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## Environmental DNA: a new area in marine biodiversity monitoring?

### Counting the number of fish species living on tropical coral reefs ... How scientists do it?

A recent scientific publication, published in November 2020 in the international journal *Environmental DNA*, compares two techniques used to assess marine biodiversity: the classic underwater visual census and the study of environmental DNA, an emerging technique in this field.

The study, supported by Monaco Explorations, focuses on the census of the number of fish species living on tropical coral reefs and was carried out in Colombian marine sites. The results are part of a vast international research program: the Megafauna project, initiated among others by the researchers of the MARBEC Joint Research Unit (MARine Biodiversity, Exploitation and Conservation), which aims at carrying out an exhaustive inventory of marine biodiversity on a maximum of sites around the world. Research in which the need for knowledge is still immense given the unknowns and current environmental issues in terms of sustainable development and management of seas and oceans.



*Scientific divers setting up a temporary net to take biological samples of different fish species to enrich the genetic reference base - Santa Marta, Colombia*

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The authors come from various horizons such as Andrea Polanco, a researcher from the Institute of Marine and Coastal Research, INVEMAR, from Colombia; Virginie Marques, PHD student from the University of Montpellier ; Loic Pellissier, Professor of Ecology at the ETH Zurich in Switzerland; Stéphanie Manel Professor, from the École Pratique des Hautes Études, Center for Functional and Evolutionary Ecology Department based in Montpellier in France ; Camille Albouy researcher from IFREMER Nantes; Tony Dejean director of the SPYGEN company in Le Bourget-du-Lac; and Régis Hocdé, researcher from the French National Research Institute for Sustainable Development and David Mouillot Professor at Montpellier University both based at MARBEC research unit. They demonstrate that the environmental DNA technique is a revolutionary tool for exhaustive and rapid censuses of the fish present in an ecosystem as complex as a coral reef.

Their study focused on two tropical coral reefs on the Colombian Atlantic coast: Providencia and Gayraca Bay. Visual censuses have been carried out there regularly since 1999 and environmental DNA samples were taken more recently during two missions coordinated by the Explorations de Monaco in 2018. Thanks to this technique, more than a hundred different species of fishes have been identified without any disturbance, just by filtering the water. These results are proof of a significant biodiversity that is rarely recorded by visual census or by camera. They enable the managers of these two sites to encourage the public authorities to protect these places, still full of life, which need to be monitored over time at this critical period of global change.

However, the study points out the limits of this census method and the need to continue to increment the reference genetic databases in order to be ever more precise in assigning species to all the DNA fragments collected by filtration.

#### For more information :

[www.monacoexplorations.org/actu](http://www.monacoexplorations.org/actu)

Bibliographie : Comparing environmental DNA metabarcoding and underwater visual census to monitor tropical reef fishes, Andrea Polanco Fernandez et Virginie Marques, 02 october 2020

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