

To blend or to stand out: Pigmentation changes in coral symbionts under environmental stress

Mussoi Lisa¹, Lourtie Alexia¹, Ver Hoeye Killian¹, Maire Julie¹, Groignet Louis², Gerbaux Pascal², Caulier Guillaume¹ and Hedouin Laetitia³

¹ Biology of Marine Organisms and Biomimetics Unit, University of Mons, 6 Avenue du Champs de Mars, Mons, Belgium

E-mail: Lisa.mussoi@umons.ac.be

² Organic Synthesis and Mass Spectrometry Laboratory, University of Mons, 6 Avenue du Champs de Mars, Mons, Belgium

³ USR 3278 CRIOBE, PSL Research University, BP 1013, 98729, Papetoai, Mo'orea, French Polynesia

Color mimicry is a common phenomenon in marine species, often used for camouflage. This process may rely on pigments, such as carotenoids, contained in chromatophores in many organisms. This strategy is notably used by symbiotic decapods to camouflage themselves on their hosts in order to reduce their predation rate. In addition, it has also been described that when symbionts are separated from their hosts, the latter can suffer from 'Host separation syndrome', leading to a decline in health and sometimes discoloration of the symbiont. This study explores the effects of the 'Host separation syndrome' between ectosymbionts (*Alpheus lottini* and *Trapezia serenei*) and their host, the coral *Pocillopora acuta* in Mo'orea (French Polynesia). Two questions arise: do these ectosymbionts undergo separation-related discoloration? And what impact does this have on their carotenoid content? To answer these questions, the ectosymbionts were placed in different environmental conditions and their color evolution was monitored using standardized photography. Chemical analysis of the carotenoids was carried out by HPLC-MS to identify the nature of the pigments and to discover if the symbionts and the host share similar pigmented molecules. This analysis was also used to assess potential differences in the quantity of these pigments between control symbionts and those suffering from host separation syndrome. The results revealed significant discoloration patterns after isolation and the presence of similar pigments in both partners, such as astaxanthin. The results of the photographic analyses showed various color changes for the 2 ectosymbiont species studied under the different conditions. Discoloration and a decline in survival were observed in individuals physically isolated from their host. These phenomena could be explained by a trophic link between the symbionts and their host.

Keywords

Symbiosis; Coloration; Decapods; Coral