ID 189

Sealed with a Poo: Preliminary eDNA Analyses of Mediterranean Monk Seal Faeces

atonay@istanbul.edu.tr

Arda M. Tonay[1,2], H. Aygün Karaçay İlgürgen[3], Ayhan Dede[1,2], Pelin S. Çiftçi Türetken[1], Erdem Danyer[2], Işıl Aytemiz Danyer[2], Raşit Bilgin[3]

[1] Istanbul University, Faculty of Aquatic Sciences, Istanbul, Türkiye, [2] Turkish Marine Research Foundation (TUDAV) Istanbul, Türkiye
[3] Boğaziçi University, Institute of Environment Sciences, Hisar Campus, Istanbul, Türkiye

Introduction

- Environmental DNA (eDNA) sampling is a non-invasive research method that may be used to discover additional information about wild animals, such as if they are afflicted with a certain illness or dietary preferences.
- Gökçeada Island is one of the endangered Mediterranean monk seal (*Monachus monachus*) breeding habitats in northern Aegean Sea, totally five individuals were detected in 2017 (Dede et al. 2019). The number of adult animals in the eastern Mediterranean was estimated likely 187-240 (Karamanlidis et al. 2019).

© Philippe Henry -Octopus Foundation

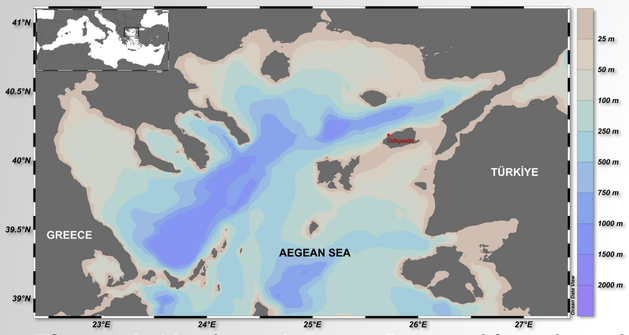

Figure 1. Northern Aegean Sea and location of the sampling cave in Gökçeada Island

Figure 2. The entrance of the cave

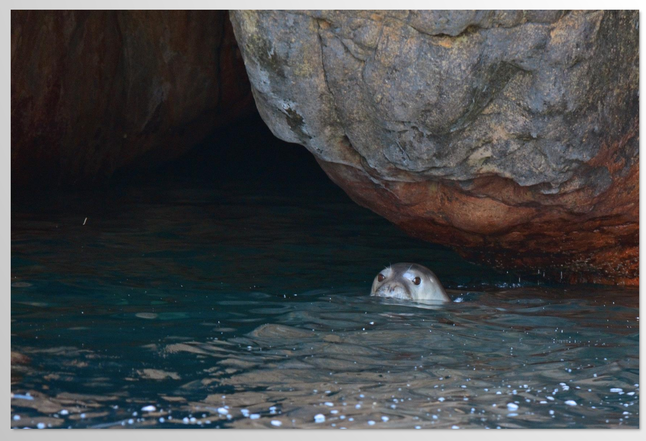

Figure 4. One of the inhabitants of the cave

Figure 3. Faeces in the cave

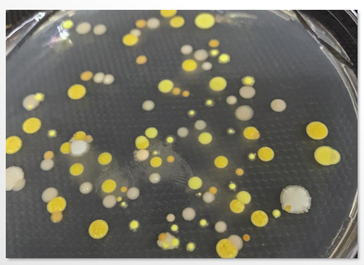

Figure 5. Isolated bacterial colonies

Materials and Methods

- A specimen of Mediterranean monk seal *Monachus monachus* faeces was collected from a cave at Gökçeada Island, Türkiye, in the Northern Aegean Sea during a camera-trap surveillance study in May 2018 (Dede et al. 2019).
- The metagenomics analyses of the *M. monachus* faeces was made by amplifying the CO1 gene using the primers mlCOIintF: 5' GGWACWGGWTGAACWGTWTAYCCYCC 3‘ and dgHCO-2198: 5' TAAACTTCAGGGTGACCAAARAAYCA 3‘ (Leray et al. 2013) for the total DNA extracted from the sample. The sequencing was made in the Illumina Miseq platform, using 300 bp pair-end reads.

Results

- The results confirmed that the faeces indeed belonged to a monk seal. In addition, the data showed the presence of tapeworm parasite ***Diphyllobothrium* sp.** and the fungus ***Geotrichum candidum***. Besides, two unidentified OTUs (Operational Taxonomic Units) of gram-negative bacteria, one OTU of a tapeworm, and one OTU of a fungus/mold were identified. No data associated with prey were found.
- Gram (-) negative species of the culturable bacterial isolates were determined as dominant in the preliminary bacteriological studies of the sample.
- *Diphyllobothrium* sp. is among the parasites previously reported in the Mediterranean monk seal in the Black Sea (Schnapp et al. 1962).

Discussion

- Due to its non-invasive nature, eDNA studies ensure the safety of both the researchers and the animals during field studies and do not cause stress for the animals. Therefore, they have a great potential to complement other monitoring efforts, for not only abundance and distribution and diet but also the health status of such endangered populations. This study is the first one using eDNA in faeces to collect information about the health status of the Mediterranean monk seal.

A short film on Mediterranean monk seals of Gökçeada Island

Acknowledgement

Authors would like to thanks to Ali Karanfil-BİGTEM, İ.Ü. Faculty of Aquatic Sciences Gökçeada Marine Research Unit staff for the help field studies, İ.Ü. University Scientific Research Projects (FBA-2017-23455) and Turkish Marine Research Foundation for financial and equipment support.

References

Dede, A., Tonay, A.M., Gönülal, O., Güreşen, O., Öztürk, B. 2019. Camera-trap surveillance of the endangered Mediterranean monk seal in the Gökçeada Island, Northern Aegean Sea, Turkey. World Marine Mammals Conference, 9-12 December 2019, Barcelona, 594. **Karamanlidis, A.A., Adamantopoulou, S., Tounta, E., Dendrinos, P. 2019**. *Monachus monachus* (Eastern Mediterranean subpopulation). The IUCN Red List of Threatened Species 2019. **Leray, M., Yang, J. Y., Meyer, C. P., Mills, S. C., Agudelo, N., Ranwez, V., ... & Machida, R. J. 2013.** A new versatile primer set targeting a short fragment of the mitochondrial COI region for metabarcoding metazoan diversity: application for characterizing coral reef fish gut contents. Frontiers in Zoology, 10(1), 1-14. **Schnapp, B., Hellwıng, S., Ghızelea, G. 1962**. Contributions to the knowledge of the Black Sea seal (*Monachus monachus*) Herm. Travaux du Museum d'Histoire Naturelle "Gr. Antipa" 3: 383–400.