

# Trophic niches within a black coral meadow (Hexacorallia: Antipatharia) near the Great Reef of Toliara, Madagascar

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Black corals are deep-sea organisms characterized by a long lifespan, a very slow growth rate and late maturity. Generally, they are difficult to study as more than 75% of species are found below 100 meters. They have very diverse morphologies, from a single stem to a bushy tree shape. These morphological differences have an impact on the polyp morphology, which is linked to the general shape and size of the colony. Mouth and tentacle sizes can be very different between species, and these features can have an effect on the capacity to capture food, either particulate organic matter or large zooplanktonic prey.

Studies about stable isotope ratios of black corals are few and mainly based on deep sea species. Here, for the first time, we study the isotopic composition of carbon, nitrogen and sulphur of a multispecific black coral meadow located in the shallow waters of the northern limit of the Great Reef of Toliara, Madagascar. The objective of this study was to compare diet and isotopic niche of different black coral species in relation to colony morphology and polyp size. Twelve species of black corals were sampled by removing tissues from the skeleton underwater to avoid killing entire colonies. Potential food sources were also collected with different trapping techniques during the day and night to determine their diet. Morphological data about the colony and the polype size were also recorded.

Using statistical comparisons, as well as SIBER and SIAR models, we found that these corals have a certain trophic diversity and gather in 3 different groups, showing a division in the assimilation of their food. Their diet is mainly based on microplankton, mesoplankton and particulate organic matter and not on zoobenthos. As hypothesized, the general morphology of the colony influences food assimilated, as branching corals with very small polyps tend to have a significantly lower value of  $\delta^{15}\text{N}$ . Moreover, these species showed different feeding strategies regarding to a diurnal or nocturnal feeding activity, as values of  $\delta^{13}\text{C}$  were significantly different for mesoplankton according to the time of their capture. These results are consistent with observations made during dives, as some species were observed with expanded tentacles during nighttime.