

Use of stable isotopes to characterize symbiotic associations

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Organisms belonging to different species which are closely and durably associated together form a symbiotic association that involves a host and one or several symbionts. Depending on the relative duration of the interaction and the impact on host fitness, three categories of symbiotic association can be distinguished: parasitism, commensalism and mutualism (Parmentier and Michel, 2013). It is difficult to categorize a symbiotic association because the estimation of the costs and benefits for each organism depends on many different factors. One of the most important concerns the potential trophic relationship existing between both symbiotic partners. Indeed, a symbiont that eats its host in a large proportion will be qualified of parasite while a symbiont that consume its host predators usually defines a mutualistic symbiosis.

This study describes how we compared the carbon and nitrogen stable isotopes of the food contained in the digestive system of different symbionts to the isotopic signatures of their hosts and different organisms that can be found in their ecosystem. Particularly, we focus on multimodal analyses allowing the characterization of the diet of crustaceans which are obligatory symbionts of echinoderms (Caulier et al, 2014). The integration of morphologic, genetic and isotopic data provide a large overview that helps us to better understand symbiotic associations.

References

- Parmentier, E., & Michel, L. (2013). Boundary lines in symbiosis forms. *Symbiosis*, 60(1), 1-5.
- Caulier, G., Lepoint, G., Van Nederveelde, F., & Eeckhaut, I. (2014). The diet of the Harlequin crab *Lissocarcinus orbicularis*, an obligate symbiont of sea cucumbers (holothuroids) belonging to the genera *Thelenota*, *Bohadschia* and *Holothuria*. *Symbiosis*, 62(2), 91-99.