

How does the host separation impact the coloration and the survivability of obligate symbiont

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Symbioses are intimate and lasting associations between at least two heterospecific organisms, commonly named the host and the symbiont. Many symbionts can be highly host dependent, and will develop several adaptations to maintain their association. Recent research has highlighted a new type of dependency: the reliance on the chemical environment produced by the host. When they are isolated from their host, these symbionts show a “host separation syndrome. This syndrome was defined as an alteration of the health status of a host-specific symbiont that may rapidly induce discolouration for cryptic symbionts and, ultimately, death. We investigate this phenomenon in two other decapods-echinoderm associations: (i) between the sea star *Culcita noveaguineae* and the shrimp *Zenopontonia soror*, and (ii) the crinoid *Phanogenia distincta* and the pistol shrimp *Synalpheus stimpsonii*. Three different conditions were tested: (i) the symbionts remain on their host (control), (ii) they are isolated from their host and (iii) they are isolated in water conditioned by their host, containing their semiochemicals. Results show that both symbionts exhibited a separation syndrome, but only *S. stimpsonii* showed chemical dependency on its host. Moreover, it was observed that the phenomenon of discolouration is more complex than previously described. These findings provide further insights on host separation syndrome and highlight the importance of symbiont chemical dependency.

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