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# Metabarcoding-like diet assessment in carnivorous sponges. The case study of *Lycopodina hypogea* and ecological implications

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## Abstract

Carnivorous sponges (Cladorhizidae) are peculiar sponges because they lack the main feature shared by all other Porifera, the aquiferous system which makes them filter-feeders. Carnivorous sponges are rather sit-and-wait predators feeding on prey passively captured by filaments or other devices harbouring special spicules. Once captured the preys are digested through an original process of rearrangement of mobile sponge cells and apoptosis in order to entirely cover the prey. This process takes place without any digestive cavity. Because of the relative difficulty to access the deep sea or the caves where this family of sponges has been found, direct observations are scarce and very little is known about the diet of carnivorous sponges. Indeed, this feeding strategy appears particularly well suited to oligotrophic ecosystems where food amount is very low and its intake opportunistic, such as in the deep sea or underwater marine caves. Consequently, the use of classic approaches of trophic ecology is limited. Therefore, instead of attempting to target hard identifiable remains of the very small preys ingested by the sponges, targeting remaining prey DNA seems promising for assessing the diet of carnivorous sponges. Here we present how a DNA-based approach can be useful and provide a qualitative leap, complementary to classic trophic ecology tools, in assessing the diet of organism such as carnivorous sponges. Finally, we will discuss the ecological implications of our findings.

**Keywords:** Metabarcoding, dna, based diet, Mediterranean Sea, Underwater marine caves, *Lycopodina hypogea* (Vacelet & Boury, Esnault, 1995)

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