

Revealing the trophic ecology of black corals through stable isotope analysis

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Antipatharians, also known as black corals, are colonial organisms that show a high heterogeneity in their colony morphology and polyp sizes. This morphological diversity likely sustains varied adaptations and various trophic strategies, such as variation in feeding behavior and diet composition. In some areas, black coral colonies are so dense that they dominate the community, forming black coral beds where different species co-occur. Although studies on the trophic ecology of black corals are few, they are considered to feed on zooplankton and a research, currently in progress, demonstrates that diverse species present different trophic niches, supporting the hypothesis that black corals differ in their trophic diversity. Here we are aiming to identify their diet and thus the potential diverse feeding strategies of black corals. For this purpose, we will study the stable isotopic composition of carbon, nitrogen and sulfur of black corals living in shallow waters of the northern limit of the Great Reef of Toliara, Madagascar. Tissues of black corals and three potential food sources (*i.e.* plankton, suspended particulate organic matter and benthic particulate organic matter) were sampled. Samples were collected at two sites, within the same bed, during the dry and wet seasons, in order to assess spatio-temporal variations. Further, plankton was sampled at bottom and sea surface, at night and day and categorized according to six size classes. Data generated will be analyzed using Bayesian modeling tools in R (SIAR, Stable Isotope Mixing Model and tRophicPosition) to determine the proportional contribution of food sources in the coral's diet and their trophic position. Results will reveal a new perspective on the feeding ecology of black corals, filling the numerous gaps on their trophic ecology, a knowledge that may explain how these species coexist in the same environment and that is needed to develop future conservation policies.

Keywords: Black corals; Isotope ecology; Diet; Trophic diversity