

Genetic characterization of Risso's dolphin in the Mediterranean Sea and Atlantic Ocean

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INTRODUCTION

Grampus griseus (Cuvier, 1812) is an odontocete cetacean belonging to Delphinidae family and is the only species of the genus *Grampus*. In Mediterranean Sea, it has a widespread distribution even if it seems not abundant possibly due to its wide-ranging movements and because it is rarely sighted (Bearzi et al., 2010). This species is classified as "Least Concern" at the global level by the IUCN (Kiszka and Braulik, 2018). The genetic diversity of Risso's dolphin was investigated by Gaspari et al. (2007) with a small number of samples from a restricted area. Their results demonstrated that geographical areas under investigation (U.K. waters and Mediterranean Sea) are inhabited by genetically differentiated populations, while the within-region population structure for Risso's dolphin in Mediterranean Sea has not yet been investigated.

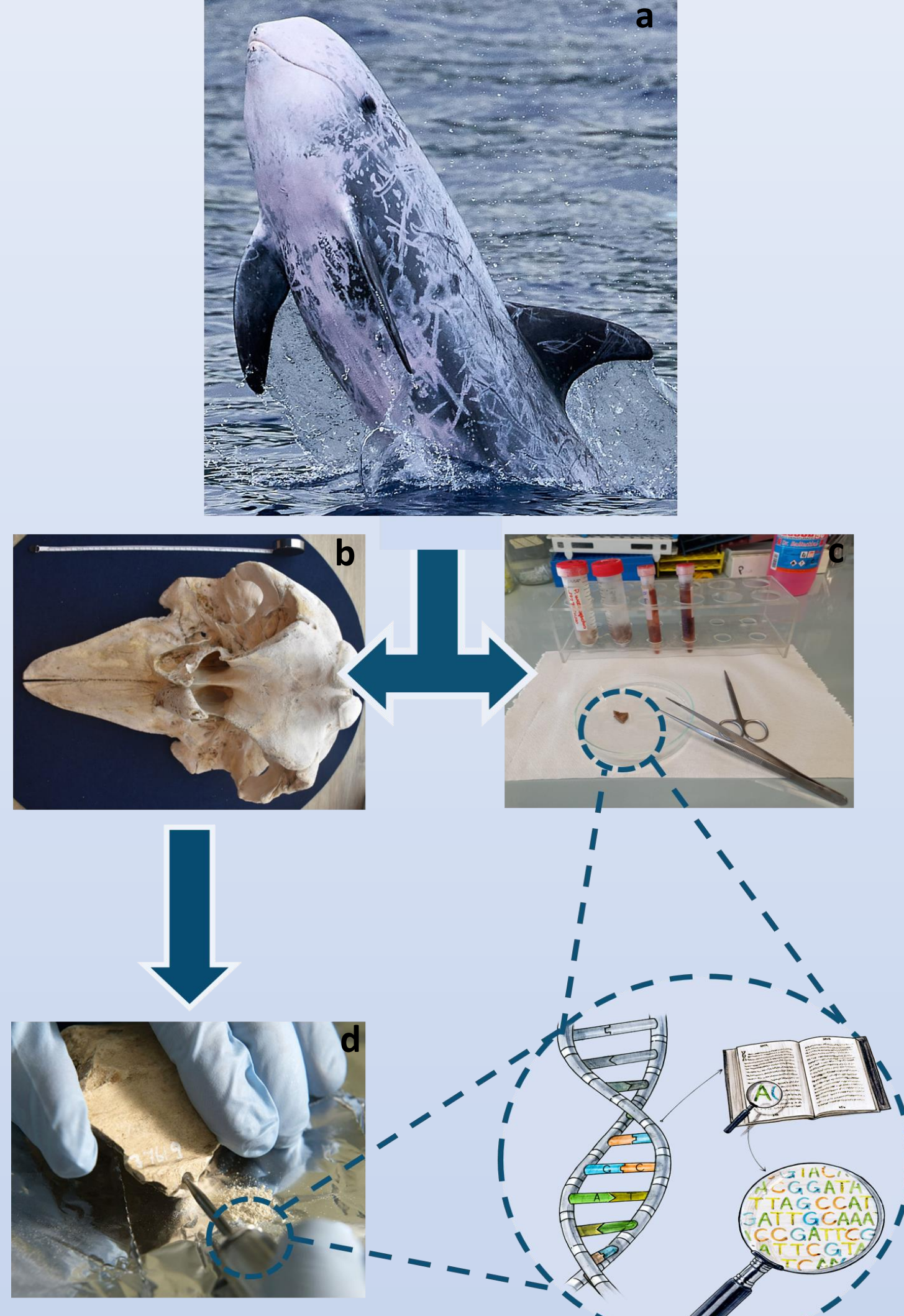


Fig. 1 a- (A Risso's dolphin (*G. griseus*); b- Skull of *G. griseus* from Museo Ittico Augusto Capriotti (S. Benedetto del Tronto); c- A piece of tissue sample; d- Sampling powder from bone with a drill

MATERIALS AND METHODS

- **Samples:** 40 samples were collected from several Italian museums, so far the DNA has been successfully extracted from 20 of them and only 11 have produced sequences long enough to be compared with those in the GenBank database.
- **The analysis:**
 - **DNA extraction** was conducted by using a specific protocol in an appropriate laboratory suitable for the handling of historical DNA;
 - **PCR** was performed amplifying a trait of the mitochondrial DNA control region (mtDNA CR) with four partially overlapping primer pairs;
 - A **Sanger sequencing** was conducted and the sequences obtained were compared with those of previous studies (Gaspari et al., 2008; Chen et al., 2018);
 - A **Media Joining Network** was created with Network 10.2 software (Fluxus Technology Ltd., Colchester, UK, www.fluxus-engineering.com).

PRELIMINARY RESULTS TO DATE

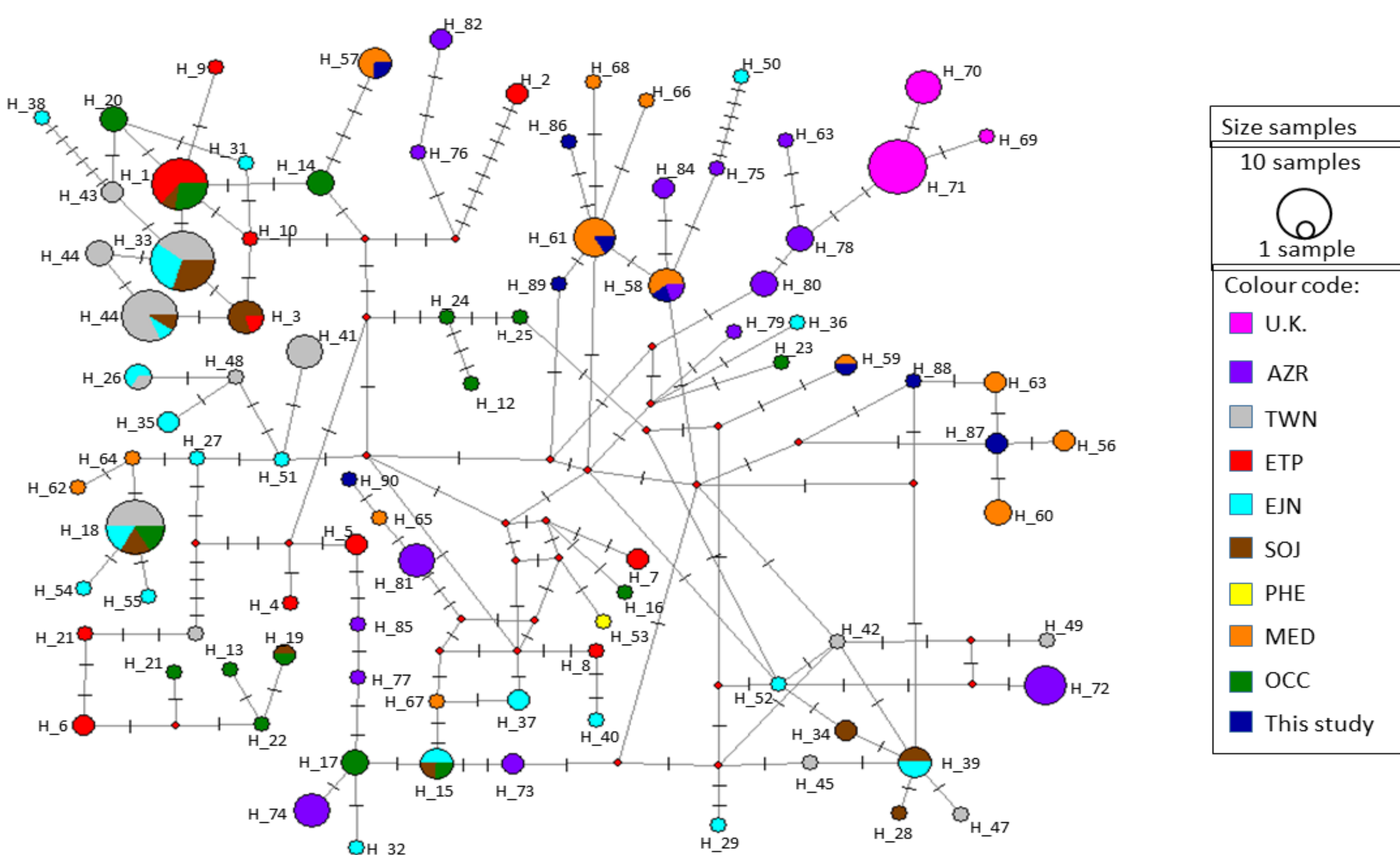


Fig. 4 Median-joining network for the 90 Risso's dolphin mtDNA control region haplotypes. Each circle represents a unique haplotype. The size of circles is directly proportional to the number of individuals and the colour shade indicates the proportion of each population within the haplotype. The transversal lines indicate mutational steps separating the haplotypes. Abbreviations: ETP, Eastern Tropical Pacific; OCC, Oregon-California Coastal; EJM, eastern Japan; SOJ, Sea of Japan; TWN, Taiwan; PHE, Philippines; MED, Mediterranean Sea; UK, United Kingdom; AZR, the Azores. In blu are the samples from this study.

The importance of having such a large collection, as shown in the graphs in figures 2 and 3, allows the best investigation of a rare specimen population structure trends over time.

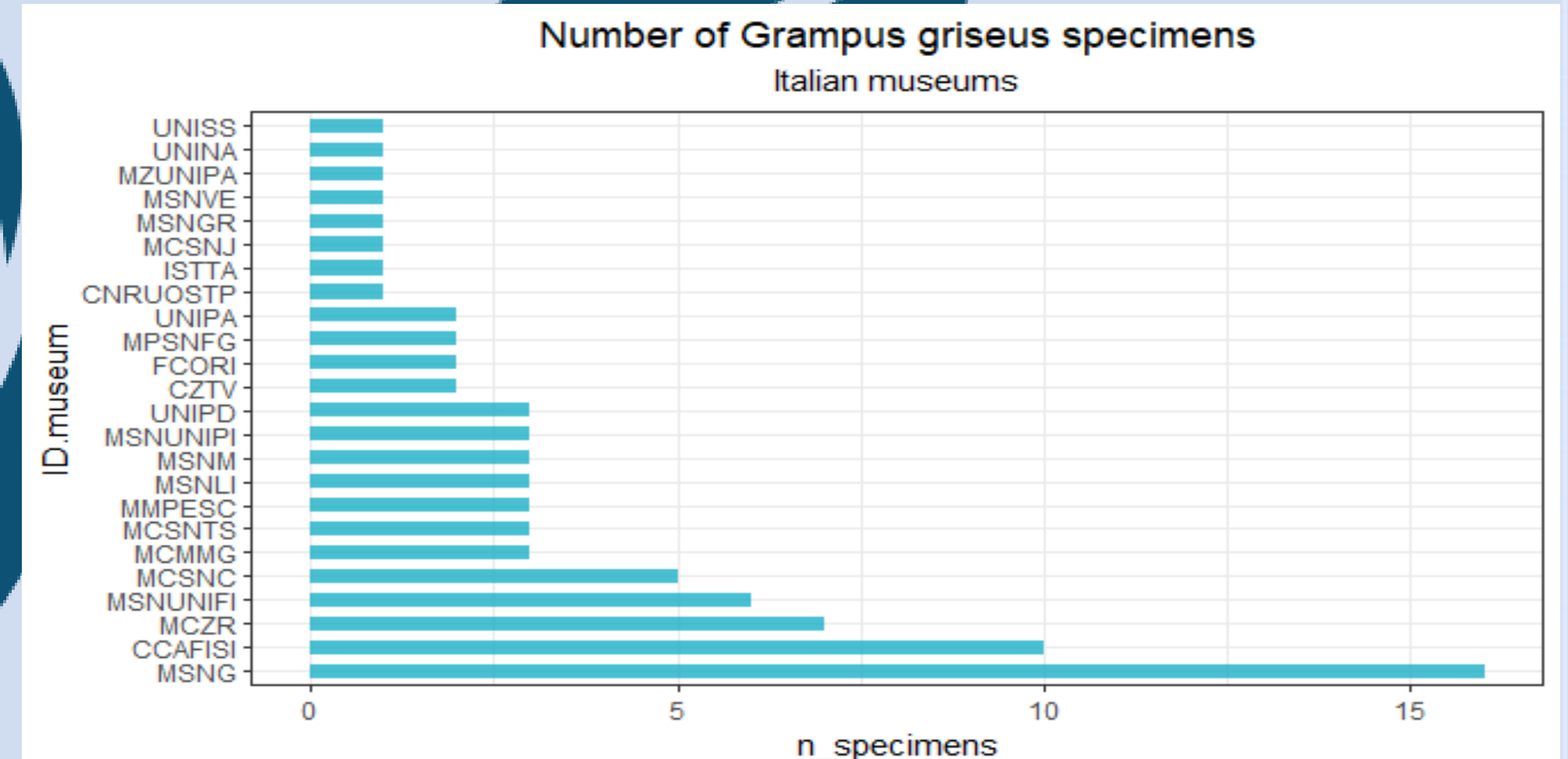


Fig. 2 Bar Plot representing the number of *Grampus griseus* specimens in different Italian museums each identified by the code on the y-axis.

Number of *G. griseus* specimens in different Italian Seas

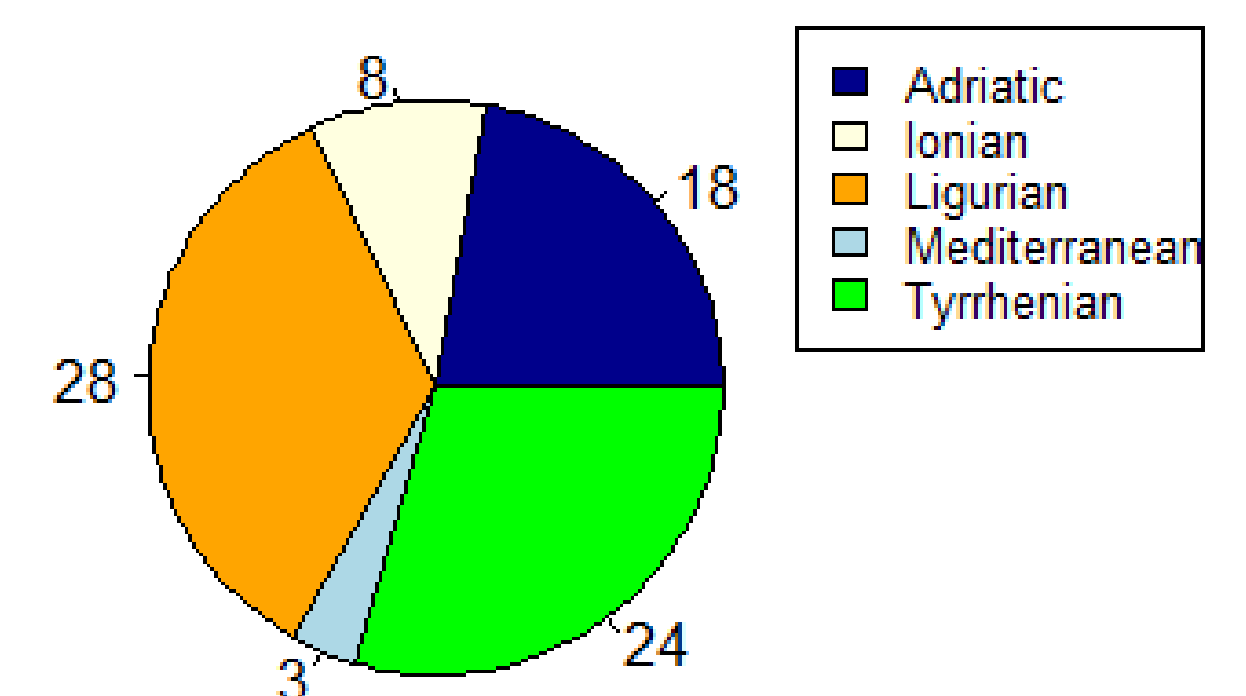


Fig. 3 Pie chart representing the number of Risso's dolphin specimens in all Italian museums organized by sea of origin within the Mediterranean basin.

WHAT I PLAN TO DO

We would like to analyse the mitochondrial (mtDNA CR) and nuclear (single nucleotide polymorphisms- SNPs) diversity of Risso's dolphin from the North Atlantic Ocean and Mediterranean Sea. The results of our genetic analysis and the comparison with those obtained from other studies could be useful to: **1)** reconstruct the phylogenetic relationships between mtDNA haplotypes from different geographical areas, **2)** estimate global levels of genetic diversity for the species, **3)** highlight a differentiation in/of genetically distinct populations. Obtained information could be very useful to improve knowledge about distribution, movement patterns and ecology of the species, update the IUCN status of the Risso's dolphin in the studied areas and to implement *G. griseus* conservation and management plans.

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