

GTL Project



GreenTecLab

eDNA Analysis -
Possible Uses in the
Fields of Nature and
Species Conservation





DNA analyses are familiar from criminalistics.

The perpetrator has left DNA traces at the scene of the crime, e.g. traces of blood.

These are compared with the DNA of a suspect and if there is a match, the perpetrator has most likely been caught.



But what does DNA have to do with green economy and environmental protection?



One GTL start-up from Crete wants to implement, the monitoring of aquatic habitats with the help of environmental DNA (eDNA).



1

What is eDNA ?



DNA is a nucleic acid made up of different deoxyribonucleotides. It is the carrier of species-specific and individual hereditary information in every single cell of living organisms.

Every living being leaves traces in its environment, e.g. skin scales.

These traces are called eDNA.





How does eDNA analysis work?



"You take a small amount of water, analyse that water through molecular methods (e.g. PCR methods) and then you have all the wildlife living there in front of your inner eye."

Panagiotis Kasapidis,
Hellenic Centre for Marine Research, Crete





What are the advantages of working with eDNA?



The use of eDNA analyses is revolutionary for biologists, because DNA traces from the environment reveal what escapes the eye.



Traces of genetic material in the environment provide information about hidden organisms or the composition of entire species communities.

The analysis is simple, cost and time effective, and non-invasive.



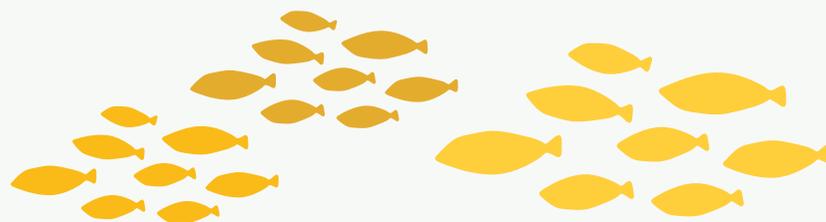
How can eDNA analysis be used in a "green context" ?



eDNA analysis offers numerous possible applications in the fields of nature conservation and species protection.

For example:

- Recording the species community, the biodiversity in an (aquatic) habitat as a snapshot
- Monitoring the development of biodiversity in (aquatic) habitats over a longer period of time
- Determination of taxonomic groups that occur in a specific habitat, e.g. fish, amphibians



4

How can eDNA analysis be used in a "green context" ?



- For **protected species**, eDNA analyses form the basis for protective measures (e.g. designation of protected areas, examination of construction projects)
- The spread of **invasive species** can be detected and, if necessary, early protective measures can be taken to prevent further threats to the ecology.



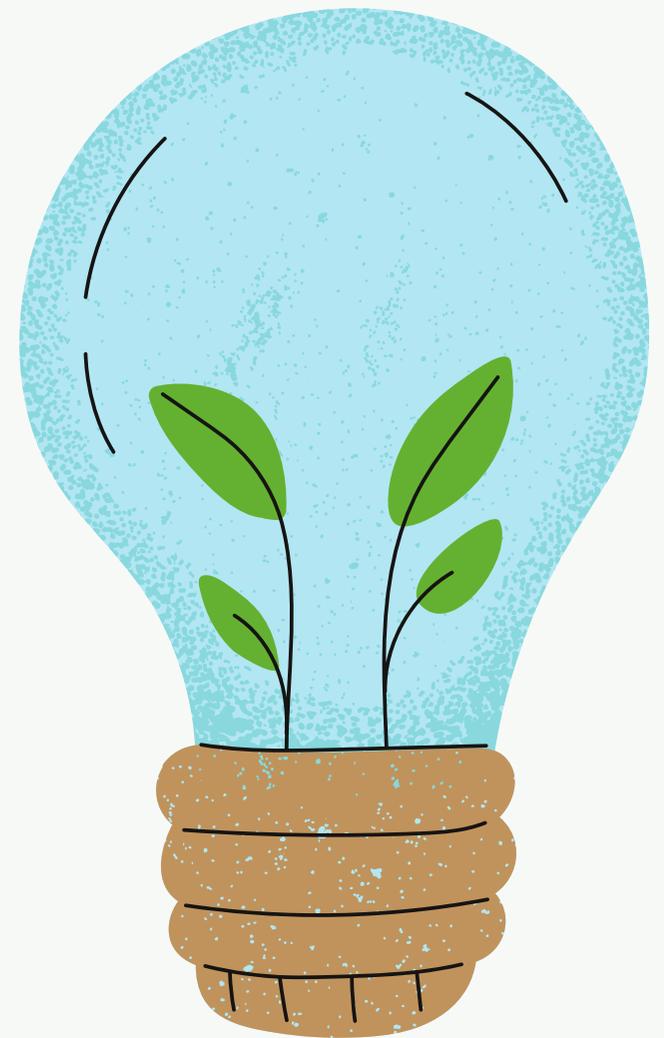


How to make eDNA analyses more efficient?



Only organisms whose DNA is recorded in the respective reference database can be identified. Therefore existing databases should be networked and an international standardised scheme is required.

Expansion to other habitats in order to gain even more experience with it.





New possibilities for the use of eDNA analyses



Low-cost rapid tests that are easy to handle, and deliver results within a short time (similar to Covid rapid tests) are developed.

This expand the range of possible applications e.g.

- people can be better involved in nature conservation
- Young people can be reached more easily through technology than traditional nature observation



Any more questions?

Visit the website and become a
future leader of the transition



-
- <https://www.nhm.ac.uk/discover/what-is-environmental-dna-edna.html>
 - <https://www.sciencedirect.com/science/article/pii/S0006320714004443>
 - <https://www.frontiersin.org/articles/10.3389/fevo.2021.785077/full>