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Long distance interaction between cave-dwelling sponges and crustaceans mediated by chemical cues

Marie Le Croller¹, Mathieu Santonja¹, Olivier P. Thomas² & Thierry Pérez¹

Even if benthic sessile organisms, such as corals and anemones, are known to attract fishes and invertebrates in benthic tropical ecosystems, our knowledge of chemical mediations in benthic ecosystems is still very limited especially in temperate areas. So far, most studies have indeed been restricted to defensive strategies between benthic organisms. Sponges are sessile filter feeders dominant in several ecosystems. They are also known to produce a large chemical diversity. We therefore hypothesized that sponges release chemical cues in their surrounding seawater which might influence the behavior of various mobile organisms and would contribute to benthic ecosystems structuring and functioning. We decided to focus our attention on submarine cave ecosystems because they harbor much stable environmental conditions and sessile species assemblages that are dominated by sponges.

Using two- and four-choice tests systems, we observed the response of two cave-dwelling crustaceans (*Hemimysis margalefi* and *Palaemon serratus*) and two other species which are living in shallow water environments (*Leptomysis* sp. and *P. elegans*) to the surrounding seawater of four Mediterranean sponge representatives of marine cave entrances: *Aplysina cavernicola*, *Haliclona fulva*, *Oscarella tuberculata* and *Spongia officinalis*. Both cave-dwelling species, *H. margalefi* and *P. serratus*, were significantly attracted by sponge chemical cues, while *Leptomysis* sp. spent more time in the reference seawater and *P. elegans* had indifferent responses. Four-choice tests revealed that both cave-dwelling species responded differently to the four sponge species taken individually. To our knowledge, this is the first evidence of the attractive potential of sponge chemical cues to the mobile fauna.

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¹ Institut Méditerranéen de Biodiversité et d'Ecologie marine et continentale (IMBE), UMR CNRS 7263 / IRD 237, Aix-Marseille Université, Université Avignon, Station Marine d'Endoume, Chemin de la Batterie des Lions, 13007 Marseille, France

² National University of Ireland, School of Chemistry, Galway, Ireland