# FISH PARASITES AS INDICATORS OF FISHING IMPACT

A comparative study between two submarine canyons in the NW Mediterranean Sea

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## BACKGROUND & AIMS

The Mediterranean submarine canyons represent areas of high richness and abundance of organisms. They have been highly exploited by fisheries mainly targeting the red shrimp (*Aristeus antennatus*) and the hake (*Merluccius merluccius*). Recently, due to the overexploitation of the demersal stocks this pressure has increased reaching depths of 800 m without knowing the impact it can have on deep-sea communities.

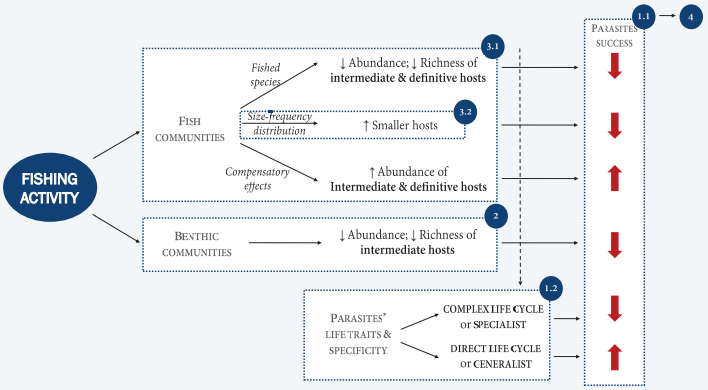


**Figure 1.** Relation of hypothesis and aims established for the project. The main aims (1 to 4) here are as follows: firstly, to assess the effects of fishing impact on parasite [1.1], benthic (epifauna and suprabenthos) [2] and fish [3.1] communities by analysing the differences in species richness and abundance between the two localities selected. Furthermore, for parasites differences will be analysed according to life cycle traits and specificity [1.2]. Size-frequency distributions will be also analysed in fishes [3.2]. Finally, the potential use of parasites as indicators of fishing impact will be discussed [4].

Parasitological data is proposed as an indicator of fishing impact as parasites integrate the community response at different levels. Because of their biological nature, parasites depend directly on their host communities (fish, invertebrates, elasmobranches, etc.) which can be directly or indirectly affected by trawl-fisheries. To prove this relationship a comparative study is proposed between two submarine canyons affected by different fishing intensities.

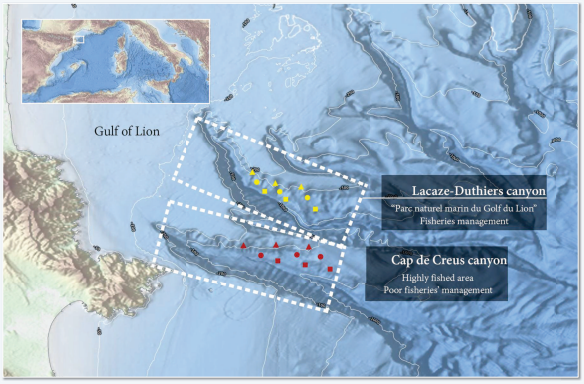


**Figure 2.** Location of the study area within the Gulf of Lion (NW Mediterranean Sea) with the two submarine canyons selected highlighted (Lacaze-Duthiers canyon, LDC; and Cap de Creus canyon, CCC). Approximate predicted distribution of the sampling points (N=18). In yellow the sampling points at LDC and in red at CCC. Depths: 400 m (Δ); 600 m (○) and 800 m (□). Original bathymetrical map obtained from EMODNET and modified.

## PROJECT SCHEDULE

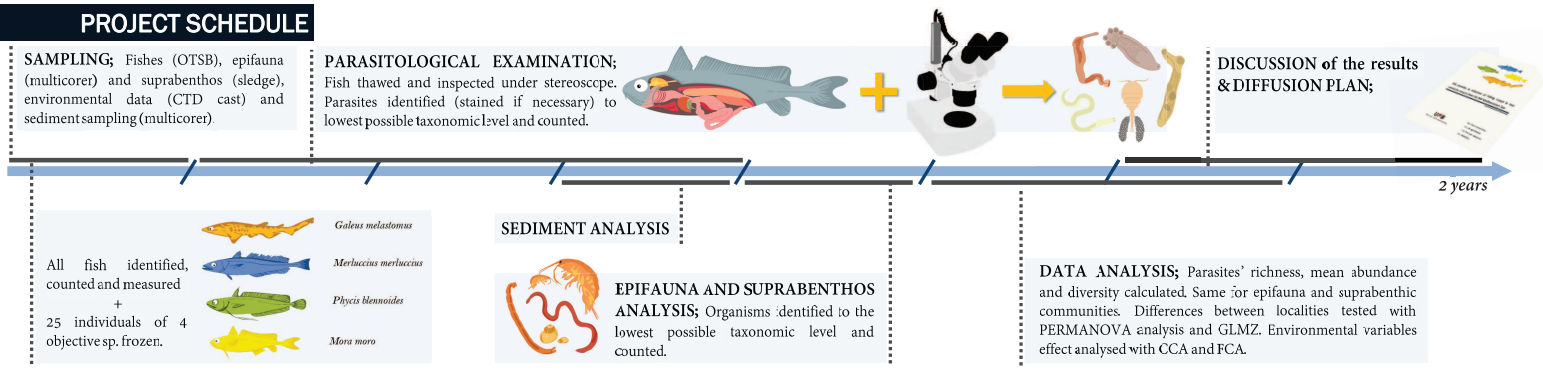


**Figure 3.** Schematic representation of the project schedule. It has an estimated duration of 2 years with tasks being distributed among 8 seasons. The length of each task is represented with dark bars.

## EXPECTED RESULTS

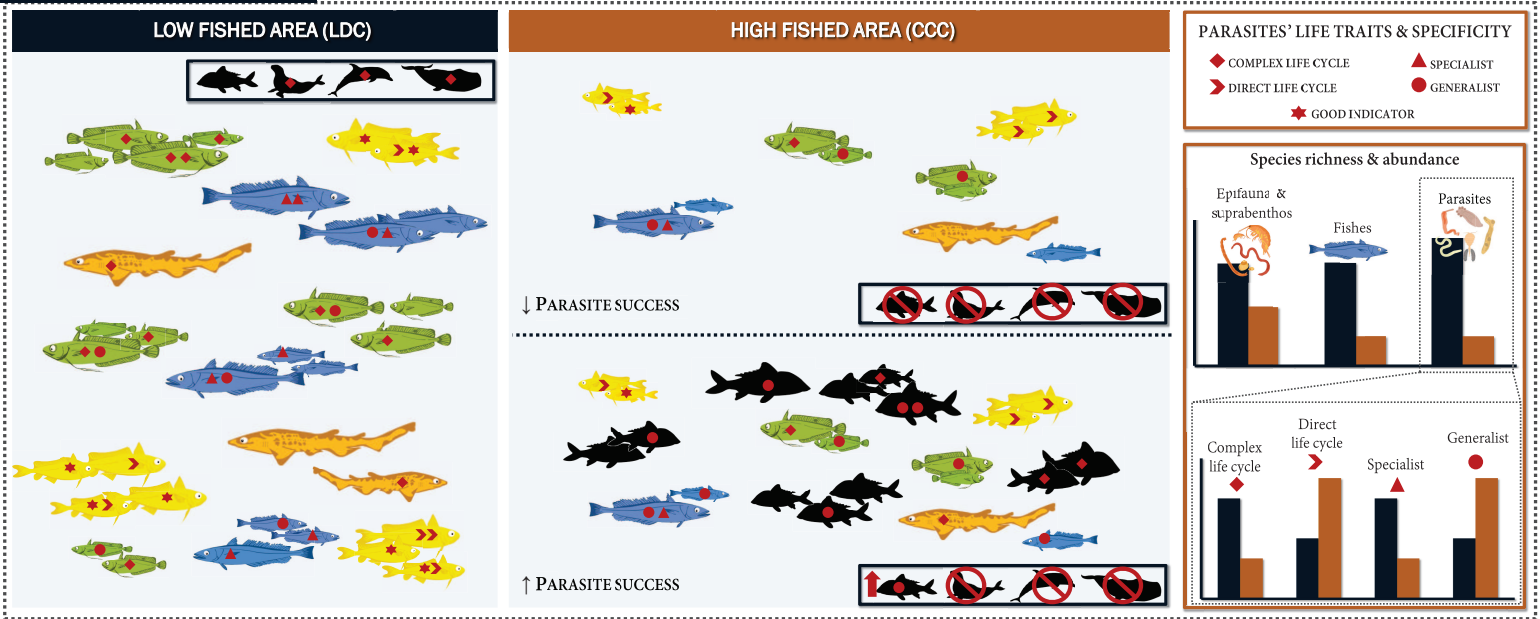


**Figure 4.** On the left: schematic representation of the differences expected in fish and parasite communities between LDC and CCC. The possible outcomes have been simplified, being represented only one parasite species for each life-cycle or specificity trait. The relation between parasites and host species has been randomly established. The objective species are represented in color (see Fig. 3). On the top right corner: list of symbols used to represent each life-cycle or specificity parasite trait. On the bottom right corner: trends expected for species richness and abundance of epifauna, suprabenthos, fish and parasite communities are represented. Blue bars correspond to LDC and brownish bars to CCC.

## DIFFUSION PLAN

*"If the appropriate fish host is selected, analysis of its parasites offers a useful, reliable, economical, telescoped indication or monitor of environmental health".*

Overstreet (1997)

- Enlarge the KNOWLEDGE about submarine canyons and the fishing impact on them.
- Determine the EFFECTS OF FISHING ACTIVITIES upon parasite communities.
- Is it necessary to PROTECT SUBMARINE CANYONS?
- The effectiveness of FISHERIES MANAGEMENT in French MPA.
- Assess the potential use of parasites as MONITORS of fish stocks.
- COMMUNICATION to fishermen, local and national governments and other proper organizations

Overstreet, R. M., 1997. Parasitological Data As Monitors of Environmental Health. Parasitologia, 39:169-175. *All figures except for the map, elaborated by Ester Carreras Colom.