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Symbiosis, reproduction and metamorphosis: The functional uniqueness of deep-sea vent shrimps in the face of mining threat.

Pierre Methou¹, Valérie Cueff-Gauchard¹, Loïc Michel², Hiromi Watanabe³, Jon Copley⁴, Chong Chen³, Florence Pradillon¹, and Marie-Anne Cambon¹

¹IFREMER, Plouzané, France

²University of Liège, Liège, Belgium

³JAMSTEC, Yokosuka, Japan

⁴National Oceanographic Centre / University of Southampton, Southampton, United Kingdom

Within the deep ocean, hydrothermal vent ecosystems are home to unique set of species' communities, that live nowhere else, and whose food chains have the particularity to rely on microorganisms activities through a process called chemosynthesis. Many animals living there have adopted the strategy of hosting these microorganisms in symbiosis on or within their body, including many of the most emblematic groups such as tubeworms, Pompeii worm, yeti "crabs" or scaly-foot and hairy snails. Among them, shrimps of the Alvinocarididae family constitute a major component of this endemic fauna, with a global distribution across the globe, and dominating visually vent communities of the Atlantic and Indian Ridges. Work led and carried out by Ifremer have characterized the biology of the *Rimicaris* shrimps inhabiting the Mid Atlantic Ridge with an emphasis on their chemosynthetic symbiosis and their lifecycle, from the egg development to the reproduction phase. Recently, studies in collaboration with other research institutes have expanded these knowledges to other shrimps of the family inhabiting different regions. They have revealed a large variation in the set of functional traits related to their reproduction, symbiosis and feeding strategy. Hence, the evolutionary history of their chemosynthetic symbiosis contrast with most of the other emblematic species, while some shrimps present a unique and intriguing case of reproductive periodicity that had never been documented before. Overall, these observations reveal the functional uniqueness of this family, that also reflect their fragility in the face of mining threats, highlighting the need of conservation measures to protect them.