covering the period 1995-2004 showed the presence of 5 baleen whales: fin (*Balaenoptera physalus*), minke (*B. acutorostrata*), humpback (*Megaptera novaeangliae*), sei (*B. borealis*) and Bryde's (*B. edeni*). These two last species had their first confirmed sightings for these waters in August 2002 and September 2003, respectively. Between 1995 and 2001 there were a total of 11 records of baleen whales. In the following three years the number went up to 105 records. Humpback and minke whale sightings were rare (2 for each species), while the remaining 101 were from the other 3 species. The opportunistic nature of these data does not allow us to interpret with confidence the discrepancy in the number of sightings between 1995-2001 (9.5%) and 2002-2004 (90.5%). However, the frequency of which baleen whales have been seen in the last three years lets us believe that we might be witnessing an increase in the presence of these cetaceans in Madeiran waters. Also, data from sea surveys, with controlled effort, carried out around the islands of the Archipelago in 2001 (284 hours of sea effort / 1 sighting), 2002 (222 hours / 12 sightings) 2004 (49 hours / 4 sightings) reinforces this belief. Sei and Bryde's whale were sighted only during the summer and autumn, while fin whale was seen year-round. All 3 species have been seen feeding in these waters and calves of Bryde's and fin whale were observed, indicating that they may be using Madeiran waters as breeding/birthing area.

### SA-03

#### PHOTO-IDENTIFICATION OF CUVIER'S BEAKED WHALES (*ZIPHIUS CAVIROSTRIS*) IN THE NORTHERN LIGURIAN SEA

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